



062316

The University of Texas at Austin UT High School

6th Grade Math Study Guide Credit by Exam for Credit Recovery or Acceleration

The exam you are interested in taking is designed to test your proficiency in the relevant subject matter. You should be thoroughly familiar with the subject matter before you attempt to take the exam. This EA/CBE Study Guide can help you prepare for the exam by giving you an idea of what you need to review. You can check your familiarity level by reviewing the Texas Essential Knowledge and Skills (TEKS) for this course (see below). To refine your skills, you can refer to any of the state-adopted textbooks.

Texas Essential Knowledge and Skills (TEKS)

Every question that appears on this exam is derived from the knowledge and skills statements and student expectations within the Texas-mandated standards, the Texas Essential Knowledge and Skills (TEKS). You can view the TEKS for this exam online via the following link: <http://ritter.tea.state.tx.us/rules/tac/chapter111/ch111b.html#111.26>. Refer to section (b), Knowledge and skills, 1A–14H.

Throughout this guide, you'll see TEKS references. These refer to the numbers listed under (b) Knowledge and skills; for example, 1A or 3B.

Materials Needed

You will need to bring a scientific calculator. The formula sheets at the end of this study guide will be provided during the exam. You can also bring these formula sheets with you to your exam. If you are taking a print exam, you must bring a #2 pencil to complete the exam. You will receive a computer-graded answer sheet when you arrive at the testing center. The proctor will provide scratch paper.

Exam Structure

You will be allowed **3 hours** to complete this exam. The exam consists of 63 multiple-choice questions that are equally weighted. You will be allowed one short, monitored break during the exam. The exam covers the following 9 Objectives:

- Objective 1:** Number Operations (6 questions)
- Objective 2:** Fraction and Decimal Operations (7 questions)
- Objective 3:** Ratios, Rates and Percentages (13 questions)
- Objective 4:** Integer Operations (6 questions)
- Objective 5:** Financial Literacy (6 questions)
- Objective 6:** Expressions, Equations, and Inequalities (7 questions)
- Objective 7:** Multiple Representations (5 questions)
- Objective 8:** Two-Dimensional Figures and Measurement (7 questions)
- Objective 9:** Data and Statistics (6 questions)

Scholastic Honesty

When you arrive at the testing center, you will be asked to carefully read the exam rules and sign a statement agreeing to take the exam in accordance with the rules. This is called the Examinee's Certification. The following is a copy of these rules:

Examinee's Certification

This certification must be signed *before* the exam is administered and then returned with the completed examination attached, or credit for the exam will not be given.

Scholastic dishonesty is a serious academic violation that will not be tolerated. Scholastic dishonesty encompasses, but is not limited to:

- copying from another student's work;
- using an unauthorized testing proctor or taking the exam at an unauthorized testing location;
- using materials not authorized by a testing proctor;
- possessing materials that are not authorized by a testing proctor, such as lessons, books, or notes;
- knowingly using or soliciting, in whole or part, the contents of an unadministered test;
- collaborating with or seeking aid from another student without authorization during the test;
- substituting for another person, or permitting another person to substitute for oneself, in taking a course test or completing any course-related assignment;
- using, buying, stealing, or transporting some or all of the contents of an unadministered test, test rubric, homework answer, or computer program.

Evidence of scholastic dishonesty will result in a grade of *F* on the examination and an *F* in the course (if applicable).

At the testing center, you will be asked to sign a statement that says you have read the above and agree to complete the examination with scholastic honesty.

General Study Tips

The bulleted lists and sample questions in this study guide can assist you in preparing for the exam. It is a fairly complete guide, but does not cover every item on the test. Ultimately, you should use the TEKS to guide your exam preparation.

Additional Study Tips

The following information provides direction for your studies. For each part, you will find study tips and sample questions to give you a general idea of the types of questions you can expect to see on the exam.

Objective 1: Number Operations

This part relates to your knowledge of number operations including the order of operations, multiple ways to represent mathematical operations, and mathematical properties such as associative and commutative properties. It includes 7 questions that are equally weighted.

Study Tips for Objective 1

This part relates to TEKS 2E, 7A, and 7D. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Generate equivalent numerical expressions using order of operations, including whole number exponents, and prime factorization
- Extend representations for division to include fraction notation such as a/b represents the same number as $a \div b$ where $b \neq 0$
- Generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties

Sample Questions for Objective 1

The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** response to each of the following questions.

1. What is the prime factorization of 156?
 - A. $2 \cdot 78$
 - B. $2^2 \cdot 39$
 - C. $2^2 \cdot 3 \cdot 13$
 - D. $2^2 \cdot 3^2 \cdot 13$

2. Samantha and two friends split the cost of their lunch at Dandy Birds. They each had an order of chicken tenders and fries and all shared a sundae. The expression below can be used to find the amount each person will pay

$$\frac{3(9) + 3.75}{3}$$

How much will each person pay?

- A. 5.25
- B. 10.25
- C. 30.75
- D. 33.75

Objective 2: Fraction and Decimal Operations

This part relates to operations with integers, rational numbers, and fractions. It includes 9 questions that are equally weighted.

Study Tips for Objective 2

This part relates to TEKS 2C, 2D, 3A, 3B, 3E, 4G, and 5C. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Locate, compare, and order integers and rational numbers using a number line
- Multiply and divide positive rational numbers fluently
- Determine, with and without computation, whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one
- Recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values
- Order a set of rational numbers arising from mathematical and real- world contexts
- Generate equivalent forms of fractions, decimals, and percents using real- world problems, including problems that involve money
- Use equivalent fractions, decimals, and percents to show equal parts of the same whole

Sample Questions for Objective 2

The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** response to each of the following questions.

3. Angelica was asked to arrange the numbers below from least to greatest. Which answer choice correctly lists the numbers?

57% .7 $\frac{7}{8}$ $\frac{5}{7}$ 74%

- A. 74%, .7, $\frac{7}{8}$, $\frac{5}{7}$, 57%
- B. $\frac{7}{8}$, 74%, $\frac{5}{7}$, .7, 57%
- C. $\frac{5}{7}$, 57%, $\frac{7}{8}$, .7, 74%
- D. 57%, .7, $\frac{5}{7}$, 74%, $\frac{7}{8}$

4. Below are three students' explanations on how to calculate 10% of \$25.60.

- Nick said, "I multiplied 25.6 by $\frac{1}{10}$."
- Samantha said, "I divided 25.6 by 10."
- Amanda said, "I multiplied 25.6 by 0.1."

Which student was correct and why?

- A. Both Nick and Amanda are correct because of means to multiply.
- B. Only Amanda because she calculated the decimal equivalent of 10% to multiply.
- C. Only Samantha because she found the value of 1 out of 10 parts by dividing by 10.
- D. All three students are correct because dividing by 10 and multiplying by its reciprocal give equivalent values.

5. Which of the following describes the result of multiplying a positive number, x , by a fraction?

- A. $x \times \frac{1}{3} < x$
- B. $x \times \frac{7}{3} < x$
- C. $x \times \frac{1}{5} > x$
- D. $x \times \frac{3}{3} > x$

Objective 3: Rates, Ratios, and Percentages

This part relates to your knowledge of setting up rates and ratios correctly in order to use them to solve real world problems, generate fraction, decimal, and percent equivalencies. It includes 17 questions that are equally weighted.

Study Tips for Objective 3

This part relates to TEKS 4B-H and 5A-C. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates
- Give examples of ratios as multiplicative comparisons of two quantities describing the same attribute
- Give examples of rates as the comparison by division of two quantities having different attributes, including rates as quotients
- Represent ratios and percents with concrete models, fractions, and decimals
- Represent benchmark fractions and percents such as 1%, 10%, 25%, $33\frac{1}{3}\%$, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers
- Generate equivalent forms of fractions, decimals, and percents using real- world problems, including problems that involve money
- Use equivalent fractions, decimals, and percents to show equal parts of the same whole
- Convert units within a measurement system, including the use of proportions and unit rates
- Represent mathematical and real- world problems involving ratios and rates using scale factors, tables, graphs, and proportions
- Solve real- world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, including the use of concrete and pictorial models

Sample Questions for Objective 3

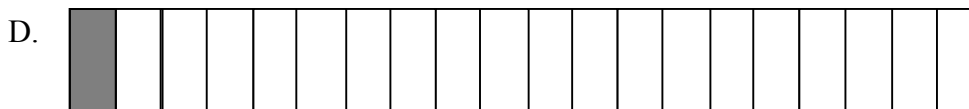
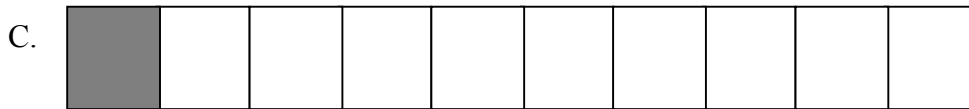
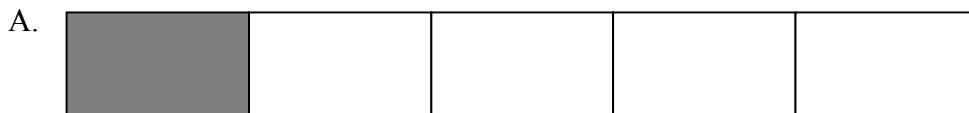
The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** response to each of the following questions.

6. Jorge drove 68 miles using 4 gallons of gas. Melanie drove 57 miles using 3 gallons of gas. Whose car has the better gas mileage?

- A. Jorge, 72 miles per gallon
- B. Jorge, 17 miles per gallon
- C. Melanie, 60 miles per gallon
- D. Melanie, 19 miles per gallon

7. Which of the following models shows 10% shaded?



8. Chandler received 60 out of 90 votes to be class treasurer. Which two values below represent the number of votes Chandler received?

- A. $\frac{1}{3}$ and $33\frac{1}{3}\%$
- B. .3 and 30%
- C. .6 and 60%
- D. $\frac{2}{3}$ and $66\frac{2}{3}\%$

Objective 4: Integer Operations

This part relates to your knowledge of relationships between sets of numbers, integer operations, comparisons of integers and rational numbers, and graphing using coordinate planes. It includes 7 questions that are equally weighted

Study Tips for Objective 4

This part relates to TEKS 2A-C, 3C-D and 11. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

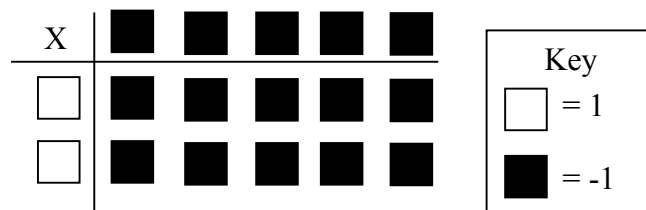
- Classify whole numbers, integers, and rational numbers using a visual representation such as a Venn diagram to describe relationships between sets of numbers
- Identify a number, its opposite, and its absolute value
- Locate, compare, and order integers and rational numbers using a number line
- Add, subtract, multiply, and divide integers fluently
- Represent integer operations with concrete models and connect the actions with the models to standardized algorithms
- Graph points in all four quadrants using ordered pairs of rational numbers

Sample Questions for Objective 4

The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

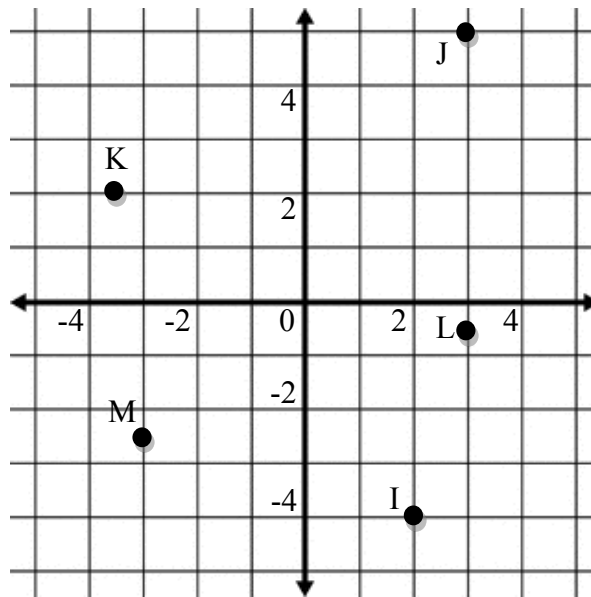
DIRECTIONS: Select the **BEST** response to each of the following questions.

9. Which equation represents the model shown below?



- A. $2 \cdot 5 = 10$
 B. $5 \cdot (-2) = 10$
 C. $2 \cdot (-5) = -10$
 D. $(-5) \cdot (-2) = 10$

10. Which coordinate pair best represents point M on the coordinate grid below?



- A. $(3, 3.5)$
- B. $(-3.5, 3)$
- C. $(-2.5, -3)$
- D. $(-3, -2.5)$

Objective 5: Financial Literacy

This part relates to your knowledge of financial literacy regarding checking and savings accounts, credit reports, ways to pay for higher education, qualities of a financial institution, etc. It includes 8 questions that are equally weighted.

Study Tips for Objective 5

This part relates to TEKS 14A-H. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Compare the features and costs of a checking account and a debit card offered by different local financial institutions
- Distinguish between debit cards and credit cards
- Balance a check register that includes deposits, withdrawals, and transfers
- Explain why it is important to establish a positive credit history
- Describe the information in a credit report and how long it is retained
- Describe the value of credit reports to borrowers and to lenders
- Explain various methods to pay for college, including through savings, grants, scholarships, student loans, and work- study
- Compare the annual salary of several occupations requiring various levels of post-secondary education or vocational training and calculate the effects of the different annual salaries on lifetime income

Sample Questions for Objective 5

The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST response to each of the following questions.

11. Josh’s bank account record is shown below. He is diligent about recording his transactions, but does not regularly balance his checkbook. After paying his electric bill, his balance is \$1,100 as shown below.

| Check Number | Date | Transaction | Payment/Debit | Deposit | Balance |
|--------------|-------|-----------------------|---------------|---------|---------|
| 101 | 12/2 | Electric Bill | 120.00 | | 1100.00 |
| 102 | 12/6 | Mortgage Payment | 1200.00 | | -100.00 |
| | 12/16 | Transfer from savings | | 500.00 | |
| 103 | 12/18 | Phone Bill | 60.00 | | |
| 104 | 12/18 | Groceries | 80.00 | | |

What will Josh’s account balance be after he buys his groceries?

- A. \$-740
 - B. \$-140
 - C. \$260
 - D. \$1,960
12. Which of the statements below about credit cards and debit cards is not true?
- I. You pay interest on the unpaid balance of debit cards.
 - II. With debit cards you are able to buy things before you have saved for the entire purchase.
 - III. You must have enough money in your account to cover credit purchases.
 - IV. Credit cards are a way to pay for things in case of an emergency.
- A. I only
 - B. IV only
 - C. I and II only
 - D. I, II, and III

Objective 6: Expressions, Equations, and Inequalities

This part relates to your knowledge of solving one-step equations, creating rules for a given table of data, and selecting scenarios that represent equations. It includes 8 questions that are equally weighted.

Study Tips for Objective 6

This part relates to TEKS 7B-C, 9A-C, and 10A-B. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Distinguish between expressions and equations verbally, numerically, and algebraically;
- Determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations
- Write one- variable, one- step equations and inequalities to represent constraints or condition within problems
- Represent solutions for one- variable, one- step equations and inequalities on number lines
- Write corresponding real- world problems given one- variable, one- step equations or inequalities
- Model and solve one- variable, one- step equations and inequalities that represent problems, including geometric concepts
- Determine if the given value(s) make(s) one- variable, one- step equations or inequalities true

Sample Questions for Objective 6

The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** response to each of the following questions.

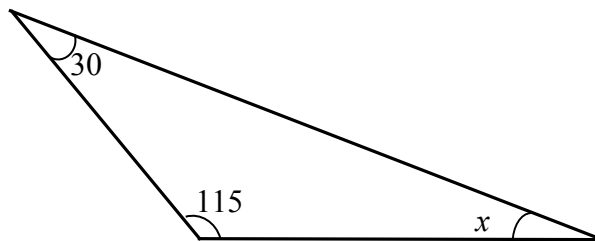
13. Which of the following is an expression?

- I. a number is less than eight
- II. eight is greater than a number
- III. eight less than a number
- IV. Seventeen is eight less than a number

- A. I only
- B. III only
- C. IV only
- D. I and II

14. The equation can be used to determine the measure of the angle labeled x for the triangle shown below.

$$115 + 30 + x = 180$$



What value of x makes the equation true?

- A. 35°
- B. 65°
- C. 145°
- D. 150°

Objective 7: Multiple Representations

This part relates to your knowledge of comparing equations and representing data graphically, in tables, and in equations. It includes 6 questions that are equally weighted.

Study Tips for Objective 7

This part relates to TEKS 4A, 6A, 6B, and 6C. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Compare two rules verbally, numerically, graphically, and symbolically in the form of $y = ax$ or $y = x + a$ in order to differentiate between additive and multiplicative relationships
- Identify independent and dependent quantities from tables and graphs
- Write an equation that represents the relationship between independent and dependent quantities from a table
- Represent a given situation using verbal descriptions, tables, graphs, and equations in the form $y = kx$ or $y = x + b$

Sample Questions for Objective 7

The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** response to each of the following questions.

15. Which table below has a multiplicative relationship between x and y ?

A.

| | | | | |
|-----|---|---|----|----|
| x | 2 | 4 | 6 | 8 |
| y | 4 | 8 | 12 | 16 |

B.

| | | | | |
|-----|---|---|----|----|
| x | 1 | 2 | 5 | 7 |
| y | 8 | 9 | 10 | 11 |

C.

| | | | | |
|-----|---|---|---|---|
| x | 1 | 2 | 3 | 4 |
| y | 4 | 5 | 6 | 7 |

D.

| | | | | |
|-----|---|---|---|---|
| x | 1 | 3 | 5 | 7 |
| y | 2 | 4 | 6 | 8 |

16. Which of the following describes the relationship in the table?

Mark Up Price of Clothing Items

| Whole Sale Price, w | Retail Price, r |
|--------------------------|----------------------|
| \$4 | \$6 |
| \$8 | \$12 |
| \$12 | \$18 |
| \$20 | \$30 |

- A. $r = 1.5w$
- B. $r = w - 2$
- C. $r = w + 2$
- D. $r = 2w + 2$

Objective 8: Two-Dimensional Figures and Measurement

This part relates to your knowledge of triangles and quadrilaterals including angle measurements, area, and volume; converting units within a measurement system. It includes 10 questions that are equally weighted.

Study Tips for Objective 8

This part relates to TEKS 4H, 8A-D, and 10A. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle
- Model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes
- Write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers
- Determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers
- Model and solve one- variable, one- step equations and inequalities that represent problems, including geometric concepts
- Convert units within a measurement system, including the use of proportions and unit rates

Sample Questions for Objective 8

The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST response to each of the following questions.

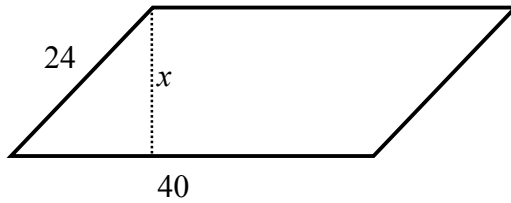
17. Possible dimensions for a triangle are given below.

- I. 5cm, 5cm, 5cm
- II. 11cm, 5cm, 7cm
- III. 5cm, 2cm, 3cm
- IV. 6cm, 8cm, 10cm

Which set can create a triangle?

- A. I only
- B. I and II only
- C. II and IV only
- D. I, II, and IV

18. Which equation could be used to solve for a , the area of the parallelogram below?



- A. $a = 40 \cdot x$
- B. $a = 40 \cdot 24$
- C. $a = 40 \cdot 24 \cdot x$
- D. $a = 40 \cdot 24 \cdot x^2$

Objective 9: Data and Statistics

This part relates to your knowledge of representing data, reading data representations, and summarizing data. It includes 7 questions that are equally weighted.

Study Tips for Objective 9

This part relates to TEKS 12A-D and 13A-B. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Represent numeric data graphically, including dot plots, stem- and- leaf plots, histograms, and box plots
- Use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution
- Summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution
- Summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution
- Interpret numeric data summarized in dot plots, stem- and- leaf plots, histograms, and box plots
- Distinguish between situations that yield data with and without variability

Sample Questions for Objective 9

The following are sample questions. You can find the correct answers listed at the end of this study guide, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** response to each of the following questions.

19. Which of the following CANNOT be used to describe how the values in a data set are distributed?

- I. Mode
- II. Mean
- III. Range
- IV. Interquartile range
- V. Standard deviation

- A. V only
- B. I and II only
- C. IV and V only
- D. III and IV only

20. Below are the test grades from science exam in Ms. Dakota's class.

| Test Grades | |
|-------------|---------------|
| 6 | 3 5 8 |
| 7 | 0 3 3 8 9 |
| 8 | 0 0 0 5 6 7 8 |
| 9 | 0 2 2 5 6 8 |

According to the data presented, which of the following is NOT true?

- A. The mean is about 82.
- B. The mean is less than the median.
- C. The median and mode are the same.
- D. Ms. Dakota has 21 students in this class.

Answer Key

| Item Number | Correct Answer |
|-------------|----------------|
| 1 | C |
| 2 | B |
| 3 | D |
| 4 | D |
| 5 | A |
| 6 | D |
| 7 | C |
| 8 | D |
| 9 | C |
| 10 | D |
| 11 | C |
| 12 | D |
| 13 | B |
| 14 | A |
| 15 | A |
| 16 | A |
| 17 | D |
| 18 | A |
| 19 | B |
| 20 | B |

6th Grade Mathematics Formula Sheet

Length

Customary

1 mile (mi) = 1,760 yards (yd)

1 yard (yd) = 3 feet (ft)

1 foot (ft) = 12 inches (in)

Metric

1 kilometer (km) = 1,000 meters (m)

1 meter (m) = 100 centimeters (cm)

1 centimeters (cm) = 10 millimeters (mm)

Volume

Customary

1 gallon (gal) = 4 quarts (qt)

1 quart (qt) = 2 pints (pt)

1 pint (pt) = 2 cups (c)

1 cup (c) = 8 fluid ounces (fl oz)

Metric

1 liter (L) = 1,000 milliliters (mL)

Weight and Mass

Customary

1 ton (T) = 2,000 pounds (lb)

1 pound (lb) = 16 ounces (oz)

Metric

1 kilogram (kg) = 1,000 grams (g)

1 gram (g) = 1,000 milligrams (mg)

Time

1 year = 12 months

1 year = 52 weeks

1 week = 7 days

1 day = 24 hours

1 hour = 60 minutes

1 minute = 60 seconds

6th Grade Mathematics Formula Sheet

Perimeter

| | |
|--------|----------|
| Square | $P = 4s$ |
|--------|----------|

| | |
|-----------|---------------|
| Rectangle | $P = 2l + 2w$ |
|-----------|---------------|

Circumference

| | | | |
|--------|--------------|----|-------------|
| Circle | $C = 2\pi r$ | or | $C = \pi d$ |
|--------|--------------|----|-------------|

Area

| | | | |
|----------|--------------------|----|---------------------|
| Triangle | $A = \frac{bh}{2}$ | or | $A = \frac{1}{2}bh$ |
|----------|--------------------|----|---------------------|

| | |
|--------|-----------|
| Square | $A = s^2$ |
|--------|-----------|

| | | | |
|-----------|----------|----|----------|
| Rectangle | $A = lw$ | or | $A = bh$ |
|-----------|----------|----|----------|

| | |
|---------------|----------|
| Parallelogram | $A = bh$ |
|---------------|----------|

| | | | |
|-----------|------------------------------|----|-------------------------------|
| Trapezoid | $A = \frac{(b_1 + b_2)h}{2}$ | or | $A = \frac{1}{2}(b_1 + b_2)h$ |
|-----------|------------------------------|----|-------------------------------|

| | |
|--------|---------------|
| Circle | $A = \pi r^2$ |
|--------|---------------|

Volume

| | |
|------|-----------|
| Cube | $V = s^3$ |
|------|-----------|

| | | | |
|-------------------|-----------|--|---------------------|
| Rectangular prism | $V = lwh$ | | $V = \frac{1}{3}Bh$ |
|-------------------|-----------|--|---------------------|

Additional Information

| | |
|----|-----------------|
| Pi | $\pi \approx 3$ |
|----|-----------------|