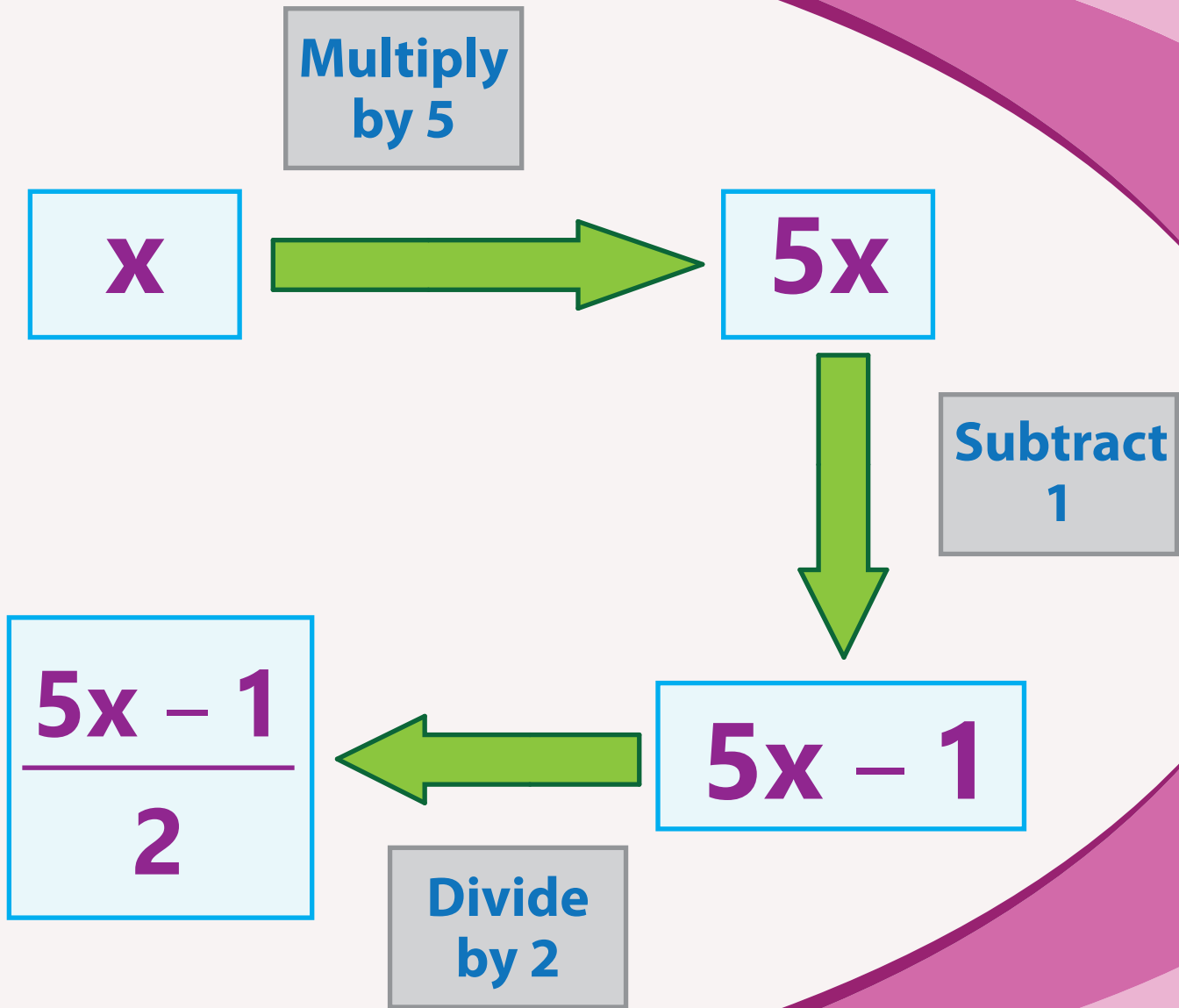


**7th  
Grade**

# Expressions



## Workbook 1

## Simplifying Linear Expressions

E

Simplify each expression.

1)  $10x - 8x + 2 + 10$

2)  $3a + 7 + 2(3 + a)$

3)  $3(m - 5) + m$

4)  $2s + 10 - 7s - 8 + 3s - 7$

5)  $8c - 4 - 2c + 5$

6)  $-4 + 7z + 3 - 2z$

7)  $15 + 4(5y - 10)$

8)  $2d + 17 - 3 - 2d + 4d$

9)  $12n - 8 - 2n + 10 - 4$

10)  $8(2k + 1 + 3k)$

11)  $4(2b + 2) - 3$

12)  $-4 + 8p - 6p - 5 + 20p$

## Simplifying Linear Expressions

M

Simplify each expression.

1)  $\frac{1}{2}(8x - 6 + 2x) + 10 + 2x$

2)  $2(5a + 10) - 3(2a + 1) + 4(a + 5)$

3)  $5(2s + 4 + 3s) - 4(s + 7)$

4)  $7(5n + 4 + 7n - 10 + 3n) - 30$

5)  $-3(4 + z) - 5(-2 + z) + 2(11z + 3)$

6)  $2\left(\frac{1}{2}c + 5 - \frac{3}{2}c + \frac{1}{2}\right) + 21c$

7)  $-60 + 4(5y - 11) + 30(y + 2)$

8)  $\frac{7}{3}(-12m - 9 - 6m) + 2m - 8$

9)  $\frac{5}{4}(8d - 16 + 4d) - 15 - d + 21$

10)  $4(2p + 4 - 2p - 6) + 4(3p - 5)$

## Simplifying Polynomial Expressions

E

Simplify each expression.

1)  $3x^2 - 5x^3 - x(2x^2 + 4x)$

2)  $a^2 - 2a + 5a^3 + 1 - 10a$

3)  $17 - 3s^2 + 2s^2 - 5s^3 + 5$

4)  $17p + 8p^3 - 4 - 5(p^3 - 2)$

5)  $3(7r^{10} - 4r^9 - 5r^{10})$

6)  $11c^5 - 9c^6 + 15c^5 - 13c^6 + 5c^6$

7)  $5m^5 - 7m^3 + 3m^2 - 5m^5$

8)  $5d^2 + 2d^2 - 8d^3 - (2d^2 + 5d)$

9)  $15x^2 - 7x^4 + 25x^3 - 10x^4 + 35x^3 - 5x^4$

10)  $2(n^2 + 2n^2 - 5n^3) + 8n^3 + 19$

11)  $-5(b^6 + 10) - 8(14 + b^6)$

12)  $10 + 2y^2 - (8y^3 - y^2 + 5y^3)$

## Simplifying Polynomial Expressions

M

Simplify each expression.

1)  $3(4x - 5) - 2(3x + 7) + 4(2x - 8)$

2)  $\frac{3}{2}(2a^2 + 6a^3 - 9a^5 + 8a^2 - 3a^5 + 2a^3)$

3)  $(2m^3 + 4m^2)(2m^2 + 5m^3)$

4)  $10s^7 + 2(s^6 - 5s^9) - s(4s^6 + 8)$

5)  $10p(2p^5 - 4p^9 + 3p^7 - 2p^7 + 5p^5) + 4$

6)  $\frac{4}{3}(8x^2 + 9x^3 - 2x^2) - \frac{12}{5}(5x^3 + 10)$

7)  $3(15d^2 - 10d^2 + 7d^3) - 25d^2 + 2d^2 + 8d^3$

8)  $(r - 4)(7r^2 - 2r^2 + 5r^3)$

9)  $\frac{1}{2}(-8x^7 + 2x^9 - 6x^7 + 4x^9 - 10)$

10)  $5(a^6 + 2a^5) - 6a(5a^4 - 7a^3)$

## Missing Terms

Find the missing term in each equation.

1)  $10x - 8x + 2 + \underline{\hspace{2cm}} = 2x + 12$

2)  $5a + 10 - 3a + \underline{\hspace{2cm}} = 4a + 10$

3)  $\underline{\hspace{2cm}} - 4 - 2p + 5 = 6p + 1$

4)  $7d - 4 + 3 - 2d = \underline{\hspace{2cm}} - 1$

5)  $12c - 8 - 2c + 10 - 4 = 10c - \underline{\hspace{2cm}}$

6)  $2m - 3 - \underline{\hspace{2cm}} + 17 = 14$

7)  $2z + 3z - 8 + 10 - 7z - 7 = - \underline{\hspace{2cm}} - 5$

8)  $4r + 12 - 2r - 10 + 2 = 2r + \underline{\hspace{2cm}}$

9)  $10x + 2 + \underline{\hspace{2cm}} - 3 + 5x = 22x - 1$

10)  $\underline{\hspace{2cm}} - 14 + 2n + 7 + 1 = 10n - 6$

Find the value of 'z' in each problem.

1)  $3a - 2 + z - 6 = 8a - 8$

2)  $-12 + 2y + 4 - 2z = 2y + 8$

z =                     

z =

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## Translating Phrases: Single-Variable

E

Translate each verbal phrase into an algebraic expression.

1) Two-ninths of  $h$

\_\_\_\_\_

2)  $g$  reduced by 1

\_\_\_\_\_

3) The quotient of the square of  $r$  and 6

\_\_\_\_\_

4) Combine the cube of  $k$  and 27

\_\_\_\_\_

5)  $y$  raised to the fourth power

\_\_\_\_\_

6) 10 multiplied by  $m$

\_\_\_\_\_

7) One-half of the cube of  $k$

\_\_\_\_\_

8) The square of  $d$

\_\_\_\_\_

9) Add  $x$  to 4

\_\_\_\_\_

10)  $j$  diminished by two-thirds

\_\_\_\_\_



## Translating Phrases: Single-Variable

M

Translate each verbal phrase into an algebraic expression.

1) Subtract 16 from the square of  $v$

\_\_\_\_\_

2) Four-ninths of  $g$  increased by 1

\_\_\_\_\_

3) The cube of  $h$

\_\_\_\_\_

4) Three-quarter less than 10 times  $x$

\_\_\_\_\_

5)  $f$  raised to the fourth power divided by 13

\_\_\_\_\_

6) 6 multiplied by the square of  $n$

\_\_\_\_\_

7) The cube of  $d$  increased by 8

\_\_\_\_\_

8) Two-thirds of  $k$  reduced by 5

\_\_\_\_\_

9)  $t$  raised to the fifth power diminished by 1

\_\_\_\_\_

10) 2 divides the sum of  $j$  and 9

\_\_\_\_\_

## Translating Phrases: Single-Variable

M

Translate each verbal phrase into an algebraic expression.

- 1) The total of  $b$  and 5 is raised to the sixth power \_\_\_\_\_
- 2) 1 added to the quotient of the cube of  $r$  and 7 \_\_\_\_\_
- 3) The cube of difference between  $y$  and 4 \_\_\_\_\_
- 4) The sum of 5 and the square of  $p$  is divided by 2 \_\_\_\_\_
- 5) Take away 9 from 3 times the square of  $k$  \_\_\_\_\_
- 6) 4 divides the difference between 7 times  $t$  and 3 \_\_\_\_\_
- 7) Subtract the square of  $v$  from the cube of 2 \_\_\_\_\_
- 8) Add three-fifths to twice the square of  $h$  \_\_\_\_\_
- 9) The sum of  $g$  and 1 raised to the fifth power is added to 6 \_\_\_\_\_
- 10) Add 16 to twice the cube of  $d$  \_\_\_\_\_

## Translating Phrases: Multi-Variable

E

Translate each verbal phrase into an algebraic expression.

1)  $p$  decreased by the total of  $q$  and  $r$  \_\_\_\_\_

2) Three less than the sum of  $x$  and  $y$  \_\_\_\_\_

3)  $c$  added to the square of  $b$  \_\_\_\_\_

4) The sum of  $m$  and  $n$  \_\_\_\_\_

5) Twice of  $p$  minus  $q$  \_\_\_\_\_

6) Subtract the product of  $x$  and  $y$  from 58 \_\_\_\_\_

7) The ratio of  $v$  to  $w$  \_\_\_\_\_

8) 5 times  $g$  reduced by the square of  $h$  \_\_\_\_\_

9) The product of  $p$ ,  $q$  and  $r$  \_\_\_\_\_

10) 6 is subtracted from the sum of  $x$  and 2 times  $y$  \_\_\_\_\_

## Translating Phrases: Multi-Variable

M

Translate each verbal phrase into an algebraic expression.

- 1) One-quarter of  $c$  added to the square of  $b$  \_\_\_\_\_
  
- 2) Subtract 12 from the square of sum of  $w$  and  $v$  \_\_\_\_\_
  
- 3) One-half of total of  $x$  and twice of  $y$  \_\_\_\_\_
  
- 4) 5 divides  $m$  plus  $n$  \_\_\_\_\_
  
- 5) Difference between the quotient of  $p$  and  $q$  and one-quarter \_\_\_\_\_
  
- 6) Multiply the square of  $b$ ,  $c$  and the cube of  $d$  \_\_\_\_\_
  
- 7) Add one-half and 4 times the square of  $w$  plus  $v$  \_\_\_\_\_
  
- 8) The ratio of power 3 of  $y$  to 5 increased by  $z$  \_\_\_\_\_
  
- 9) Twice of  $p$  decreased by  $q$  reduced by 5 times  $r$  \_\_\_\_\_
  
- 10) The cube of difference between  $j$  and  $k$  \_\_\_\_\_