

# **Mental Math**

**Grade 10 Essential  
Mathematics**



# **Mental Math**

## **Grade 10 Essential Mathematics**

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This resource is also available on the Manitoba Education and Advanced Learning website at <[www.edu.gov.mb.ca/k12/cur/math/supports.html](http://www.edu.gov.mb.ca/k12/cur/math/supports.html)>.

*Disponible en français.*

Available in alternate formats upon request.

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# Introduction





# INTRODUCTION

This document is a complement to the Grade 10 Essential Mathematics curriculum and is intended to help students develop strategies that allow them to perform mental calculations.

## Why Mental Mathematics?

Mental mathematics and estimation is one of the seven processes of the mathematics curriculum.

“Mental mathematics is a combination of cognitive strategies that enhance flexible thinking and number sense. It involves using strategies to perform mental calculations.

Mental mathematics enables students to determine answers without paper and pencil. It improves computational fluency by developing efficiency, accuracy, and flexibility in reasoning and calculating” (Manitoba Education and Advanced Learning, p. 9).

It is used by individuals in their daily lives at home and at work. Mental calculation requires students to call on their knowledge of numbers and mathematical operations. It not only calls on memory but helps improve it as well.

Mental calculation is at the root of the estimation process. It allows us to determine whether results obtained with a calculator are reasonable.

“Estimation is used for determining approximate values or quantities, usually by referring to benchmarks or referents, or for determining the reasonableness of calculated values. Estimation is also used to make mathematical judgments and to develop useful, efficient strategies for dealing with situations in daily life” (Manitoba Education and Advanced Learning, p. 9).

Mental calculation is an important way of developing number sense and acquiring a better understanding of place value and mathematical operations. Students who have experience with mental math develop the ability to work with numbers. Mental calculation can be used to prepare for written work by providing an approximate answer to a problem. Using certain mental calculation strategies can eliminate some steps in written calculations and help simplify the process. In short, mental calculation skills are at the heart of numeracy.

Mental calculation is used almost daily in life. We often have to do quick mental calculations at times when we do not have paper, a pencil, or a calculator handy. Mental calculation is therefore a very practical skill. Teachers should provide opportunities for their students to use mental math and estimation on a daily basis. They should encourage their students to find examples of the usefulness of mental calculation in their lives, such as when shopping, doing home renovations, estimating mileage, or working at their jobs.

## Strategies

Teachers should promote a variety of mental mathematics strategies. They are encouraged to make students aware of the strategies described in the Strategies section of this document. The strategies that are most effective for mental calculation are often not the same strategies that are most effective for written calculation. Most students are able to develop strong mental calculation techniques, but often need help in doing so. Students may discover and use some mental calculation techniques by themselves but need to be taught other techniques to increase their mental calculation effectiveness. Regular mental calculation activities should be included in all mathematics curricula at all grade levels.

## Document Features

The document includes three main sections: this introduction, a section describing strategies, and a series of mental mathematics questions organized by units.

The teacher will find mental mathematics questions relating to a specific unit of Grade 10 Essential Mathematics as written in *Grades 9 to 12 Mathematics: Manitoba Curriculum Framework of Outcomes*. This document follows the order of units as given in *Grade 10 Essential Mathematics: A Course for Independent Study*. The *Mental Math: Grade 10 Essential Mathematics* document consists of eight (8) units:

Unit	Number of Pages
A: Gross Pay, Time Cards, and Percents	8
B: Net Pay	10
C: Measurement	11
D: Geometry	9
E: Angles and Parallel and Perpendicular Lines	10
F: Consumer Decisions	8
G: Trigonometry	9
H: Transformations	7

The units may be taught in a different order as determined by the teacher. Every unit consists of several pages of mental math questions. Each page has questions that correspond to the Brain Power questions found in the learning activities of the Independent Study Option (ISO) course.

The number of individual mental math pages for each unit corresponds to the number of learning activities given for the unit in the ISO course. The unit of study is identified on each page. The questions on each page are divided into three different categories: five (5) general or review questions; three (3) questions related to the unit of study; and two (2) blanks for teachers to insert their own questions.

The answers to the questions are provided in the column on the extreme right-hand side of each page. Sometimes students are asked to provide the one right answer and at other times they are to provide an estimate where a range of values would be correct.

Teachers may want to prepare additional questions to better meet the needs of their students. A section at the bottom of each page entitled Other Questions has been set aside for this purpose. A blank template is also provided in a section titled Reproducible Sheets. Teachers may use it to prepare additional question sheets.

A file in Word format is available in the Mathematics Group on the MAPLE (Manitoba Professional Learning Environment) site at <[www.maple4teachers.ca](http://www.maple4teachers.ca)>. The Word file does not contain the Strategies section of this document but it does contain the section with the Mental Math Questions by Unit. It is provided to enable teachers to add or modify questions to suit the needs of their students.

Immediately following this introduction is a section describing mental calculation strategies along with examples. Some students may already have an inventory of strategies that they can apply; others may not. Teachers can use the strategies information given in this document to help students expand their strategy knowledge.

## Methodology

Given their usefulness, mental calculation exercises should be short and done frequently.

They should be short because they require sustained concentration. For example, the first five minutes or so of math class could be devoted to mental calculation exercises. This practice would also serve as a warm-up to the day's lesson. In addition, although mental calculation should be done within a certain period of time, it is preferable not to emphasize speed. Although speed is a factor, it is not a primary goal. It is obviously important to ensure that time spent on mental mathematics activities does not infringe on the time needed for instruction and other learning activities.

Establishing routines in the classroom also encourages students to get to work quickly at the beginning of each class. Teachers could establish a process such as the following:

- As soon as students arrive at the beginning of the class, they can take out a sheet of paper and write down the numbers 1 to 10 if there are 10 questions.
- The teacher can project a mental math page, present questions orally, or distribute a page with written questions.
- The students are given time to answer the questions.
- If students are unable to find an answer to a specific question, they could leave an empty space on that question and go on to the next question. The goal is accuracy and the development of a bank of effective strategies.
- The teacher should, on occasion, spend time discussing various strategies used by the students for one or more of the questions.

To ensure students gain confidence with a new strategy, it is important that they are given adequate opportunity to practice it. It is up to the teacher to provide an adequate number of exercises or problems to ensure that students are able to use the new strategies.

## Assessment

Primarily, mental calculation exercises are used as assessment *for* learning. Mental calculation exercises should be done in a classroom environment in which students feel comfortable taking risks without being penalized when they make mistakes. However, teachers should ask students to do a self-evaluation by identifying the questions they had the most difficulty with or those they did not answer correctly. Periodically, teachers may choose to use the mental mathematics questions as assessment *of* learning by asking them to explain the strategy they used for a specific question or questions.

Mental calculation can allow students an opportunity to develop a better understanding of some mathematical concepts. Consequently, mental calculation activities should include periods for thought and discussion. During these periods, the teacher should encourage students to

- suggest a variety of possible correct solutions to the same problem
- explain the different methods used to come to the correct answer and their effectiveness
- explain the thought process that led to an incorrect answer

This type of discussion is very important in learning mental calculation strategies, because it is an effective way for students to present their thinking. Questioning, reflecting, and discussing, which are integral to the activities of mental calculation, are excellent ways of communicating mathematical ideas. This communication requires that students be clear and concise when explaining their thinking to others. It is often when students describe the strategy they used to solve questions that other students discover a new technique. These exchanges about the strategies as well as the results will allow the teacher to identify the difficulties encountered by some students. Subsequently, the teacher can help students discover new, relevant, useful, and important strategies.

Enjoy the mental mathematics experience!

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## Notes



# Reproducible Sheets





# Mental Math

## Grade 10 Essential Mathematics (20S)



Unit:

General Questions	Answers
1.	
2.	
3.	
4.	
5.	
Unit Questions	
6.	
7.	
8.	
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)



Unit:

### General or Unit Questions

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

### Other Questions

11.

12.

### Answers

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# Examples of Strategies



# Mental Math

## Grade 10 Essential Mathematics (20S)

S-1

### Sample Strategies

#### Begin adding from the left

When you do additions using paper and pencil, you usually start from the right and work toward the left.



To do additions in your head, start from the left.

**EXAMPLE 1**

$$\begin{array}{r} 46 \\ + 38 \\ \hline \end{array}$$

$$40 + 30 = 70$$

$$6 + 8 = 14$$

$$70 + 14 = 84$$

**EXAMPLE 2**

$$\begin{array}{r} 25.6 \\ + 13.7 \\ \hline \end{array}$$

$$20 + 10 = 30$$

$$5 + 3 = 8$$

$$\frac{6}{10} + \frac{7}{10} = 1 \text{ and } \frac{3}{10}$$

$$30 + 8 + 1\frac{3}{10} = 39.3$$

# Mental Math

## Grade 10 Essential Mathematics (20S)

S-2

### Sample Strategies

#### Break down numbers and add their parts

Here's another way of doing additions in your head.

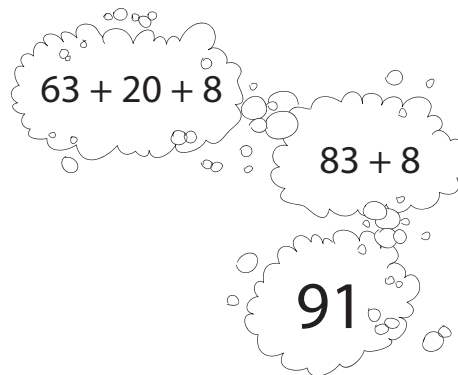
$$\begin{array}{r} 63 \\ + 28 \\ \hline \end{array}$$



Break down the numbers, then add their parts.

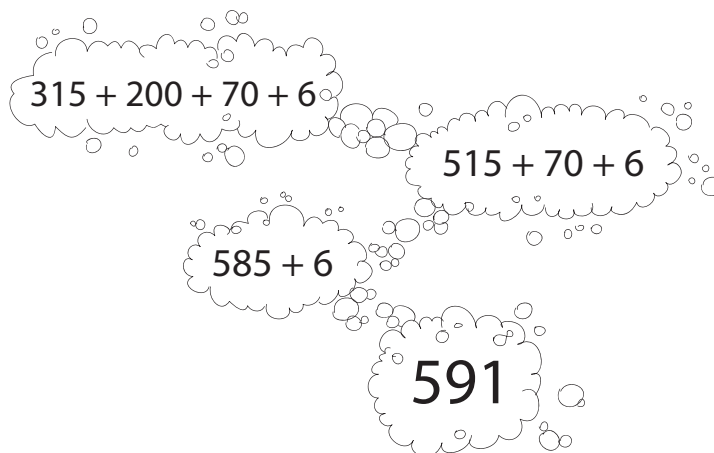
EXAMPLE  
1

$$\begin{array}{r} 63 \\ + 28 \\ \hline \end{array}$$



EXAMPLE  
2

$$\begin{array}{r} 315 \\ + 276 \\ \hline \end{array}$$



# Mental Math

## Grade 10 Essential Mathematics (20S)

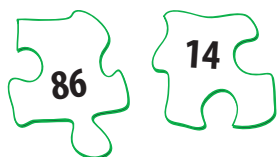
S-3

### Sample Strategies

#### Finding compatible numbers

Compatible numbers are pairs of numbers that are easy to add in your head.

The following are examples of compatible numbers:



The sum equals 100



The sum equals 600



Find the pairs of compatible numbers that add up to 300.

140

85

160

118

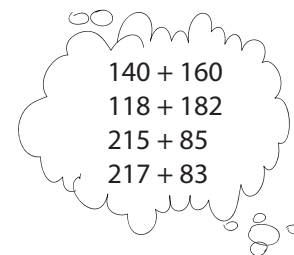
217

73

215

182

83



Find the pairs of compatible numbers that add up to 800.

250

175

567

333

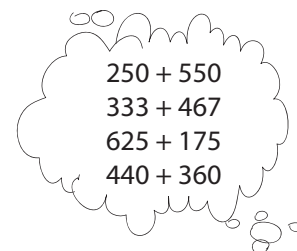
440

467

625

550

360



# Mental Math

## Grade 10 Essential Mathematics (20S)

S-4

### Sample Strategies

#### Create your own compatible numbers



Sometimes it is easier to do additions in your head by creating your own compatible numbers and adjusting the total.

EXAMPLE  
1

$$\begin{array}{r} 650 \\ + 375 \\ \hline \end{array}$$

$$650 + 350 + 25$$

$$1000 + 25$$

$$1025$$

EXAMPLE  
2

$$\begin{array}{r} 1250 \\ + 753 \\ \hline \end{array}$$

$$1250 + 750 + 3$$

$$2000 + 3$$

$$2003$$



# Mental Math

## Grade 10 Essential Mathematics (20S)

S-5

### Sample Strategies

#### Subtract starting from the left

Here's a technique that works well when doing subtractions that do not require grouping.



To do subtractions in your head, start from the left and think of your answer one part at a time.

EXAMPLE  
1

$$\begin{array}{r} 468 \\ - 323 \\ \hline \end{array}$$

$$400 - 300 = 100$$

$$60 - 20 = 40$$

$$8 - 3 = 5$$

$$100 + 40 + 5 = 145$$

EXAMPLE  
2

$$\begin{array}{r} 9514 \\ - 6203 \\ \hline \end{array}$$

$$9000 - 6000 = 3000$$

$$500 - 200 = 300$$

$$14 - 3 = 11$$

$$3000 + 300 + 11 = 3311$$

# Mental Math

## Grade 10 Essential Mathematics (20S)

S-6

### Sample Strategies

#### Subtract one part at a time



When you do a subtraction that requires a grouping, subtract one part at a time.

EXAMPLE  
1

$$\begin{array}{r} 132 \\ - 59 \\ \hline \end{array}$$

$$132 - 50 = 82$$

$$82 - 9 = 73$$

Check your answer by adding the following in your head:

$$73 + 59 = 120 + 12 = 132$$

EXAMPLE  
2

$$\begin{array}{r} 6.25 \\ - 3.15 \\ \hline \end{array}$$

$$6.25 - 3 = 3.25$$

$$3.25 - 0.15 = 3.10$$



Don't forget to check your answer doing a mental addition.

# Mental Math

## Grade 10 Essential Mathematics (20S)

S-7

### Sample Strategies

#### Balance a subtraction with whole numbers

When you add the same number to the two elements of a subtraction, the difference between the two does not change.



By adding to both elements, you balance the subtraction.

That makes it easier to find the answer in your head.

EXAMPLE  
1

$$\begin{array}{r} 76 \\ - 28 \\ \hline \end{array}$$

$$76 + 2 = 78$$

$$28 + 2 = 30$$

$$78 - 30 = 48$$

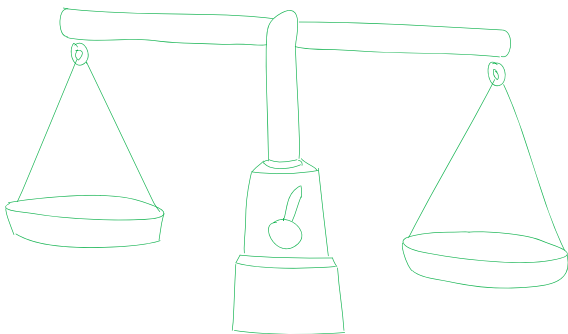
EXAMPLE  
2

$$\begin{array}{r} 660 \\ - 185 \\ \hline \end{array}$$

$$660 + 15 = 675$$

$$185 + 15 = 200$$

$$675 - 200 = 475$$



# Mental Math

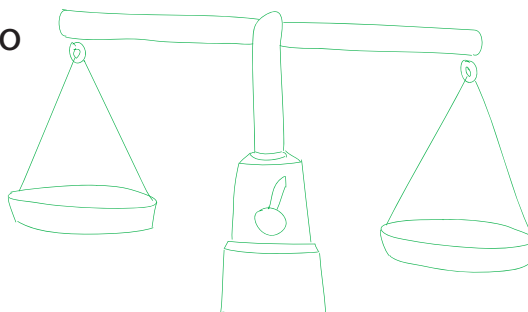
## Grade 10 Essential Mathematics (20S)

S-8

### Sample Strategies

#### Balance a subtraction with decimal numbers

When you add the same number to the two elements of a subtraction, the difference between the two does not change.



Adding to both elements balances the subtraction.

That makes it easier to find the answer in your head.

**EXAMPLE 1**

$$\begin{array}{r} 4.32 \\ - 1.95 \\ \hline \end{array}$$

$$4.32 + 0.05 = 4.37$$

$$1.95 + 0.05 = 2$$

$$4.37 - 2 = 2.37$$

**EXAMPLE 2**

$$\begin{array}{r} 23.62 \\ - 15.89 \\ \hline \end{array}$$

$$23.62 + 0.11 = 23.73$$

$$15.89 + 0.11 = 16$$

$$23.73 - 16 = 7.73$$



Remember that you have to make sure the second element (not the first) becomes a number that is easy to subtract.

# Mental Math

## Grade 10 Essential Mathematics (20S)

S-9

### Sample Strategies

#### Multiply starting from the left



It is easier to multiply in your head when you break down a number and multiply starting from the left.

Add in your head as you multiply each part.

EXAMPLE  
1

$$\begin{array}{r} 635 \\ \times 4 \\ \hline \end{array}$$

$$600 \times 4 = 2400$$

$$30 \times 4 = 120$$

$$5 \times 4 = 20$$

$$2400 + 120 + 20 =$$

$$2540$$

EXAMPLE  
2

$$\begin{array}{r} 528 \\ \times 3 \\ \hline \end{array}$$

$$500 \times 3 = 1500$$

$$20 \times 3 = 60$$

$$8 \times 3 = 24$$

$$1500 + 60 + 24 = 1584$$

# Mental Math

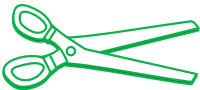

## Grade 10 Essential Mathematics (20S)

S-10

### Sample Strategies

#### Cut and paste the zeros

In multiplication, when one factor is multiplied by 10, the result is also multiplied by 10.

  
$$\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$$
  
$$\begin{array}{r} 60 \\ \times 4 \\ \hline 240 \end{array}$$

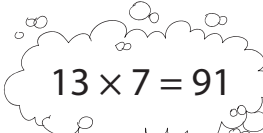

Knowing this concept, you can easily multiply by 10 in your head by following these steps:



1. Cut all the zeros at the end.
2. Multiply the remaining numbers.
3. Paste all the zeros back.

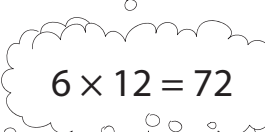

EXAMPLE  
1

$$\begin{array}{r} 13 \\ \times 70 \\ \hline \end{array}$$

  
 $13 \times 7 = 91$   
  
910

EXAMPLE  
2

$$\begin{array}{r} 6000 \\ \times 1200 \\ \hline \end{array}$$

  
 $6 \times 12 = 72$   
  
7,200,000

# Mental Math

## Grade 10 Essential Mathematics (20S)

S-11

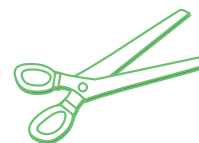
### Sample Strategies

#### Cut and paste the zeros

To mentally divide numbers that end in zero, follow these steps:



1. Cut all the zeros at the end.
2. Do the division.
3. Paste the zeros back.



**EXAMPLE**  
1

$$\begin{array}{r} 2400 \\ \div 6 \\ \hline \end{array}$$

$24 \div 6 = 4$

400

Check the answer by multiplying:  $6 \times 400 = 2400$

**EXAMPLE**  
2

$$\begin{array}{r} 45,000 \\ \div 15 \\ \hline \end{array}$$

$45 \div 15 = 3$

3000

Check:  $15 \times 3000 = 45,000$

# Mental Math

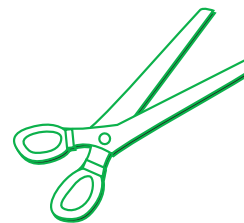
## Grade 10 Essential Mathematics (20S)

S-12

### Sample Strategies

#### Cut the zeros in dividend and divisor

When dividing the dividend and divisor in a division by the same amount, the quotient does not change.



$$\begin{array}{r} 800 \\ \div 20 \\ \hline \end{array} \quad \rightarrow \quad \begin{array}{r} 80 \\ \div 2 \\ \hline \end{array} \quad \rightarrow \quad 40$$

Knowing this concept will help you do the division in your head more easily when the dividend and the divisor both end in zero.



All you have to do is divide both the dividend and divisor by the same value, 10.

EXAMPLE  
1

$$\begin{array}{r} 6300 \\ \div 90 \\ \hline \end{array}$$

630 ÷ 9

70

EXAMPLE  
2

$$\begin{array}{r} 4,500,000 \\ \div 500 \\ \hline \end{array}$$

45,000 ÷ 5

9000



# Mental Math

## Grade 10 Essential Mathematics (20S)

S-13

### Sample Strategies

#### Work with prices

The sale price of items is often a little less than an even number of dollars.



To work with prices in your head, round off to the nearest dollar. Then, do the calculation required by the problem and adjust your answer.

EXAMPLE  
1

$$\begin{array}{r} \$16.65 \\ + \$2.99 \\ \hline \end{array}$$

$$\begin{array}{l} \$16.65 + \$3 \\ = \$19.65 \end{array}$$

$$\$19.65 - 1\text{¢} =$$

$$\$19.64$$

EXAMPLE  
2

$$\begin{array}{r} \$19.98 \\ \times \quad 6 \\ \hline \end{array}$$

$$6 \times \$20 = \$120$$

$$6 \times 2\text{¢} = 12\text{¢}$$

$$\$120 - 12\text{¢} =$$

$$\$119.88$$

# Mental Math

## Grade 10 Essential Mathematics (20S)

S-14

### Sample Strategies

#### Check your change

When you buy something, it is important to check that the amount of change returned to you is correct.

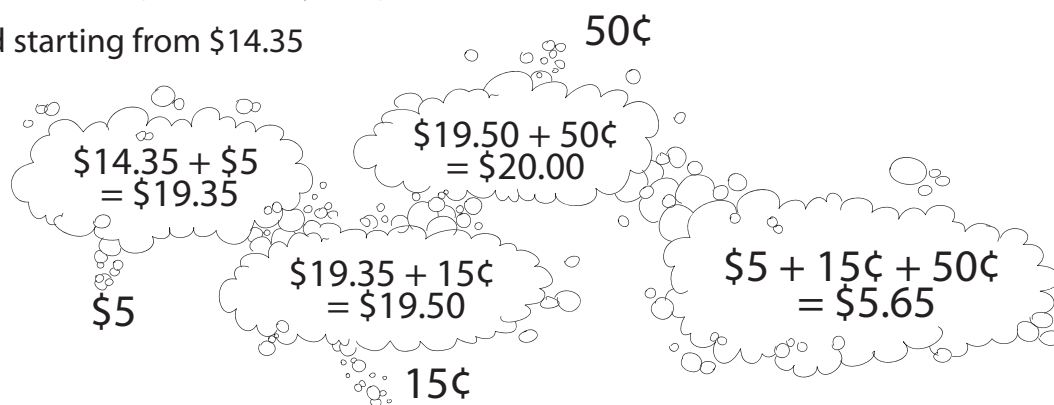


There is an easier way than subtracting in your head:  
**add to the purchase price.**

**EXAMPLE 1**

You buy a CD for \$14.35 with a \$20 bill. How much change should you get back?

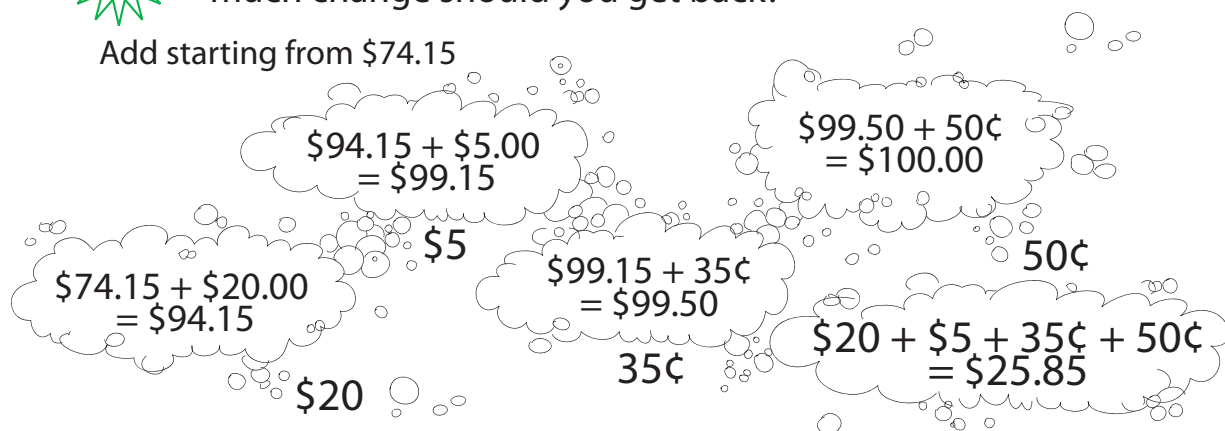
Add starting from \$14.35



**EXAMPLE 2**

You buy a watch for \$74.15 with a \$100 bill. How much change should you get back?

Add starting from \$74.15



# Mental Math

## Grade 10 Essential Mathematics (20S)

S-15

### Sample Strategies

#### Find the time difference

Mental math calculation is useful to find how much time is left before an event.



To find the difference between two given times, add by steps.

**EXAMPLE 1**

If it is 8:27 a.m., how long do you have to wait before lunch at noon?

8:27 a.m. to 8:30 a.m.  
3 MINUTES

TO 9:00 a.m.  
30 MINUTES

TO 12:00 noon  
3 HOURS

3 HOURS  
33 MINUTES

**EXAMPLE 2**

If it is 9:50 a.m., how much time is there before 8:15 p.m.?


9:50 a.m. to 10:00 a.m.  
10 MINUTES

TO 8:15 p.m.  
15 MINUTES

TO 8:00 p.m.  
10 HOURS

10 HOURS  
25 MINUTES





# **Mental Math Questions by Unit**

**Grade 10 Essential Mathematics**



# Mental Math

## Grade 10 Essential Mathematics (20S)

A-1

### Unit A: Gross Pay, Time Cards, and Percents

#### General Questions

1. You walk 2 km north, then you turn around and walk 5 km south. How many km and in what direction are you from your starting point?
2. If Evan eats  $\frac{3}{5}$  of a pizza and Nick eats  $\frac{4}{5}$  of a pizza, how many pizzas do they have to order so that both can eat as much as they like?
3. Write  $\frac{6}{2}$  in simplest terms.
4. Knowing 50% of 680 is 340, evaluate 25% of 680.
5. If you buy a shirt for \$8 and jeans for \$32, how much do you spend altogether (before taxes)?

#### Answers

3 km to the south

2

$$\frac{3}{1} = 3$$

170

\$40

#### Unit Questions

6. Convert 47.5% into a decimal number.
7. Change 17% to a decimal number.
8. Write the decimal form of 4.32%.

0.475

0.17

0.0432

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

A-2

### Unit A: Gross Pay, Time Cards, and Percents

#### General Questions

1. Rank the numbers highest to lowest: 0.5, 0.05, 0.3, 0.09, 0.25
2. Evaluate the following:  $2 - 3 + 6 \times 2 - 5 \times 4$
3. Solve for  $i$ :  $4i + 3 = 15$
4. Is an angle that measures  $140^\circ$  acute, right, obtuse, straight, or reflex?
5. Write the next two numbers in the pattern: 1, 2, 4, 8, \_\_\_\_\_, \_\_\_\_\_

#### Answers

0.50, 0.30, 0.25,  
0.09, 0.05

-9

3

obtuse

16, 32

#### Unit Questions

6. Convert 0.56 to a percent.
7. Write the percent form of the number 0.034.
8. Change 0.0025 to percent form.

56%

3.4%

0.25%

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

A-3

### Unit A: Gross Pay, Time Cards, and Percents

#### General Questions

1. A volleyball team trains for 2 hours and 30 minutes three times per week. How many minutes per week does the team train?
2. An octave of music includes 8 notes. If you were to go up half an octave, how many notes is that?
3. You walk a distance of 2 km north, 3 km east, and then 2.5 km to the northwest. What total distance did you walk?
4. Write the percent as a decimal: 62%
5. You buy some popcorn for \$3.80. You give the cashier a \$5 bill. How much change do you receive?

#### Answers

450

4

7.5 km

0.62

\$1.20

#### Unit Questions

6. Convert  $\frac{3}{4}$  to a percent.
7. Write  $\frac{1}{8}$  in percent form.
8. Your salary is 10 dollars per hour. You get a raise of 0.40 dollars per hour. What is the salary increase as a percent?

75%

12.5%

4%

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

A-4

### Unit A: Gross Pay, Time Cards, and Percents

#### General Questions

1. You are going to the store to buy a drink with \$2.05 in your pocket. If a drink costs \$1.75, will you be able to buy one?
2. Which is larger, 0.76 or 0.07?
3. Solve for  $g$ :  $3 - g = 15$
4. Is an angle with a measurement of  $86^\circ$  acute, right, obtuse, straight, or reflex?
5. Complete the pattern: 4, 1, -2, \_\_\_\_\_, \_\_\_\_\_

#### Answers

Yes

0.76

-12

acute

-5, -8

#### Unit Questions

6. Bernard works 30 hours at a rate of 25 dollars per hour. What is his gross pay?
7. Marcel's annual salary is \$72,000. What is his monthly salary?
8. Erika earns a salary of \$1500 per week. What is her annual salary?

\$750

\$6000

\$78,000

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

A-5

### Unit A: Gross Pay, Time Cards, and Percents

#### General Questions

1. You take swimming lessons 4 days out of 5. What percent does this represent?
2. A basic calculator has 6 rows and 5 columns of buttons. How many buttons does it have in total?
3. Three students receive their marks for a project. Jane found her mark as a decimal, 0.62; John calculated his mark as a percent, 73%; Jean got  $\frac{12}{16}$ . Who got the best mark?
4. What value is larger, 80% or  $\frac{15}{20}$ ?
5. If  $0.33\bar{3} = \frac{1}{3}$ , then what does  $0.66\bar{6}$  equal?

#### Answers

80%

30

Jean

80%

$\frac{2}{3}$

#### Unit Questions

6. What value represents 1% of \$400,000?
7. You receive a commission of 20% for all your sales. You sell \$15,000 of goods. What amount of commission will you receive?
8. Carole sells \$2400 worth of hats. If each hat costs \$40, how many hats did Carole sell?

\$4000

\$3000

60

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

A-6

### Unit A: Gross Pay, Time Cards, and Percents

#### General Questions

1. Candy regularly costs \$40. What is the cost after a discount of 40%?
2. Rewrite the following fraction in lowest terms:  $\frac{18}{27}$
3. There is a 50% discount on all candy at the store the day after Hallowe'en. If it cost you \$30 to buy candy before Hallowe'en, how much would you spend if you bought the same candy after Hallowe'en?
4. What is the mean of 3, 4, 6, and 7?
5. Jamie is twice as old as Dan. Dan is 3 times as old as Kim. If Kim is 4 years old, how old is Jamie?

#### Answers

\$24

$\frac{2}{3}$

\$15

5

24

#### Unit Questions

6. You worked 7 hours each day of the week except Sunday. How many hours did you work in the week?
7. A normal workweek is 40 hours. If you work 52 hours, how many hours of overtime did you work?
8. How many more hours must you add to 5.25 hours to have a total of 8 hours?

42

12

2.75

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

A-7

### Unit A: Gross Pay, Time Cards, and Percents

#### General Questions

1. There are 60 candies in a box. If you eat one candy each day, how many candies are there in the box after 8 full weeks?
2. Complete the following pattern: 60, 75, \_\_\_\_\_, 105, \_\_\_\_\_
3. Is an angle of  $235^\circ$  an acute, an obtuse, a right, a straight, or a reflex angle?
4. Evaluate:  $4 - 6 + 2 \times (3 - 8)$ .
5. There are 3 pairs of socks in a package. If the whole package costs \$6, how much does it cost per pair of socks?

#### Answers

4

90, 120

reflex

-12

\$2

#### Unit Questions

6. Evaluate:  $10.75 + 27.50$
7. How many hours are there between 9:00 a.m. and 5:00 p.m.?
8. You leave the house at 7:30 a.m. You return to the house at 3:45 p.m. How many minutes are you gone from the house?

38.25

8

495

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

A-8

### Unit A: Gross Pay, Time Cards, and Percents

#### General Questions

#### Answers

1. What is 10% of 500?

50

2. What is 5% of 500?

25

3. What is 15% of 500?

75

4. Paul lives 2 km to the south of your house. Pierre lives 4 km to the north of your house. What is the distance between the houses of Paul and Pierre?

6 km

5. You give the cashier a \$10 bill to pay for your lunch. If the total for your lunch is \$7.60, how much change will you get back?

\$2.40

#### Unit Questions

6. Jack and John are paid by commission. Jack receives 9% of \$5000 of sales. John receives 8% of \$6000 of sales. Who receives more and by how much?

John; \$30

7. Marc earns \$20; Jean earns twice as much as Marc; Lionel earns twice as much as Jean. How much do Marc, Jean, and Lionel earn in total?

\$140

8. Tom earns a weekly base salary of \$500. If Tom works 48 weeks per year, what is Tom's annual base salary?

\$24,000

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-1

### Unit B: Net Pay

General Questions	Answers
1. It costs \$4.00 for a package of 3 chocolate bars. Geri spends \$20 on chocolate bars. How many chocolate bars does she buy?	15
2. You worked 35 hours this week. Your hourly wage is \$10. How much was your gross pay?	\$350
3. You walk 8 km north, 6 km east, 3 km north, and finally 4 km west. What distance have you walked?	21 km
4. Write the percent as a decimal: 3.5%.	0.035
5. Arrange the numbers from largest to smallest: $\frac{1}{2}$ , 0.29, $\frac{3}{4}$ , 0.65, 0.34	$\frac{3}{4}$ , 0.65, $\frac{1}{2}$ , 0.34, 0.29
Unit Questions	
6. Deductions of \$16.85 for CPP and \$10.55 for EI are made to your salary. What is the total deduction?	\$27.40
7. How much income tax do you pay on each cheque if the provincial tax is \$42 and the federal tax is \$56 each time?	\$98
8. True or False? Net pay is more than gross pay.	False
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-2

### Unit B: Net Pay

#### General Questions

1. What are the factors of 8?
2. You are getting ready for a barbeque you are hosting. It costs \$1.50 for a package of 30 plastic cups. How much does each plastic cup cost?
3. You buy 2 packs of hotdogs at \$12.00 each and 3 packs of chicken burgers at \$15.00 each. How much must you pay in total?
4. Write the following decimal as a fraction: 0.058
5. Solve for  $h$ :  $h + 12 = 32$

#### Answers

1, 2, 4, 8

\$0.05

\$69.00

$\frac{58}{1000}$  or  $\frac{29}{500}$

20

#### Unit Questions

6. You pay \$33.01 for CPP for your gross salary of \$734.07. What is your salary after this deduction?
7. Marie's gross salary is \$576.49. After a deduction for CPP, her pay is \$552.49. How much is the CPP deduction?
8. After a deduction for CPP of \$26.02, Linda's net pay is \$653.46. What is Linda's gross pay?

\$701.06

\$24.00

\$679.48

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

B-3

### Unit B: Net Pay

General Questions	Answers
1. You were paid \$180 from your part-time job. Your hourly wage is \$9. How many hours did you work?	20
2. Which is smaller: $\frac{4}{5}$ or $\frac{7}{10}$ ?	$\frac{7}{10}$
3. Add: $3 + 6 + 7 + 4 + 3$	23
4. You want to save \$12,000 to buy a car 1 year from now. How much do you have to save per month to reach this goal?	\$1000
5. Rewrite the fraction in lowest terms: $\frac{33}{21}$	$\frac{11}{7}$
Unit Questions	
6. If you pay 5% to CPP and your monthly income is \$5000, how much is your CPP deduction each month?	\$250
7. Your monthly income is \$400. You owe 4.95% of your income for CPP. Do you owe more than or less than \$20 for CPP?	less
8. If you pay \$30 in CPP for a week, how much do you owe per year?	\$1560
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-4

### Unit B: Net Pay

#### General Questions

1. What is 4 times  $\frac{1}{2}$ ?
2. There are approximately 2.5 cm in 1 inch. A table measures 50 inches long. What is the approximate length of the table in centimetres?
3. You are out for dinner with your best friend for his birthday. The bill comes and you pay for everything. If the total is \$35.75 and you leave \$40 on the table (including tip), how much are you tipping the server?
4. Is an angle that measures  $35^\circ$  acute, right, obtuse, straight, or reflex?
5. Estimate the CPP (4.95%) if the gross pay is \$600.

#### Answers

2

125

\$4.25

acute

$\approx$  \$30

#### Unit Questions

6. You owe \$10.20 in EI for a gross salary of \$589.89. What is your salary after this deduction?
7. Marie's gross salary is \$636.00. Her net salary is \$625.00 after deducting EI. How much does she owe for EI?
8. After a CPP deduction of \$9.50, Linda's net salary is \$540.00. What is her gross pay?

\$579.69

\$11.00

\$549.50

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-5

### Unit B: Net Pay

General Questions	Answers
1. What is the range of the following numbers: 0.2, 0.6, 0.08, 0.5, 0.03?	0.57
2. A dozen muffins costs \$8.66. How much would you expect half a dozen muffins to cost?	\$4.33
3. Solve for $d$ : $3d = 9$	3
4. Subtract: $46 - 29$	17
5. If 2 blocks on a street have a length of 100 m, how many metres long is 5 blocks?	250
Unit Questions	
6. If you owe 1.5% for EI and your monthly income is \$1000, how much do you owe for EI?	\$15.00
7. Your monthly income is \$400. You owe 1.73% of your income for EI. Do you owe more or less than \$7 for EI?	less
8. If you owe \$11 for CPP each week, how much do you owe in one year?	\$572
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-6

### Unit B: Net Pay

#### General Questions

1. Estimate the EI (1.5%) charged if you have a gross pay of \$250.
2. List four different methods of payment for work.
3. You buy a waffle iron for your mother for her birthday. The waffle iron costs \$40 (taxes included) and its price is reduced by 20%. If you have \$30, how much more will you need?
4. I have 9 letters in my name. Is it possible that half of those letters are vowels?
5. What are the first 3 multiples of 7?

#### Answers

≈ \$4

piecework,  
commission,  
annual salary,  
hourly rate

\$2

No

7, 14, 21

#### Unit Questions

6. If you owe \$4.95% for CPP and 1.5% for EI, what percent do you owe in total for these two deductions?
7. Ava makes a weekly payment of \$9. What percent of her weekly income of \$150 is the payment?
8. In one month, you owe \$75.00 in income tax, \$11.50 for EI, and \$29.75 for CPP. What is the total amount of deductions owed for the month?

6.45%

6%

\$116.25

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-7

### Unit B: Net Pay

General Questions	Answers
1. You travel from 9:00 a.m. until 4:00 p.m. each day for 5 days. How many total hours did you travel?	35
2. You are craving 5¢ candy. You have \$1.43 in your pocket. How many candies can you afford?	28 candies
3. Evaluate: $\frac{4}{5} + \frac{2}{3}$	$\frac{22}{15}$
4. There are 34 passengers on a bus. At the next stop, 7 people leave and 5 people board the bus. How many passengers are left on the bus?	32
5. Evaluate: $\frac{6}{0}$	not possible or no such number
Unit Questions	
6. You receive a gross salary of \$283.00. What is your net income if your deductions are \$75.00?	\$208.00
7. You pay \$46.80 in federal income tax and \$32.95 in provincial income tax. What is your total income tax payment?	\$79.75
8. Your weekly gross income is \$543.60. The total deductions for the week are \$153.60. What is your net income?	\$390.00
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-8

### Unit B: Net Pay

#### General Questions

1. If 3% of 500 is 15, what is 12% of 500?
2. Write the following as an improper fraction:  $2\frac{3}{7}$
3. If you are  $\frac{3}{2}$  times taller than your brother and your brother is 4 feet tall, how tall are you?
4. Solve for  $v$ :  $9v = 63$
5. Identify the type of angle for an angle that measures  $156^\circ$ .

#### Answers

60

$\frac{17}{7}$

6 feet

7

obtuse

#### Unit Questions

6. How much income tax will you pay if your taxable income is \$30,500 and if you pay 10% of your taxable income to income tax?
7. If the income tax rate is 10.8% in Manitoba and 6.05% in Ontario, what is the percent difference in the two tax rates?
8. Julie must pay \$2600.70 and \$3700.80 for provincial and federal income tax, respectively. How much income tax must she pay in total?

\$3050

4.75%

\$6301.50

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-9

### Unit B: Net Pay

General Questions	Answers
1. Fill in the blanks for the pattern: $-43, -38, -33, \underline{\quad}, \underline{\quad}$	$-28, -23$
2. You train with your soccer team 4 evenings per week for 90 minutes each evening. How many hours do you train each week?	6
3. You have \$4.65. If you buy a package of gum for \$2.95, how much money will you have left over?	\$1.70
4. Which is larger, 0.54 or 39%?	0.54
5. You work 5 hours per day, 6 days per week. If your hourly wage is \$10, how much do you make bi-weekly (for two weeks)?	\$600
Unit Questions	
6. Your daily net pay has increased by 5%. If you originally earned \$120, what is your new net pay?	\$126.00
7. Your weekly gross pay is \$750.00. Your deductions are \$243.00. What is your net pay each week?	\$507.00
8. Your weekly gross pay is \$802.50. Your net pay is \$550.00. What is the amount of your deductions?	\$252.00
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

B-10

### Unit B: Net Pay

#### General Questions

#### Answers

1. You need to make exact change for a customer at your work. She has given you \$60 and her bill is \$42.60. How much money will you give her?
2. Write the following percent as a decimal: 46.1%
3. There are 21 people in your class. You make 2 dozen cupcakes to share with the class. Will you have enough?
4. Complete the pattern: 24, 28, 32, 36, \_\_\_\_, \_\_\_\_
5. It is 11:30 a.m. right now. You are going out for dinner at 17:00. How long is it until you go out for dinner?

\$17.40

0.461

Yes,  
3 extra

40, 44

5.5 hours

#### Unit Questions

6. You work 12 hours at a rate of \$13 per hour. How much money do you earn?
7. If you earn \$600 gross pay in 24 hours of work, what is your hourly rate of pay?
8. Your income is \$4000 and your total deductions are \$598. Estimate the percent of your income that you pay for deductions.

\$156

\$25/hour

≈ 15%

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

C-1

### Unit C: Measurement

General Questions	Answers
1. What is the total distance travelled by a car if it has followed routes with the following lengths: 300 km, 150 km, 800 km, 200 km, and 500 km?	1950 km
2. Your friends share and eat 45 candies. If 13 candies remain, what fraction of candies were eaten?	$\frac{32}{45}$
3. There is a great sale on clothes at 30% off the marked price. If you are buying a hoodie that is priced at \$40.00, how much will you save?	\$12
4. What is the range of the following numbers: 2, 6, 4, 8, 7, 13, 11?	11
5. Solve for $k$ : $\frac{k}{8} = 2$	16
Unit Questions	
6. To obtain the answer when you multiply 5.65 by 100, how many places and in what direction does the decimal point move?	2 places to the right
7. When you divide a number by 10, is the decimal point in the answer moved to the right or to the left?	1 place left
8. When dividing by 1000, how many places is the decimal point moved?	3
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-2

### Unit C: Measurement

#### General Questions

1. Fill in the missing terms in the following pattern: 0, 3, \_\_\_\_\_, 9, 12, \_\_\_\_\_
2. What is 10% of 760?
3. What is 5% of 760?
4. Your sales for the week totalled \$760. You receive a commission of 15% of your total sales. What is the amount of your commission?
5. You have 4 different pairs of pants and 6 different shirts. How many outfits can you make consisting of a pair of pants and a shirt?

#### Answers

6, 15

76

38

\$114

24

#### Unit Questions

6. Write 123.4 using scientific notation.
7. What is the value of  $7.4 \times 10^3$  using decimal notation?
8. What is the value of  $6.8 \times 10^{-2}$  using decimal notation?

$1.234 \times 10^2$

7400

0.068

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-3

### Unit C: Measurement

General Questions	Answers
1. In a bag, there are 5 yellow marbles and 3 red marbles. Write a fraction to represent the number of yellow marbles in the bag.	$\frac{5}{8}$
2. Usain Bolt can run 100 m in 10 s. What is his average speed?	10 m/s
3. List the factors of 12.	1, 2, 3, 4, 6, 12
4. The ticket price of a shirt is \$44.00. If you buy the shirt, what amount of GST (5%) do you owe?	\$2.20
5. Estimate the value of the CPP deduction if your gross salary is \$1400 and the Government of Canada deducts 4.95% of your salary for CPP.	$\approx 5\% = \$70$
Unit Questions	
6. Convert 900 millilitres (mL) to litres (L).	0.9
7. Convert 5372 m to km.	5.372
8. Convert 72.5 m to cm.	7250
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-4

### Unit C: Measurement

#### General Questions

1. If it rains 10 mm, how much rain is that in centimetres?
2. A marathon is 26.4 miles. How long is a half marathon?
3. Express the fraction as a decimal:  $4\frac{3}{5}$
4. Movies on DVD cost \$18.99 each. Do you have enough money to buy 2 movies if you have \$35.00?
5. Penelope is two times smaller than Carson. Carson is one inch shorter than Zachary. Who is the tallest?

#### Answers

1

13.2 miles

4.6

No

Zachary

#### Unit Questions

6. How many inches are equal to 3 feet?
7. How many pounds are the same as 48 ounces?
8. There are 4 quarts in a gallon, 2 pints in a quart, and 2 cups in a pint. How many cups are in a gallon?

36

3

16

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-5

### Unit C: Measurement

General Questions	Answers
1. If a desk is 90 cm high, how tall is it in metres?	0.9
2. Your neighbour just had a baby. The baby is 18" long. How long is the baby in feet?	1.5
3. The clock on the wall ticks every second. How many times does it tick in 10 minutes?	600
4. Write this number in scientific notation: 0.000 243 5.	$2.435 \times 10^{-4}$
5. You buy 6 doughnuts at \$0.60 each and pay the cashier with a \$5 bill. How much change will you receive?	\$1.40
Unit Questions	
6. Your friend tells you that an object measures $2\frac{3}{8}$ inches. How many eighths of an inch is the object?	$\frac{19}{8}$
7. The measure of an object is $\frac{53}{16}$ inches. Write this measure as a mixed fraction.	$3\frac{5}{16}$
8. Which measure is larger, $2\frac{5}{8}$ inches or $\frac{17}{8}$ inches?	$2\frac{5}{8}$
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-6

### Unit C: Measurement

#### General Questions

1. An anaconda snake can be up to 24 feet in length. How long is it in yards?
2. Solve for  $m$ :  $2 - m = 14$
3. Fill in the blanks for the following pattern: 0, 1, 4, 9, \_\_\_\_\_, 25, \_\_\_\_\_
4. Including you, there are 16 players on your team. Each player buys a "freezie" for \$2.50. How much do the "freezies" cost for the whole team?
5. Last week, Ryan worked 46 hours. If he is paid 11 dollars per hour, what was his salary last week?

#### Answers

8

-12

16, 36

\$40.00

\$506.00

#### Unit Questions

6. What measure is larger, 3 cm or 25 mm?
7. How many millimetres is equal to 5.8 cm?
8. How many centimetres is equal to 149 mm?

3 cm

58

14.9

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-7

### Unit C: Measurement

General Questions	Answers
1. Dino has three times as many sisters than he has brothers. If he has 2 brothers, how many kids are in the family?	9
2. Six boxes, each measuring 80 cm in height, are stacked one above the other. What is the total height (in metres) of all 6 boxes?	4.80
3. There are 24 people in a room. If $\frac{1}{6}$ of the people are younger than 18 years, how many people are 18 or older?	20
4. Write the following improper fraction as a mixed fraction: $\frac{29}{9}$	$3\frac{2}{9}$
5. What type of angle has a measure of $270^\circ$ ?	reflex
Unit Questions	
6. There are 2.2 pounds in one kilogram. Approximately how many kilograms is 17 pounds of meat?	$\approx 8$
7. There are approximately 4.5 litres in one Canadian gallon. How many litres are equal to 4 gallons?	18
8. If 6 miles is approximately 9.6 km, how many kilometres are equal to 12 miles?	19.2
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-8

### Unit C: Measurement

#### General Questions

1. You and 6 of your friends are at a fondue restaurant. The bill comes to \$42. If you divide the cost evenly, how much will you pay each?
2. Complete the pattern: \_\_\_\_\_, \_\_\_\_\_, 1, 0.5, 0.25
3. Solve for  $a$ :  $18 + a = 23$
4. In a test there are questions worth 3 points and 5 points when answered correctly. If Jean had 39 points, what maximum number of 5-point questions did he answer correctly?
5. You leave home at 8:30 a.m. and you return at 7:00 p.m. How many minutes were you away from home?

#### Answers

\$6

4, 2

5

6

630

#### Unit Questions

6. Add:  $2.1 \text{ cm} + 0.05 \text{ cm} + 3.9 \text{ cm}$
7. How many tenths are in 12 units?
8. Add:  $0.1 \text{ cm} + 0.2 \text{ cm} + 0.3 \text{ cm} + 0.4 \text{ cm} + 0.5 \text{ cm}$

6.05

120

1.5 cm

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

C-9

### Unit C: Measurement

General Questions	Answers
1. A bag contains 30 red beads and 27 yellow beads. If there are 80 beads in the bag, how many beads are neither red nor yellow?	23
2. Solve for $r$ : $5 + r = -4$	-9
3. Which is larger: 436% or $\frac{18}{5}$ ?	436%
4. Estimate the taxes, at 12%, of a pair of shoes that cost \$74.89.	≈ \$9
5. A loonie is approximately 2.5 cm across. Convert to inches.	about 1
Unit Questions	
6. Add: 11 mm + 0.5 mm + 0.42 mm	11.92 mm
7. A micrometer is used to measure a very small diameter. On the tool, 0.5 mm is divided into 50 smaller divisions. What is the size of each smaller division?	0.01 mm
8. How many centimetres are equivalent to 25 mm?	2.5
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-10

### Unit C: Measurement

#### General Questions

1. The body of a daddy-long-legs spider is about 0.7 cm long. How long is this in mm?
2. Team A has won 5 out of their last 9 games. Team B has won 4 out of their last 7 games. Which team has won a greater percentage of their games?
3. Write as an improper fraction:  $1\frac{3}{16}$
4. You bought a hot dog for \$3.75, some fries for \$2.00, a drink for \$2.25, and an apple for \$1.50. How much did you spend?
5. Your employer gives you \$2.50 for each shirt and \$3.00 for each pair of pants that you make. If you make 20 shirts and 13 pairs of pants, how much money will you receive?

#### Answers

7

Team B

$\frac{19}{16}$

\$9.50

\$89.00

#### Unit Questions

6. Evaluate:  $1.8C + 32$  if  $C = 5$ .
7. Evaluate:  $1.8C + 32$  if  $C = 30$ .
8. You can travel 1440 km using 120 litres of gasoline. How many kilometres can you travel on 1 litre of gasoline?

41

86

12

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

C-11

### Unit C: Measurement

General Questions	Answers
1. A waffle iron costs \$40. If a discount of 20% is offered, how much will the waffle iron cost?	\$32
2. If 5% of 260 is 13, what is 5% of 520?	26
3. Evaluate: $3 + 9 - 2 \times 12 \div 3$	4
4. Represent 75% of 2 hours, in minutes.	90
5. Convert: 300 m = _____ km	0.3
Unit Questions	
6. Your foot measures 30 cm. If you use your foot to measure an approximate distance of 120 metres, how many of your feet will you count off?	400
7. What is the value of $C$ if, $C = 2\pi d$ , $\pi = 3.14$ , and $d = 10$ .	62.8
8. Julie is 1.50 m tall. Marc estimates that the tree in front of her is 5 times taller than Julie. What is the approximate height of the tree?	7.50 m
Other Questions	
9.	
10.	



# Mental Math

## Grade 10 Essential Mathematics (20S)

D-1

### Unit D: Geometry

General Questions	Answers
1. Rewrite the following fraction in lowest terms: $\frac{24}{52}$	$\frac{6}{13}$
2. You have measured your foot to be 9.5". Is your foot a good referent to approximate a foot in length?	No
3. You are paid a salary of \$960 every two weeks. If you work a total of 96 hours in that time, what is your hourly wage?	\$10
4. Solve for $p$ : $p \div 5 = 15$	75
5. You are available to meet from 9:00 a.m. to 3:00 p.m., Antoine can meet from 12:00 noon to 2:00 p.m., and Liane is available from 10:00 a.m. to 1:00 p.m. During what time frame can you and your friends meet?	12:00 noon to 1:00 p.m.
Unit Questions	
6. The floor of a classroom measures 25 feet by 22 feet. What is the area of the floor of this classroom?	550 ft. <sup>2</sup>
7. Estimate the area of the floor of a room measuring 19.7 m by 32.3 m.	$\approx 640 \text{ m}^2$
8. Determine the area of a deck that measures 8' by $4\frac{1}{2}$ '.	36 ft. <sup>2</sup>
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

D-2

### Unit D: Geometry

#### General Questions

1. Estimate the product of 0.524 and 3.57.
2. The last time you counted, you had 54 DVDs. Your house was broken into last night and now you only have 32. How many DVDs were stolen?
3. Complete the pattern:  $-1, 2, -3, \underline{\quad}, \underline{\quad}$
4. A  $90^\circ$  angle is called a \_\_\_\_\_ angle.
5. What is a logical unit to use when measuring the dimensions of your room?

#### Answers

$\approx 1.8$

22

4, -5

right

metres or feet

#### Unit Questions

6. Multiply  $\frac{5}{2} \times \frac{4}{3}$  (simplify your answer).
7. Change the improper fraction,  $\frac{151}{12}$ , to a mixed number.
8. Estimate the product:  $4\frac{1}{2} \times 5\frac{3}{4}$

$\frac{10}{3}$

$12\frac{7}{12}$

$\approx 4\frac{1}{2} \times 6 = 27$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

D-3

### Unit D: Geometry

#### General Questions

1. In the morning, you need 30 minutes to eat, 35 minutes to get ready, and 15 minutes to travel to work. What time, at the latest, must you get up to make it to work on time at 8:00 a.m.?
2. Solve for  $b$ :  $8 + b - 4 = 16$
3. Which is larger: 0.66 or  $\frac{2}{3}$ ?
4. If you are looking for a good deal, you found it—bread is 50% off! One loaf usually costs \$2.40. How much will you pay with the discount?
5. There is half a pie on the counter. If you eat a quarter of that pie, how much will you have eaten out of the whole pie?

#### Answers

6:40 a.m.

12

$\frac{2}{3}$

\$1.20

$\frac{1}{8}$

#### Unit Questions

6. What is the area of a rectangle measuring 15 ft. by 26 ft.?
7. Find the area of a triangle with a base of 25 cm and a height of 16 cm.
8. What is the width of a rectangular carpet if its area is  $2700 \text{ cm}^2$  and its length is 90 cm?

$390 \text{ ft.}^2$

$200 \text{ cm}^2$

30 cm

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

D-4

### Unit D: Geometry

#### General Questions

1. In Home Economics, the teacher asks your group to make a double recipe of lasagna for the class, while other groups are making different parts of the meal. The recipe for lasagna calls for  $\frac{3}{4}$  cup of Parmesan cheese. How much Parmesan cheese will you need if you are making a double recipe?
2. John's office is 5 tiles long and 5 tiles wide. If each tile measures 2 feet by 2 feet, what is the area of John's office?
3. To get to Gimli it takes 1.25 hours. If you are travelling at 100 km/h the whole time, how far is Gimli?
4. At a baseball game, you bought popcorn for \$3.00 and a drink for \$2.50. If the ticket cost \$12.50, what total amount did you spend at the game?
5. Put the following numbers in order from smallest to largest: 0.53, 29%, 0.045, 0.13, 78%.

#### Answers

$1\frac{1}{2}$  cups

100 ft.<sup>2</sup>

125 km

\$18.00

0.045, 0.13,  
29%, 0.53, 78%

#### Unit Questions

6. To the nearest centimetre, what is the area of a circle with a radius of 10 cm?
7. A trapezoid has a height of 10 cm and a base of 22 cm. The side parallel to the base is 18 cm. What is the area of the trapezoid?
8. A circle has an area of 1200 m<sup>2</sup>. Approximating  $\pi$  to 3, estimate the value of the radius.

314 cm<sup>2</sup>

200 cm<sup>2</sup>

≈ 20 m

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

D-5

### Unit D: Geometry

General Questions	Answers
1. The mat used for floor gymnastics is a square. The length along one side is 40 feet. What is the total area of the mat?	1600 feet <sup>2</sup>
2. A student receives a grade of $\frac{18}{21}$ on his test. Estimate the percent value.	$\approx 90\%$
3. Rewrite the following fraction in lowest terms: $\frac{12}{20}$	$\frac{3}{5}$
4. A restaurant offers you a 10% discount on a meal regularly priced at \$16. How much money will you receive back if you pay with a \$20 bill?	\$5.60
5. Your gross pay is \$530. You receive a bonus of \$60 and your deductions of CPP and EI are \$26 and \$10, respectively. What is your net pay?	\$554.00
Unit Questions	
6. You are making a map using a scale of 1 cm : 100 km. What distance represents 550 km on your map?	5.5 cm
7. Your garden has a perimeter of 32 m. What would be the perimeter on the drawing of your garden if the scale used is 1 cm : 8 m?	4 cm
8. On a drawing, a house measures 10 cm high using a scale of 2 : 250. What is the actual height of the house (in metres)?	12.5
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

D-6

### Unit D: Geometry

#### General Questions

1. Solve for  $q$ :  $\frac{13}{q} = \frac{1}{3}$

2. Write the ratio as a fraction: 1 : 17

3. You are buying a hot chocolate. The total is \$1.78, but all you have is a \$20 bill. How much change will you get back?

4. What numbers and types of bills and coins would you expect to get back if you bought the hot chocolate in Question 3?

5. Diane works 42 hours at an hourly rate of \$11 per hour. If she gets paid at double-time after 40 hours, what is her gross salary?

#### Answers

39

$\frac{1}{17}$

\$18.22

2 pennies,  
2 dimes, a loonie,  
a toonie, a \$5 bill,  
a \$10 bill

\$484.00

#### Unit Questions

6. A diagram is drawn on a scale of 1 in. : 50 km. How long is 250 km on the drawing?

5 in.

7. A garden has a perimeter of 81 feet. What would be the perimeter of the garden on a drawing if the scale is 1 in. : 3 ft.?

27 in.

8. Using a scale of 2 in. : 50 yd. on a diagram, a path measures 20 inches long. What is the actual length of the path?

500 yd.

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

D-7

### Unit D: Geometry

General Questions	Answers
1. A 2-door sports car gets 12.2 km per L of gas. A truck gets 7100 m per L of gas. Which is more fuel efficient?	sports car
2. 35% of the trees in the forest of 400 have Dutch elm disease. How many trees have this illness?	140
3. Find the average: 2, 4, 6	4
4. A clown needs two balloons to make a flower. If he makes a bouquet of a dozen flowers, how many balloons will he need?	24
5. It is 1:35 p.m. You have been waiting for your friend for 50 minutes. What time did you expect to meet?	12:45 p.m.
Unit Questions	
6. A rug is in the shape of a rectangle measuring 2 feet by 5 feet. What is the area of the rug in square inches?	1440 in. <sup>2</sup>
7. Marie's bedroom measures 8 m by 12 m. What is the area of her room in cm <sup>2</sup> ?	9600 cm <sup>2</sup>
8. There are 3 feet in 1 yard. How many square yards are equal to 1800 ft. <sup>2</sup> ?	200 yd. <sup>2</sup>
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

D-8

### Unit D: Geometry

#### General Questions

1. Jared lost 55% of his weight when he went on his submarine sandwich diet. He originally weighed 420 pounds. How much does he weigh now?
2. Your suitcase cannot exceed 26 kg when you are going on an international flight. Your cousin weighs around 25 kg. Would he be a good referent?
3. At the gas station, the price posted is \$1.20 per L. Your fuel tank holds 40 L. How much is it going to cost to fill up your car?
4. In a restaurant, typically there is half the number of clients on Monday than there was on Saturday. If there are 590 clients on Monday, how many clients were there on Saturday?
5. Evaluate:  $\frac{2}{7} + \frac{6}{14}$

#### Answers

189 lbs.

Yes

\$48.00

1180

$\frac{5}{7}$

#### Unit Questions

6. One hectare is equal to about 2.5 acres. How many hectares are equal to 12.5 acres?
7. There are about 4000 m<sup>2</sup> in one acre. How many square metres are there in 3.5 acres?
8. There are about 2.5 km<sup>2</sup> in one square mile and one square mile is equivalent to 640 acres. Estimate the number of acres in 10 km<sup>2</sup>.

5

14 000

2560

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

D-9

### Unit D: Geometry

General Questions	Answers
1. Solve for $z$ : $3 \times 7 = z - 4$	25
2. Complete the pattern: $-1, 0, 1, 0, \underline{\quad}, \underline{\quad}, 1$	$-1, 0$
3. Amy has twice as many shirts as dresses and 3 times as many dresses as pants. If she has 24 shirts, how many pants does she have?	4
4. The radius of a globe is 5 cm. The ratio comparing the size of the globe to the earth is 1 cm : 800 miles. What is the approximate radius of the earth?	4000 miles
5. What is your gross pay if you work for 28 hours at \$15 per hour?	\$420
Unit Questions	
6. You need 1 cubic yard of concrete to cover an area of 32 square feet with a uniform depth. How many cubic yards does it take to cover an area of 160 square feet with the same uniform depth?	$5 \text{ yd.}^3$
7. If there is about 3 feet for each of your steps and your rectangular garden measures 15 steps by 20 steps, what is the area of your garden in square feet?	$2700 \text{ ft.}^2$
8. A piece of carpet costing \$2.50 per square foot measures 12 feet by 25 feet. What is the cost of this piece of carpet?	\$750
Other Questions	
9.	
10.	



# Mental Math

## Grade 10 Essential Mathematics (20S)

E-1

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. How tall is a door in centimetres if it is 2.2 m tall?
2. The ratio comparing the distance on a map to the distance in real life is 1 cm:1000 m. If the distance from your house to your school on the map is 4 mm, how far do you live from school?
3. If 36% of 500 is 180, what is 18% of 500?
4. Solve for  $w$ :  $w \div 6 = 2$
5. The Pythagorean theorem is  $a^2 + b^2 = \underline{\hspace{2cm}}$ .

#### Answers

220

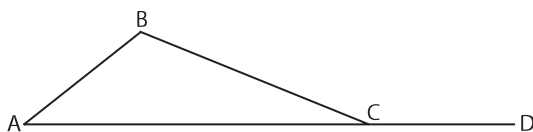
400 m

90

12

$c^2$

#### Unit Questions



6. Name two acute angles in the diagram above.
7. Name two obtuse angles in the diagram above.
8. Name one straight angle in the diagram above.

$\angle BAC$  (or  $\angle A$ )  
and  $\angle BCA$

$\angle ABC$  (or  $\angle B$ )  
and  $\angle BCD$

$\angle ACD$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

E-2

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. Identify the type of angle that has a measure of  $315^\circ$ .
2. Convert 24 inches into feet.
3. You are supposed to be at work for 8:00 every morning. You arrive at work at 8:17 because a train delayed you. If the hour is divided into quarters when determining late penalties, how much time are you penalized?
4. You have received a \$50 bill for your birthday. At the music store, your total cost is \$30.75. How much change will you get back?
5. What time do you arrive at home if you leave for a movie at 8:30 p.m., drive for 20 minutes, wait for 25 minutes, watch a movie for 1 hour and 45 minutes, and drive home for 20 minutes?

#### Answers

reflex

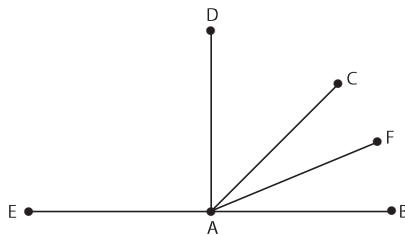
2'

30 minutes

\$19.25

11:20 p.m.

#### Unit Questions



6. Name an angle that is approximately half the measure of  $\angle EAD$ .
7. Estimate the measure of  $\angle CAB$ ?
8. Name an angle with a measure of approximately  $22.5^\circ$ .

$\angle DAC$  or  $\angle CAB$

$\approx 45^\circ$

$\angle CAF$  or  $\angle FAB$

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

E-3

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. You know that your glass holds 1 cup of milk. Would this be a good referent to use to find out how much water your water bottle can hold?
2. The distance from the MTS Centre to Polo Park is 5.1 km. How far is it to a doughnut shop that is halfway between the two?
3. Your gross income is \$980. Estimate your CPP (4.95%).
4. Travelling to Calgary, you notice that after 5 hours of driving you have travelled 515 km. What is your average speed during that time?
5. Solve for  $r$ :  $\frac{r}{5} = \frac{10}{25}$

#### Answers

Yes, but not very accurate.

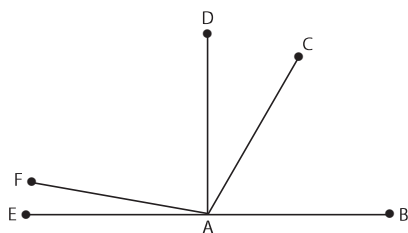
2.55 km

$\approx \$49$

103 km/h

2

#### Unit Questions



6. Estimate the measure of  $\angle BAC$  to the nearest  $10^\circ$ .
7. Estimate the measure of  $\angle EAC$  to the nearest  $10^\circ$ .
8. Estimate the measure of  $\angle EAF$ .

$\approx 60^\circ$

$\approx 120^\circ$

$\approx 10^\circ$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

E-4

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. An angle that has a measure of  $110^\circ$  is called a(n) \_\_\_\_\_ angle.
2. The scale of a miniature pyramid model is 1 cm: 70 cubits. The miniature's height is 4 cm. How tall is the real pyramid?
3. For breakfast you order coffee for \$2.50, orange juice for \$3.75, pancakes for \$8.50, and fruit salad for \$3.25. What is the total?
4. Approximate the tip on an \$18 bill if you want it to be about 15% of your bill.
5. For every 8 hours he works, Brian is paid a flat rate of \$50 plus 10% of his sales. If, in 8 hours, Brian sells \$740 in merchandise, how much money will he make in total?

#### Answers

obtuse

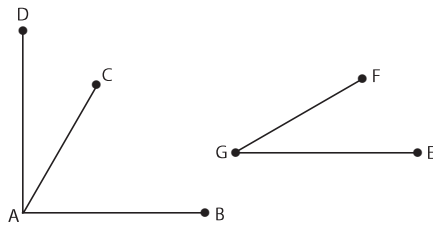
280 cubits

\$18.00  
(before taxes)

\$2.70

\$124

#### Unit Questions



6. Name an angle that was copied to create  $\angle EGF$ .
7. Name an angle that is closest to a right angle in the diagram above.
8. If  $\angle EGF$  is  $28^\circ$ , estimate the measure of  $\angle BAC$ .

$\angle DAC$  or  $\angle CAD$

$\angle DAB$  or  $\angle BAD$

$\approx 62^\circ$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

E-5

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. Rewrite the fraction in lowest terms:  $\frac{24}{28}$
2. Solve for  $t$ :  $15t - 5 = 40$
3. You are on your way to Calgary, driving on the Trans-Canada Highway. Your speed is constant at 100 km/h. If you have been driving for 3.3 hours at this speed, how far have you driven?
4. Adrian's time card for this week looks like this: Monday to Friday, 7 a.m. to 1 p.m.; Saturday and Sunday, 6 a.m. to 10 a.m. How many hours did he work this week?
5. A garden in your backyard is 2 m long and 1 m deep. What is the area of the garden?

#### Answers

$\frac{6}{7}$

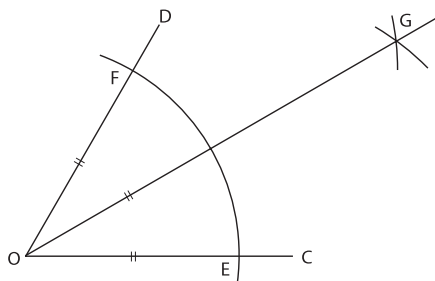
3

330 km

38

2 m<sup>2</sup>

#### Unit Questions



6. Where must the point of the compass be placed to draw the arcs to create the "X" at point G?
7. If the measure of  $\angle FOE$  is  $36^\circ$ , what is the measure of  $\angle FOG$ ?
8. If the measure of  $\angle EOG$  is  $28^\circ$ , what is the measure of  $\angle FOG$ ?

at F and E

$18^\circ$

$28^\circ$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

E-6

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. Write the following number in scientific notation: 356 300 000 000.
2. Write the following number as a decimal number:  $45.87 \times 10^{-4}$ .
3. When you were 3, your brother's age was double yours. How much older is he?
4. Put the following numbers in order from smallest to largest: 43, 12,  $3.5 \times 10^1$ , 760%, 21.
5. Your brother asks you to trade him coins for a \$5 bill. He gives you 4 nickels, 3 dimes, 5 quarters, and 3 loonies. Is this a fair trade?

#### Answers

$3.563 \times 10^{11}$

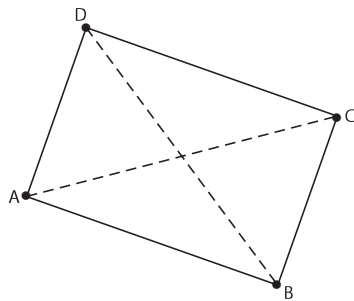
0.004 587

3 years

760%, 12, 21,  
 $3.5 \times 10^1$ , 43

No

#### Unit Questions



6. In rectangle ABCD as shown, name one pair of parallel lines.
7. In rectangle ABCD as shown, name one pair of perpendicular lines.
8. Classify the diagonals of ABCD as parallel, perpendicular, or neither.

AD // BC or  
AB // CD

AD  $\perp$  DC or DC  
 $\perp$  BC or BC  $\perp$   
AB or AB  $\perp$  AD

neither

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

E-7

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. Isabella gets paid double-time on statutory holidays. This past week was Labour Day. If she works 8 hours that day at \$9/hour, how much will she be paid.
2. Courtney is drawing out her name in art class. She changes the colour of each letter so that the colours go from red to blue to green before starting over again. What colour will the 'y' in her name be?
3. Subtract:  $\frac{9}{2} - \frac{5}{2}$
4. You have 6 blueberries, 4 raspberries, and 8 slices of strawberry in your bowl of cereal. If you get at least one piece of fruit with every mouthful, what is the maximum number of bites it takes to finish your breakfast?
5. The angle at the corner of a picture frame is  $90^\circ$ . It is bisected by a cut, where the two sides have been attached together. What is the measure of the bisected angle?

#### Answers

\$144

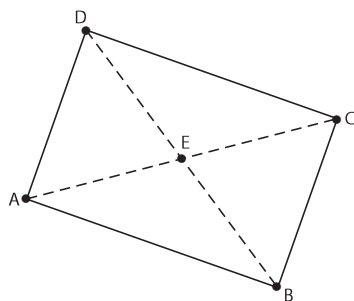
blue

$$\frac{4}{2} = 2$$

18

$45^\circ$

#### Unit Questions



6. Given rectangle ABCD, name an angle that is the complement of  $\angle CDE$ .
7. Name an angle that is the supplement of  $\angle CEB$ .
8. If  $\angle CAD$  is  $28^\circ$ , what is the measure of its complement?

$\angle ADE$  or  $\angle CBE$

$\angle BEA$  or  $\angle DEC$

$62^\circ$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

E-8

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. You are facing north. If you turn  $360^\circ$  to your right, which direction are you facing?
2. Because you have a doctor's appointment, you have to leave work at 3:45 instead of 4:30 p.m. How much time are you penalized?
3. The size of the park across from your house is about 23 yards across. What is this distance in feet?
4. There are 3 boys and 2 girls invited to your birthday party. If each boy eats 2 pieces of cake and each girl eats 1 piece, how many pieces of cake will be eaten (not including what you eat)?
5. If each piece of the cake (from the question above) is  $\frac{1}{10}$  th of the cake, will there be enough cake for you to have a piece?

#### Answers

North

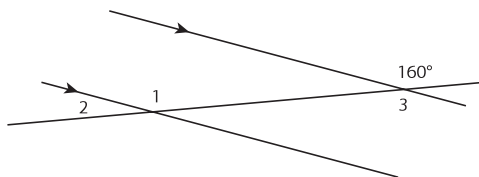
45 minutes

69

8

Yes

#### Unit Questions



6. Name the relationship between  $\angle 1$  and  $\angle 3$ .
7. Write the measure of  $\angle 1$ .
8. Write the measure of  $\angle 3$ .

interior  
alternate angles

$160^\circ$

$160^\circ$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

E-9

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. The Blackhawks have won twice as many games as the Maple Leafs. The Maple Leafs have won 5 fewer games than the Oilers. If the Oilers have won 13 games, how many games have the Blackhawks won?
2. Kaitlin types 50 words per minute. It took her 30 minutes to write her essay for English. Assuming she was typing the whole time, how many words are in her essay?
3. Write 0.456 as a percent.
4. What are “complementary angles”?
5. How do you calculate net pay?

#### Answers

16

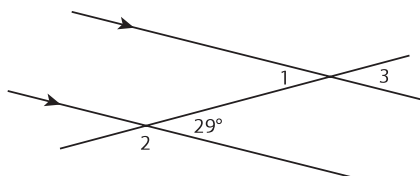
1500

45.6%

two angles that add up to  $90^\circ$

gross pay  
subtract  
deductions

#### Unit Questions



6. Write the measure of  $\angle 1$ .
7. Write the measure of  $\angle 2$ .
8. Write the measure of  $\angle 3$ .

$29^\circ$

$151^\circ$

$29^\circ$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

E-10

### Unit E: Angles and Parallel and Perpendicular Lines

#### General Questions

1. What are “supplementary angles”?
2. In Winnipeg, Fort Street and Garry Street are parallel to each other. Will these two streets ever cross?
3. In Winnipeg, Main Street and Broadway are perpendicular to each other. Will these two streets ever cross?
4. Your bed is 2 m long. If you are 180 cm tall, will you fit on your bed?
5. At noon, you go for lunch for 45 minutes. You return to work for 3 more hours, and then you drive home in 45 minutes. A clock in your house reads 5:30. How many minutes fast is your clock?

#### Answers

two angles that add up to  $180^\circ$

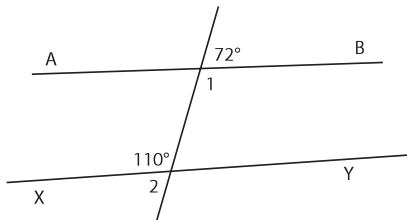
No

Yes

Yes

60

#### Unit Questions



6. What is the measure of  $\angle 1$ ?
7. What is the measure of  $\angle 2$ ?
8. Is line AB parallel to line XY?

$108^\circ$

$70^\circ$

No

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

F-1

### Unit F: Consumer Decisions

General Questions	Answers
1. A checkerboard has 8 squares along its length and 8 squares along its width. How many squares altogether are on the board?	64
2. The squares on a checkerboard alternate between black and red. How many squares are black?	32
3. You are buying coffee for your family of 6. Each cup of coffee costs \$1.50. How much will it cost in total?	\$9
4. The shortest sentence that contains all the letters of the alphabet is "The quick brown fox jumps over the lazy dog." Write a fraction comparing the number of words with 'o' to the total number of words in the sentence.	$\frac{4}{9}$
5. If 10% of 45 is 4.5, what is 20% of 90?	18
Unit Questions	
6. A box of All-Bran bars has 6 cereal bars with a total mass of 180 g. What is the mass of each bar?	30 g
7. A box contains 10 crunchy granola bars with 2 bars per pouch and a total mass of 230 g. What is the mass of one pouch?	46 g
8. The granola bar nutrition facts state that one pouch provides 3 g of fibre, which represents 12% of the recommended daily value. How many grams of fibre are recommended daily?	25 g
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

F-2

### Unit F: Consumer Decisions

#### General Questions

1. What is the complementary angle of  $79^\circ$ ?
2. You run every second day. You run 3.5 miles on Tuesday, 4 miles on Thursday, and 4.5 miles on Saturday. Which days will you run next week?
3. How far will you run each of those days if you continue the pattern?
4. Solve for  $e$ :  $\frac{1}{2} = \frac{4}{e}$
5. Your workday is supposed to be from 8:30 to 4:30. You arrive at work at 7:54 and leave at 4:23. What is the late penalty for your workday?

#### Answers

$11^\circ$

Monday,  
Wednesday,  
Friday

5 miles,  
5.5 miles,  
6 miles

8

15 minutes

#### Unit Questions

6. Estimate the unit price per pouch for granola bars that are selling at 5 pouches for \$1.98.
7. Which is a better buy for sugar, a 10 kg bag for \$12.97 or a 2 kg bag for \$1.97?
8. Estimate the unit price for a 150 g can of stacked potato chips selling for \$2.99.

$\approx \$0.40$

2 kg bag for  
\$1.97

$\approx \$0.02$  per  
gram

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

F-3

### Unit F: Consumer Decisions

General Questions	Answers
1. Linden loves milkshakes. He gets to choose from two chocolate milkshakes. One fills the glass $\frac{7}{9}$ full; the other fills the glass $\frac{2}{3}$ full. Which will he choose?	$\frac{7}{9}$
2. You are at a bake sale. You want to buy a peanut butter cookie. If the whole plate of 16 cookies costs \$3.20, how much will you pay for one cookie?	\$0.20
3. Think of a clock. How many degrees does the minute hand move between 17:30 and 18:00?	180°
4. Vertically opposite angles are _____.	equal or the same measure
5. Writers are paid by piecework. Jill Jackson is paid \$80 for every children's story she writes and \$50 for every poem she writes. Over the past 6 months she has written 4 children's stories and 6 poems. How much money was she paid?	\$620
Unit Questions	
6. How much is a 10% discount on a \$1250.00 TV?	\$125.00
7. How much is a 15% tip on a \$24.00 bill?	\$3.60
8. How much is 2% interest on a \$3600.00 loan?	\$72.00
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

F-4

### Unit F: Consumer Decisions

#### General Questions

1. Find 10% of 430.
2. Calculate:  $20 + 80$
3. Calculate:  $5 \times 30$
4. You have \$10.00. You spent \$2.60 on candy. How much do you have left?
5. Which is larger:  $\frac{1}{9}$  or  $\frac{1}{11}$ ?

#### Answers

43

100

150

\$7.40

$\frac{1}{9}$

#### Unit Questions

6. What is the sale price of a \$1200 TV with a 10% discount?
7. What is the sale price of a \$100 shirt with a 25% discount?
8. What is the total of a \$24 dinner with a 15% tip added?

\$1080

\$75

\$27.60

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

F-5

### Unit F: Consumer Decisions

General Questions	Answers
1. You are making banana bread but only need to make half the recipe. The recipe calls for $\frac{1}{2}$ cup of sugar. How much sugar will you use to make half the recipe?	$\frac{1}{4}$ cup
2. One-quarter of the Grade 10 students in a school are going to the divisional track meet. There are 120 Grade 10 students in the school. How many are going to the track meet?	30
3. At a car wash, Doug is paid \$5 per car he washes. Doug washes 20 cars during his shift. How much money will he get paid?	\$100
4. Which of the following fractions are equivalent? $\frac{4}{8}$ $\frac{5}{12}$ $\frac{7}{14}$ $\frac{9}{16}$	$\frac{4}{8}$ and $\frac{7}{14}$
5. If 100 cm of snow is equivalent to 50 mm of water, 150 cm of snow is equivalent to how much water?	75 mm
Unit Questions	
6. You receive \$11.00 per hour and are offered a raise to \$12.10 per hour. What is the amount of increase per hour?	\$1.10
7. You receive \$11.00 per hour and are offered a raise to \$12.10 per hour. What is the percent increase per hour?	10%
8. Socks regularly priced at \$8.00 are on sale for \$6.00. What percent discount is being offered?	25%
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

F-6

### Unit F: Consumer Decisions

#### General Questions

1. You are visiting your grandparents in Toronto with your two brothers. Your parents send a cheque for the three of you to split. If the cheque is for \$150, how much will each of you get?
2. Solve for  $n$ :  $4n - 3 = 2 + 19$
3. At the store, you compare the price of two hand lotions. The lemon lotion is \$3.00 for a 60 mL bottle. The vanilla lotion is \$6.00 for a 100 mL bottle. Which is the better deal (per mL)?
4. What is the supplementary angle of  $68^\circ$ ?
5. Which metric unit would be the best to describe the distance from Canada to Mexico?

#### Answers

\$50

6

lemon lotion

$112^\circ$

kilometres

#### Unit Questions

6. At a garage sale where costume jewelry is sold, a sign says, "Buy 1 for a dime or 2 for a quarter." What is the better deal?
7. Clothing store A offers "Buy 1, get the second one at half price" for ties regularly priced at \$50.00. Store B offers the same ties for \$40.00 each. What is the best price for 2 ties?
8. Which sales promotion is better, 3 CDs for \$20 or 5 CDs for \$30?

1 for a dime

\$75.00 at  
store A

5 CDs for  
\$30

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

F-7

### Unit F: Consumer Decisions

General Questions	Answers
1. What is the area of a triangle with a base of 2 m and a height of 5 m?	5 m <sup>2</sup>
2. You work 40 hours per week and are paid \$15 per hour. What is your gross pay for the year?	\$31,200
3. A map of Winnipeg is drawn to scale so that 1 cm = 5 km. If Winnipeg is 25 km from east to west, what will be the distance on the map?	5 cm
4. You changed your cell phone plan and saved \$12 a month. How much do you save in one year?	\$144
5. You want to watch a movie that is 145 minutes long but you have to leave the house in 2 hours. Do you have enough time to watch the movie before leaving the house?	No
Unit Questions	
6. A bank buys \$1.00 USD for \$1.20 CA. How many Canadian dollars will you get in exchange for \$50 American?	\$60
7. A bank buys \$1.00 Australian for \$0.78 CA. How many Canadian dollars will you get in exchange for \$50 Australian?	\$39
8. A bank buys 1 British Pound for \$1.74 CA. How many Canadian dollars will you get for 200 British Pounds?	\$348
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

F-8

### Unit F: Consumer Decisions

#### General Questions

1. If you have 5 quarters, 2 dimes, and 1 nickel, how much money do you have?
2. How many minutes in 2.25 hours?
3. Emma is 60 inches tall. What is her height in feet?
4. Which costs less per bottle: 3 bottles of pop for \$3.99 or 1 bottle of pop for \$1.50?
5. Write two equivalent fractions to  $\frac{12}{14}$ .

#### Answers

\$1.50

135 minutes

5 feet

3 bottles for  
\$3.99

$\frac{6}{7}$  and  $\frac{18}{21}$

#### Unit Questions

6. A bank buys \$1.00 USD for \$1.26 CA. How many Canadian dollars will you get in exchange for \$200 American?
7. A bank sells \$1.00 USD for \$1.26 CA. Estimate how many American dollars you will get for \$125 Canadian.
8. A bank sells \$1.00 USD for \$1.26 CA. Estimate how many American dollars you will get for \$500 Canadian.

\$252

≈ \$100 USD

≈ \$400 USD

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

G-1

### Unit G: Trigonometry

General Questions	Answers
1. You saved \$104 in one year by putting aside the same amount each week. How much did you save each week?	\$2
2. You know that $30 \times 4$ is 120. What is $60 \times 4$ ?	240
3. Convert 6 litres to millilitres.	6000 mL
4. Is $\frac{4}{5} + \frac{3}{7}$ greater or less than 1?	greater than
5. You started your math homework at 3:30 p.m. and finished at 4:25 p.m. How many minutes did you spend on your math homework?	55 minutes
Unit Questions	
6. Solve: $\frac{4}{3} = \frac{x}{6}$	8
7. Solve: $\frac{3}{m} = \frac{4}{12}$	9
8. Write the solution to the nearest tenth: $\frac{3}{5} = \frac{2}{x}$	3.3
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

G-2

### Unit G: Trigonometry

#### General Questions

1. Is the answer to  $-25 + 16$  positive or negative?
2. A shirt is 20% off of its regular price of \$40.00. How much will you pay for it on sale?
3. A 500 g package of chocolate chips is \$6.00. How much do the chocolate chips cost per gram?
4. You work 4.5 hour shifts 4 times per week. You are paid \$10 per hour. How much do you make per week?
5. Calculate:  $78 + 12$

#### Answers

negative

\$32.00

1.2¢

\$180

90

#### Unit Questions

Given similar triangles as shown:



6. If  $AB = 6$ ,  $BC = 4$ , and  $DE = 9$ , what is the measure of  $EF$ ?
7. If  $\angle A = 40^\circ$  and  $\angle F = 74^\circ$ , what is the measure of  $\angle E$ ?
8. If  $\frac{DE}{AB} = 2$ , what is the value of  $\frac{DF}{AC}$ ?

6

$66^\circ$

2

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

G-3

### Unit G: Trigonometry

General Questions	Answers
1. Two angles in a triangle are $30^\circ$ and $65^\circ$ . What is the third angle?	85°
2. Calculate: $\frac{5}{3} \times \frac{4}{5}$	$\frac{4}{3}$ or $1\frac{1}{3}$
3. How many 3-digit numbers can you write with the digits 1, 2, and 3, using each digit only once?	6
4. To pay for your movie ticket, you give the cashier \$15. The cost of the ticket is \$13.25. The cashier gives you back a loonie, a quarter, and 5 dimes. Is this the correct change?	Yes
5. Is $\frac{8}{5}$ closer to 1 or 2?	2
Unit Questions	
6. What is the measure of the hypotenuse of a right triangle if the measures of the other two sides are 5 cm and 12 cm?	13 cm
7. The hypotenuse of a right triangle is 10 units; its smaller side is 6 units. What is the measure of the third side?	8 units
8. If $a = 7$ and $b = 4$ , estimate the value of $\sqrt{a^2 + b^2}$ to the whole number.	$\approx 8$
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

G-4

### Unit G: Trigonometry

#### General Questions

1. The angle between the two equal sides of an isosceles triangle is  $80^\circ$ . What are the values of the other two angles?
2. You can buy a 400 g package of chocolate eggs for \$8.00, or you can pay \$0.10 per gram. Which is the better buy?
3. 1 out of every 25 vehicles that you see on your way home from the cabin is a truck. Express this as a ratio.
4. Is the answer to  $-14 - 29$  positive or negative?
5. Solve for  $a$ :  $3a = \frac{9}{2}$

#### Answers

$50^\circ$

package of eggs

1:25

negative

$\frac{3}{2}$  or  $1\frac{1}{2}$

#### Unit Questions

6. A right triangle has an angle measuring  $62^\circ$ . What are the measures of the other two angles?
7. Two of the angles of a right triangle are  $36^\circ$  and  $54^\circ$ . What is the measure of the angle opposite the hypotenuse?
8. The sides of a right triangle are 8, 15, and 17. What sides are adjacent to the right angle?

$90^\circ$  and  $28^\circ$

$90^\circ$

8 and 15

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

G-5

### Unit G: Trigonometry

#### General Questions

#### Answers

1. The side length of a square is 5 cm. What is the area of the square?

25 cm<sup>2</sup>

2. Knowing that there are 60 minutes in one hour, how many degrees does the minute hand of a clock move in 5 minutes?

30°

3. Convert to a decimal: 0.25%.

0.0025

4. Evaluate:  $\frac{3}{4} \times \frac{5}{7}$

$\frac{15}{28}$

5. Janelle works Monday to Friday and is paid \$80 per day. How much money does she make in two weeks?

\$800

#### Unit Questions

6. True or False:  $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$

True

7. True or False:  $\cos \theta = \frac{\text{opposite}}{\text{adjacent}}$

False

8. True or False:  $\tan \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$

False

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

G-6

### Unit G: Trigonometry

#### General Questions

1. A CFL end zone is 60 feet deep. The field is 65 yards wide. What is the area of the end zone in square yards?
2. Is the answer to  $-16 + (-15)$  positive or negative?
3. You are buying a DVD player for \$100. If the in-store warranty is 6.5% of the cost, how much will you pay for the warranty?
4. Write two equivalent fractions to  $\frac{15}{9}$ .
5. The scale diagram of an object is 1 cm: 50 cm. If the drawing is 10 cm long, what is the real length of the object?

#### Answers

1300 sq. yd.

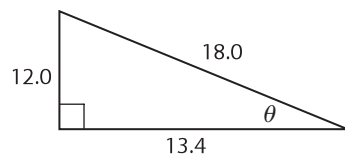
negative

\$6.50

$\frac{5}{3}$  and  $\frac{10}{6}$

500 cm or 5 m

#### Unit Questions



6. What is the value of  $\sin \theta$ ? (Don't simplify the fraction.)
7. What is the value of  $\cos \theta$ ? (Don't simplify the fraction.)
8. What is the value of  $\tan \theta$ ? (Don't simplify the fraction.)

$\frac{12.0}{18.0}$

$\frac{13.4}{18.0}$

$\frac{12.0}{13.4}$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

G-7

### Unit G: Trigonometry

#### General Questions

1. If two of the angles in a triangle are  $45^\circ$  and  $105^\circ$ , what is the third angle?
2. What is the value for  $3x - 3$  if  $x = 4$ ?
3. Is the answer to  $-5 - (-12)$  positive or negative?
4. It is really hot outside so you are very thirsty. In your fridge, there is orange juice with pulp, apple juice, water, and milk. You are lactose-intolerant. You do not like water, nor do you like pulp. What will you drink?
5. Convert 34 km into cm.

#### Answers

$30^\circ$

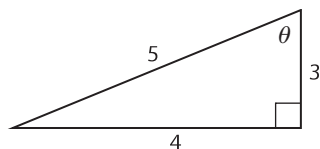
9

positive

apple juice

3 400 000 cm

#### Unit Questions



6. What is the value of  $\cos \theta$ ? (Don't simplify the fraction.)
7. What is the value of  $\sin \theta$ ? (Don't simplify the fraction.)
8. What is the value of  $\tan \theta$ ? (Don't simplify the fraction.)

$\frac{3}{5}$

$\frac{4}{5}$

$\frac{4}{3}$

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

G-8

### Unit G: Trigonometry

#### General Questions

1. You have several nickels and dimes. What is the smallest number of coins that you can use to make a sum of 45 cents?
2. Evaluate:  $\frac{5}{6} - \frac{1}{3}$
3. The three sides of a right angle triangle are 6.5, 9.7, 7.2. Which is the hypotenuse?
4. Evaluate:  $10 - 14$
5. You are supposed to work from 9 a.m. to 5 p.m. You arrive at work at 8:55 a.m., and leave at 4:50 p.m. How much time does your employer pay you for?

#### Answers

5

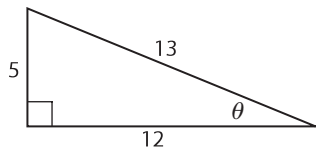
$\frac{1}{2}$

9.7

-4

$7\frac{3}{4}$  hours

#### Unit Questions



6. What is the value of  $\tan \theta$ ? (Don't simplify the fraction.)
7. What is the value of  $\cos \theta$ ? (Don't simplify the fraction.)
8. What is the value of  $\sin \theta$ ? (Don't simplify the fraction.)

$\frac{5}{12}$

$\frac{12}{13}$

$\frac{5}{13}$

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

G-9

### Unit G: Trigonometry

#### General Questions

1. Each time you get paid, you save 30% of your paycheque. This week your paycheque was \$400. How much will you save?
2. Solve for  $j$ :  $\frac{5}{8} = \frac{j}{12}$
3. When Brendan was born, his brother was 6. Brendan is now 15. How old is his brother?
4. The area taken up by a building is  $3200 \text{ m}^2$ . If the building is 40 m wide, how long is it?
5. The exchange rate from Canadian dollars to Thai baht is 1 : 37. If you have \$1000 for your trip to Thailand, how many baht will you have?

#### Answers

\$120

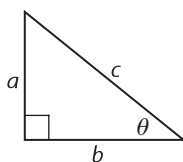
7.5

21

80 m

37 000

#### Unit Questions



6. True or False:  $\tan \theta = \frac{b}{a}$
7. What can you say about the measures of the sides of the triangle if you know  $\tan \theta = 1$ ?
8. What can you say about the measures of the sides of the triangle if you know  $\tan \theta > 1$ ?

False

$a = b$

$a > b$

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

H-1

### Unit H: Transformations

General Questions	Answers
1. What is the formula for tangent?	$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$
2. The sides of a right triangle are 85, 36, 77. What are the two possible tangent ratios of this triangle?	$\frac{36}{77}$ or $\frac{77}{36}$
3. A circle is divided into $360^\circ$ . How many degrees are in a semicircle (half-circle)?	$180^\circ$
4. You are paid \$15 per hour. If you work 20 hours per week, how much money will you earn in a week?	\$300
5. You would like to get your poster framed. The area of the poster is $4500 \text{ cm}^2$ . If the height of the poster is 0.3 m, what is the length in centimetres?	150 cm
Unit Questions	
6. According to the “rule method,” how do you write a shift of 3 units down and 2 units to the left?	[D3, L2]
7. A figure has been translated according to the rule [D3, R1]. How many units is the figure moved horizontally (and in what direction)?	1 unit right
8. A rectangle is translated 2 units up and 3 units right, and then 4 units down and another 3 units to the right. Write the total translation of the rectangle using the notation of the rule method.	[D2, R6]
Other Questions	
9.	
10.	

# Mental Math

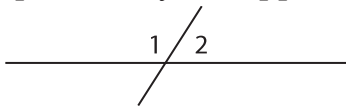
## Grade 10 Essential Mathematics (20S)

H-2

### Unit H: Transformations

#### General Questions

1. You are buying a t-shirt for \$14.83. If you pay with a \$20 bill, how much change will you receive?
2. A right triangle has the sides 8, 15, 17. What are the two possible sine ratios?
3. Evaluate:  $90 \times 3$
4. Your paycheque was \$500. Estimate your CPP (4.95%).
5. Are consecutive angles (beside each other) of a transversal equal, complementary, or supplementary?



#### Answers

\$5.17

$\frac{8}{17}$  and  $\frac{15}{17}$

270

$\approx \$25$

supplementary

#### Unit Questions

6. You go down 6 steps that are 1 unit high and 1 unit wide. Write your translation using the rule method notation.
7. A figure has been moved four times in succession, each with a move of 2 units upward. How many units has the figure moved in total?
8. Three (3) iterations of the translation [U4, R1] were performed on a figure. Write a single translation representing these three iterations using the rule method notation.

[D6, R6] or  
[R6, D6]

8 units

[U12, R3]

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

H-3

### Unit H: Transformations

#### General Questions

1. You want to go to bed at 10:15 p.m. You also want to watch a movie that lasts 2 hours and 30 minutes. What time, at the latest, should you start watching the movie?
2. There are 20 players on your rugby team. Seven of them are missing the game for a school concert. What percent of your team is at the game?
3. Is the answer to  $-11 \times -13$  positive or negative?
4. If you translate a point 4 units to the left and then 3 to the right, how far is the new point from the original point and in what direction?
5. Your hourly wage is \$8.00. You are paid time-and-a-half for overtime. If you work 4 hours of overtime, how much will you be paid for it?

#### Answers

7:45 p.m.

65%

positive

1 unit left

\$48

#### Unit Questions

6. You are making a U-turn on the street. What angle of rotation did you make?
7. You are rotating a triangle clockwise  $35^\circ$ . How many degrees does this correspond to if rotating the triangle counter-clockwise instead?
8. How many times do you need to perform a  $45^\circ$  rotation on an object before the figure returns to its original position?

$180^\circ$

$325^\circ$

8

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

H-4

### Unit H: Transformations

#### General Questions

1. A right triangle has sides 0.21, 0.20, 0.29. Write two possible ratios for cosine of this triangle.
2. Evaluate if  $w = 5$ :  $2w - 7$
3. What are the factors of 28?
4. Dylan is 6' 2" tall. How tall is he in inches?
5. Determine the number of hours per day, on average, that you watch TV each week if you usually watch 1 h on Monday, 2 h on Tuesday, 2 h on Thursday, 2 h on Saturday, and 3.5 h on Sunday.

#### Answers

$$\frac{21}{29} \text{ and } \frac{20}{29}$$

3

1, 2, 4, 7, 14, 28

74

1.5 h/day

#### Unit Questions

6. On a Cartesian plane, the point A(3,2) is reflected over the  $y$ -axis to give the point A'. What are the coordinates of the point A'?
7. On a Cartesian plane, the point B'(-4, -5) is the reflection of the point B over the  $x$ -axis. What are the coordinates of point B?
8. The point P, located in Quadrant III, undergoes two (2) consecutive reflections, first over the  $x$ -axis and then over the  $y$ -axis. In which quadrant is the reflection of the point P?

(-3, 2)

(-4, 5)

Quadrant I

#### Other Questions

9.

10.

# Mental Math

## Grade 10 Essential Mathematics (20S)

H-5

### Unit H: Transformations

General Questions	Answers
1. Audrey reads 2 pages per minute. The latest book she is reading is 720 pages long. How long will it take her to read it?	6 hours
2. What is the complementary angle to $41^\circ$ ?	$49^\circ$
3. You work 6.5 hours per day, 6 days per week. How many hours per week do you work?	39
4. Your younger brother tells you that he is 100 cm tall. Estimate how tall he is in inches (1 inch = 2.54 cm).	$\approx 40$
5. You are given \$3.32 change for buying breakfast at Moonbucks. If you gave the cashier a \$10 bill and your total was \$6.78, did you get the correct change?	No, you received too much.
Unit Questions	
6. Given a rectangle ABCD, how many rotations of $30^\circ$ around point A can be made before it returns to its original position?	12
7. How many axes of symmetry are there in an equilateral triangle?	3
8. How many axes of symmetry are there in a square?	4
Other Questions	
9.	
10.	

# Mental Math

## Grade 10 Essential Mathematics (20S)

H-6

### Unit H: Transformations

#### General Questions

1. There is a big sale at your favourite store. Everything is 30% off. Your bill before the discount is \$200. How much will you pay after the discount?
2. Solve for  $b$ :  $\frac{b}{8} = \frac{6}{20}$
3. There are 3 teams in a tournament. Team A wins against Team B. Team B loses to team C. Team C loses to Team A. Does any team win both their games?
4. The map of your mom's office has a scale of 1 cm: 3 m. On the map, your mom's office is 1 cm by 1 cm. What is the actual area of your mom's office?
5. Rotation  $90^\circ$  clockwise is the same as rotating counter-clockwise  $\text{---}^\circ$ ?

#### Answers

\$140

$\frac{12}{5}$  or 2.4

Team A

$9 \text{ m}^2$

$270^\circ$

#### Unit Questions

6. Rectangle ABCD, with dimensions 12 cm by 8 cm, undergoes a dilation transformation with a scale factor of  $\frac{1}{2}$ . What are the dimensions of the new rectangle?
7. A square underwent a dilation transformation. Its sides of 12 cm now measure 36 cm. What is the scale factor of the dilation?
8. A circle with a radius of 20 cm is a dilation of a circle with a radius of 1 m. What is the scale factor of the dilation?

6 cm by 4 cm

$\frac{36}{12}$  or  $\frac{3}{1}$

$\frac{20}{100}$  or  $\frac{1}{5}$

#### Other Questions

9.

10.



# Mental Math

## Grade 10 Essential Mathematics (20S)

H-7

### Unit H: Transformations

General Questions	Answers
1. The dimensions of Edward's yard are 20 m by 60 m. How much fence will Edward need if he is building a fence around his yard?	160 m
2. A test consists of 7 questions worth 3 marks, 12 questions worth 5 marks, and 4 questions worth 4 marks. What is the total mark value of the test?	97
3. You are filling up your scooter with gas that costs \$1.00 per litre. If your scooter's gas tank holds 8 L and you've still got 1.5 L in the tank, how much will it cost you to fill up?	\$6.50
4. In order for a rotation to appear exactly the same as the original, how much must you rotate the original object (in degrees)?	360°
5. Evaluate: $\frac{4}{7} \times \frac{8}{3}$	$\frac{32}{21}$
Unit Questions	
6. Among the letters A, H, I, M, O, T, V, and Z, which letter(s) has neither a horizontal nor a vertical line of symmetry?	Z
7. Using transformations, which of the following geometric figures are not suitable to be used as paving stones: square, circle, oval, rectangle, or triangle?	circle, oval
8. Among the letters A, H, I, M, O, T, V and Z, which have at least two axes of symmetry?	H, I, and O
Other Questions	
9.	
10.	







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