Expressions & Equations Chapter Questions

1. Explain how distribution can simplify a problem.

2. What are like terms?

3. How do you combine like terms?

4. What are inverse operations? Name them.

5. How do you solve equations?

6. What are two different ways to solve equations with fractional distributive property?

7. What do you do when an equation has variables on both sides?

8. How do we translate a statement into an inequality?

9. Explain the steps to graphing an inequality on a number line.

10. How is solving an inequality much like solving a linear equation?
Expressions & Equations Chapter Problems

Commutative and Associative Properties

Classwork

1) Identify the property as Commutative Property of Addition, Commutative Property of Multiplication, Associative Property of Addition, or Associative Property of Multiplication
   a. \( 3 \times (4 \times 5) = (3 \times 4) \times 5 \)
   b. \( 6 + 5 = 5 + 6 \)
   c. \( 12 \times 15 = 15 \times 12 \)
   d. \( 2 + (9 + 4) = (2 + 9) + 4 \)
   e. \( r + t = t + r \)
   f. \( f (gh) = (fg)h \)

Homework

2) Identify the property as Commutative Property of Addition, Commutative Property of Multiplication, Associative Property of Addition, or Associative Property of Multiplication
   a. \( 4 + 7 = 7 + 4 \)
   b. \( 12 (10 \times 8) = (10 \times 12) 8 \)
   c. \( 5 \times 4 = 4 \times 5 \)
   d. \( (15 + 9) + 45 = 15 + (9 + 45) \)
   e. \( 5(2x) = 2(5x) \)
   f. \( 3 + (b + 9) = (3 + b) + 9 \)

Like Terms

Classwork

3) Create a like term for the given term.
   a. \( 4x \)
   b. \( 13y \)
   c. \( 15x^2 \)
   d. \( 16xy \)
   e. \( X \)

Homework

4) Create a like term for the given term.
   a. \( 6x \)
   b. \( Y \)
   c. \( 10x^2 \)
   d. \( 14xy \)
   e. \( -5x \)
**Combining Like Terms**

**Classwork**

5) Simplify the expression if possible.

a. $7x + 8x$
b. $6x + 8y + 2x$
c. $15x^2 + 5x^2$
d. $-10y + 4y$
e. $x + 2x$
f. $x^2 + 5x^2$
g. $2x + 4x + 3$
h. $6y - 3y$
i. $9y + 4y - 2y + y$

**Homework**

6) Simplify the expression if possible.

a. $15x^2 + 5x^2 + 2x$
b. $-10y + 4y - 5$
c. $x + 2x + x + 5x$
d. $6x^2 + 5x^2$
e. $12x + 14x + 3y$
f. $6y - 3y + 6xy + 4xy$
g. $9y + 4y - 2y + y$
h. $x + 5x + x + 12 - 7x$
i. $8x - 3x + 2x + 15 - 7x$

**Distributive Property**

**Classwork**

7) Use the Distributive Property to rewrite the expressions without parentheses

a. $(x + 4)$
b. $8(x - 2)$
c. $6(x + 4)$
d. $-1(x - 4)$
e. $(x + 2)8$
f. $\frac{3}{4}(4x + 12)$
g. $1.2(3x - 7.1)$

8) Use the Distributive Property to factor the following expressions

a. $5x + 35$
b. $2x + 24x$
c. $7r + 42t$
d. $3j + 24k + 33m$
e. $4x^2 + 20x$
f. $-9p + 6q$
g. $-15n - 45v$

9) If a square has a perimeter of $8x + 36$, how much is each side?
Homework

10) Use the Distributive Property to rewrite the expressions without parentheses
   a. 5(x + 4)
   b. 7(x – 12)
   c. 3(x - 14)
   d. -1(x – 2)
   e. (x - 2)5
   f. ⅔(6x + 12)
   g. 2.5(3x – 4.1)

11) Use the Distributive Property to factor the following expressions
   a. 12b + 48
   b. 6m + 14m
   c. 16y + 56z
   d. 8e + 24f + 28g
   e. 12d² + 15d
   f. -14r + 21t
   g. -9c – 15h

12) If a triangle has a perimeter of 12w + 18, how much is each side?

Simplifying Algebraic Expressions

Classwork

13) Simplify the algebraic expression if possible.
   a. 7y + 8x + 3y + 2x + 9
   b. 6x + 8y - 2x – y
   c. 4x + 7
   d. x + 5x + x + 12
   e. 8x – 3x + 2x + 15
   f. 17x + 18x + 3
   g. 7y + 8x + 3y + 2x
   h. 18 + (x – 4)² – 4
   i. 5x +2(x + 8)
   j. 9(x + 5) + 7(x – 3)
   k. 8 + (x – 4)²
   l. 5x +2(x + 8) + 3
   m. 9(x - 5) + 7(x + 3)
   n. 12(x +4) –(9x + 3)

Homework

14) Simplify the algebraic expression if possible.
   a. 5x + 4x + 7y + 3y +12
   b. 22x + 9y – 14 x - 6y
   c. 25x – 15
   d. 2x + 42 x + 9x + 13
   e. 14x – 12x – 2x -9
   f. 23x + 28x + 11
   g. 5x + 7y + 4y + 16x
   h. 2(x+5) – 8 + 5x
   i. 6x + 5(x + 7)
j. \(3(4v + 10) + 8(5v + 2)\)

k. \(9 + 2k + (7 - 2k)\)

l. \(12j + 3(x + 6) + 19\)

m. \(12(x + 0.5) + 14(x + 2)\)

n. \(5(2t + 4) - (13t - 9)\)

**Inverse Operations**

**Classwork**

15) Name the inverse operation needed to solve for the variable.

   a. \(x + 9 = 17\)

   b. \(y - 8 = 5\)

   c. \(m + 5 = 21\)

   d. \(\frac{w}{6} = 12\)

   e. \(9v = 108\)

**Homework**

16) Name the inverse operation needed to solve for the variable.

   a. \(t - 18 = 54\)

   b. \(14x = 228\)

   c. \(m + 19 = 51\)

   d. \(11b = 66\)

   e. \(\frac{m}{4} = 2\)

**One Step Equations**

**Classwork**

17) Solve.

   a. \(n + 7 = 20\)

   b. \(x + 9 = -8\)

   c. \(a - 15 = 27\)

   d. \(y - 21 = -15\)

   e. \(50 + w = 92\)

   f. \(-4 + m = 18\)
g. \( \frac{m}{8} = 16 \)

h. \( 30 = 12m \)

i. \(-5m = 25 \)

j. \( \frac{1}{6}t = 12 \)

k. \(-10c = -80 \)

l. \( n - (-6) = 12 \)

m. \(-82 + x = -20 \)

n. \( \frac{-r}{2} = 5 \)

o. \( r - 3.4 = 7.1 \)

p. \( \frac{g}{2.5} = 1.8 \)

q. \( 4.8m = 43.2 \)

r. \( \frac{3}{4}t = \frac{9}{20} \)

s. \( 3\frac{2}{3} + m = 5\frac{1}{6} \)

Homework

18) Solve.

a. \( n + 9 = 13 \)

b. \(-14 + b = 21 \)

c. \( z - 18 = -14 \)

d. \(-7 + g = -12 \)

e. \( 19 = 15 + y \)

f. \( b + (-4) = 13 \)

g. \( \frac{q}{3} = 33 \)

h. \(-18x = -360 \)

i. \( x - 11 = 4 \)

j. \( \frac{1}{5}n = 15 \)

k. \(-15c = -75 \)

l. \(-8 + r = 27 \)

m. \(19 + m = 3 \)

n. \( \frac{-w}{8} = 1 \)

o. \( p - 4.8 = 11.2 \)

p. \( \frac{g}{3.4} = 2.2 \)

q. \( 3.6m = 25.2 \)

r. \( \frac{2}{5}t = \frac{8}{25} \)

s. \( 5\frac{5}{6} + m = 3\frac{5}{12} \)
Two Step Equations

Classwork

Solve.

19) \(7x - 2 = 26\)
20) \(\frac{1}{2} (m - 3) = 12\)
21) \(-6h - 6 = 30\)
22) \(5x + 20 = -20\)
23) \(3 = -3y - 15\)
24) \(-24 = 14y - 5\)
25) \(7r - 5 = 10\)
26) \(9 = 16y + 51\)
27) \(13x + 6 = 6\)
\[\frac{x}{4} + 11 = 5\]
28) \(-4.5x + 12.3 = -23.7\)
29) \(\frac{2}{3}x + 4 = 4.3\)
30) \(-\frac{x}{3} + (-7.2) = -2.1\)
31) \(5.4x - 8.3 = 14.38\)
32) \(\frac{2}{3}x - 14 = -8\frac{1}{3}\)

Homework

34) \(2m - 8 = -28\)
\[\frac{x}{9} - 3 = 8\]
35) \(12m + 20 = -40\)
\[-\frac{x}{3} + 5 = 21\]
36) \(8r - 27 = -19\)
\[6 + \frac{k}{3} = 33\]
37) \(15 = -4y - 9\)
38) \(8w + 4 = -36\)
39) \(4a - 15 = -23\)
40) \(44 = 5x - 6\)
41) \(-3.7x + 5.6 = -5.87\)
42) \(\frac{2}{5}x + 7 = 8.32\)
46) $-\frac{2}{4} + (-9.8) = -5.6$

47) $3.7x - 2.2 = 16.3$

48) $\frac{5}{6}x - 3.7 = 11 \frac{17}{20}$

**Multi-Step Equations**

**Classwork**

Solve.

49) $8s - (8 + 6s) = 20$
50) $34 = 2x + 8(x + 3)$
   \[
   \frac{3}{4}(x + 9) = 15
   \]
51) \[
\frac{2}{3}(m - 8) = 4
\]
52) $35 = 22x - 12x + 5$
53) $6(b + 8) = 54$
54) $99 = 33x + 3(3x + 5)$
55) $-t + (5t - 7) = -5$
56) $21 - 3(2 - w) = -12$
57) $9 = 8b - (2b - 3)$
58) $4.5r - 2r + 3(r - 1) = 10.75$
   \[
   \frac{2}{3}p + 3\left(\frac{2}{3}p - 8\right) = -10
   \]
59) $6(m + 4) - 2m = -8$
60) $44 = 4(8 + h)$
   \[
   \frac{3}{4}(8t - 4) = -2
   \]
61) $3(5 - t) - 4t = 18$
62) $4(2.25w + 3.1) - 2.75w = 44.9$

**Homework**

Solve.

63) $6(m + 4) - 2m = -8$
64) $44 = 4(8 + h)$
   \[
   \frac{3}{4}(8t - 4) = -2
   \]
65) $3(5 - t) - 4t = 18$
66) $2(y - 5) = 16$
68) \(0.1(h + 20) = 3\)
\[
\frac{3z}{8} - 4 = 5
\]
69) 
70) \(8.6 = 6j + 4j\)
71) \(12z - (4z + 6) = 82\)
72) \(5.4d - 2.3d + 3(d - 4) = 16.67\)
\[
\frac{3 - 4}{4} + 4(\frac{3}{4} p - 12) = -79.25
\]
73)
74) \(-5.3m + (-3.9m) - 17 = -94.28\)
75) \(6(3.5y + 4.2) - 2.75y = 134.7\)

### Distributing Fractions in Equations

#### Classwork
76) \(\frac{3}{4}(x+9) = 15\)
77) \(\frac{2}{3}(m - 8) = 4\)
78) \(\frac{1}{8}(b + 2) = \frac{3}{8}\)
79) \(\frac{1}{7}(1x - 4) = -\frac{1}{2}\)
80) \(\frac{2}{5}(- 3 - 2x) = \frac{18}{5}\)
81) \(\frac{4}{5}(j + 5) = \frac{2}{5}\)
82) \(\frac{3}{4}(8x + 12) = 21\)
83) \(\frac{1}{2}(8r + 10) = 17\)

#### Homework
84) \(\frac{2}{9}(x + 4) = 6\)
85) \(\frac{5}{8}(3x + 7) = 10\)
86) \(\frac{3}{10}(x - 3) = \frac{6}{10}\)
87) \(\frac{2}{3}(m + 2) = \frac{4}{5}\)
88) \(\frac{3}{4}(2x + 7) = \frac{9}{4}\)
89) \(\frac{6}{7}(2x - 12) = \frac{12}{7}\)
90) \(\frac{2}{3}(6x + 18) = 20\)
91) \(\frac{6}{5}(10z + 15) = -6\)

### Translating Between Words and Equations
**Classwork**

92) Write an equation then solve.
   a. You sold 4 more than three times as many newspapers this week as last week. If you sold 112 altogether, how many did you sell this week?
   b. Find the width of a rectangle if its length is 5 more than the width and its perimeter is 90 cm.
   c. Four times the sum of a number and -3 is 27 less than the number.
   d. Three times twenty-one more than a number is twelve. What is the number?

**Homework**

93) Write an equation then solve.
   a. You sell brownies for $3 each. You sold 12 more this week than last. Altogether, you made $84. How many brownies did you sell each week?
   b. Find the length of a rectangle if its width is 13 less than the length and its perimeter is 90 cm.
   c. Six times the difference of a number and 9 is 19 less than the number.
   d. Eight times seven more than a number is sixteen. What is the number?

**Using Numerical and Algebraic Expressions and Equations**

**Classwork**

94) Selina, Elena, and Peter all worked on the same homework assignment. At 6:00 pm Selina had finished 54%, Elena had finished 2/3 of the work, and Peter finished 0.63 of his homework. Who finished the least amount of homework by 6:00pm?

95) Kimberlyn bought a coat for 20% off. The original price was $95.00. How much did Kimberlyn pay?

96) Kiran bought a video game for $48.00. The sales tax was 7%. How much in total did Kiran pay for his game?

97) Rafael has 3 times as many blue marbles as he does red marbles. He has a total of 124 marbles. How many red marbles does he have? How many blue marbles does he have?

98) Luna is going bowling. Shoe rental cost $3 and the lane cost $2 per game. If Luna paid a total of $17, how many games did she bowl?

**Homework**

99) Lucas, Jerrell, and Brianna all ran a marathon. Lucas ran 5/9 of the marathon, Jerrell ran 63% of the marathon, and Brianna ran 0.46 of the marathon. Who is in the lead?

100) Kiana bought a cardigan that originally cost $60. She had a 25% off coupon. How much in total did Kiana pay?

101) Joel bought a laptop that cost $859.00. He had to pay 8% tax. How much in total did Joel pay for his laptop?

102) Lorena had 2 times as many pencils as her brother. In total they have 27 pencils. How many pencils does Lorena have? How many does her brother have?

103) Jose went to an all-you-can-eat buffet. He paid $15 for his meal and $2 for each soda. If Jose spent $21, how many sodas did he buy?

**Inequalities with One Variable**

**Classwork**
104) Write an inequality for each sentence below, and then graph the solutions of each inequality on a number line.

a. $y$ is less than 8.

\[ y < 8 \]

b. $f$ is greater than -5.

\[ f > -5 \]

c. $j$ is greater than or equal to 4.

\[ j \geq 4 \]

d. The speed limit, $s$, cannot exceed 55 mph.

\[ s \leq 55 \]

e. 10 is less than or equal to $x$.

\[ 10 \leq x \]

f. A number, $x$ is at least 15.

\[ x \geq 15 \]

g. A number, $h$ is not greater than 4.

\[ h \leq 4 \]

h. $x$ is not more than 20.

\[ x \leq 20 \]

i. A number, $z$, is negative.

\[ z < 0 \]

j. To have a passing grade, $g$, must exceed a 70.

\[ g > 70 \]
k. $k$ is less than or equal to -3.

l. The total, $t$, is fewer than 8 items.

m. -2 is less than a number, $n$.

n. The time, $t$, on your quiz cannot exceed 20 minutes.

o. At most, 4 students, $s$, will fail the test.

105) Write an inequality for the graph below.

106) Write an inequality for the graph below.
107) Write an inequality for the graph below.

108) Write an inequality for the graph below.

109) Write an inequality for the graph below.

110) Write an inequality for the graph below.

Homework
111) Write an inequality for each sentence below, and then graph the solutions of each inequality on a number line.

a. \( w \) is greater than 7.

\[\rightarrow\]

b. \( p \) is less than or equal to -1.

\[\rightarrow\]

c. \( m \) is less than 5.

\[\rightarrow\]

d. 11 is greater than or equal to \( k \).

\[\rightarrow\]

e. A number, \( f \) is positive.

\[\rightarrow\]

f. The total, \( t \) is fewer than 4 items.

\[\rightarrow\]

g. 4 is less than a number, \( n \).

\[\rightarrow\]

h. The speed limit, \( s \), cannot exceed 25 mph.

\[\rightarrow\]

i. A number \( c \) is at least 12.

\[\rightarrow\]

j. \( w \) is not more than 50.

\[\rightarrow\]
k. $g$ is more than or equal to 8.

l. $h$ is not less than -5.

m. The time, $t$ for lunch cannot exceed 30 minutes.

n. At most, 25 students, $s$, will be in the class.

o. To have an A in class, $g$, must exceed a 92.

112) Write an inequality for the graph below.

113) Write an inequality for the graph below.
114) Write an inequality for the graph below.

115) Write an inequality for the graph below.

116) Write an inequality for the graph below.

117) Write an inequality for the graph below.

118) Explain how you know if the endpoint of the graph in an inequality should be an open dot or a closed dot.
Simple Inequalities Involving Addition and Subtraction

Classwork

119) Solve, check and graph the following inequalities.
   a. \( x + 5 > 10 \)
   b. \( x + 3 < -2 \)
   c. \( 7 \geq x + 11 \)
   d. \( x - 3 \leq -5 \)
   e. \( x - 7 > 3 \)
   f. \( -2 + x \geq -2 \)
   g. \( -9 \leq x - 3 \)
   h. \( x + 0.5 < 4 \)
   i. \( -3.75 \leq x - 1.25 \)
   j. \( 8.7 > x + 2.2 \)

120) Write an inequality for each sentence below and then solve and check it.
   a. The sum of \( w \) and nine is less than 18.
   b. \( g \) decreased by 25 is at most five.
   c. The difference of a number and six is no less than 15.
   d. 14 is more than the sum of ten and a number.
   e. 25 plus a number is at least 13.

121) Suppose you must maintain at least $500 in your checking account in order to have free checking. Your balance is $542 and then you write a check for $57. How much do you need to deposit in order to keep your free checking? Write an inequality and solve.

122) You need no more than 2,200 calories in a day. You had 650 calories at breakfast and 825 calories at lunch. At most, how many calories, \( c \) can you eat for dinner? Write an inequality and solve.

Homework

123) Solve, check and graph the following inequalities.
   a. \( x + 7 > -2 \)
   b. \( x + 3 \leq -3 \)
   c. \( -8 < x + 15 \)
   d. \( x - 4 \leq 1 \)
   e. \( x - 1 > 6 \)
   f. \( -7 + x \geq -11 \)
   g. \( -6 \leq x - 2 \)
   h. \( x + 2.5 < 6 \)
   i. \( -5.5 \leq x - 3.25 \)
j. \( 7.9 > x + 4.4 \)

124) Write an inequality for each sentence below and then solve and check it.
   a. The difference of a number and seven is at most 16.
   b. 18 is less than a number plus 7
   c. \( h \) decreased by 3 is more than 1.
   d. 14 is greater than or equal to the sum of 18 and a number.
   e. The sum of \( b \) and 22 is at least 6

125) Suppose you must maintain at least $500 in your checking account in order to have free checking. Your balance is $612 and then you make a deposit of $79. How much can you withdraw and still keep your free checking? Write an inequality and solve.

126) You need no more than 2,200 calories in a day. You had 720 calories at breakfast and plan on having 1,000 calories at dinner. How many calories, \( c \) can you eat for lunch? Write an inequality and solve.

**Simple Inequalities Involving Multiplication and Division**

**Classwork**

127) Solve, check and graph the following inequalities.
   a. \( 5x > -25 \)
   b. \( -7x \leq -21 \)
   c. \( 18 > 2x \)
   d. \( 25x \geq 100 \)
   e. \( -30 \leq -6x \)
   f. \( 10x < 0 \)
   g. \( 8x \geq 24 \)
   h. \( 40 \leq -8x \)
   i. \( 20x \geq 30 \)
   j. \( 350 > -70x \)

128) Solve, check and graph the following inequalities.
   a. \( \frac{x}{5} \geq 2 \)
   b. \( \frac{x}{2} < 14 \)
   c. \( -3 \leq \frac{x}{-6} \)
   d. \( \frac{x}{-9} > 1 \)
   e. \( \frac{x}{-4} \geq -3 \)
f. $\frac{x}{3} \leq 3$

g. $0 \leq \frac{x}{8}$

h. $-1 \geq \frac{x}{2.5}$

i. $\frac{x}{-1} < 2.2$

j. $\frac{x}{-1.5} > -10$

129) Write an inequality for each sentence below and then solve and check it.
   a. The product of $r$ and 5 is no more than 55.
   b. The quotient of $v$ divided by -4 is greater than or equal to 2.
   c. Half of $d$ is greater than 40.
   d. Twice a number is at most 24.
   e. One-fourth of $y$ is less than or equal to -12.
   f. The product of -8 and $x$ is no less than -64.

130) What happens to the inequality symbol when you do each of the following to both sides of an inequality?
   a. Multiply by a positive number
   b. Divide by a positive number
   c. Add a negative number
   d. Subtract a negative number
   e. Divide by a negative number
   f. Multiply by a negative number

Homework

131) Solve, check and graph the following inequalities.
   a. $4x \leq -16$
   b. $32 \leq 8x$
   c. $-7x > 49$
   d. $-5x < -55$
   e. $13x \geq 0$
   f. $60 < 12x$
   g. $66 \geq -3x$
   h. $-6x \geq 360$
   i. $-2x \geq 17$
   j. $26 < 4x$

132) Solve, check and graph the following inequalities.
a. $5 \leq \frac{x}{3}$

b. $\frac{x}{3} < -3$

c. $\frac{x}{-8} \geq 0$

d. $\frac{x}{3} > 11$

e. $4 \leq \frac{x}{-1}$

f. $-4 \geq \frac{x}{-6}$

g. $\frac{x}{-4} \geq -1.5$

h. $\frac{x}{4} \leq 12$

i. $\frac{x}{-6} > -9$

j. $\frac{x}{-2} < 3.3$

133) Write an inequality for each sentence below and then solve and check it.
   
a. Four times a number $n$ is no more than 24.
   
b. One-third of $m$ is greater than 9.
   
c. The product of -9 and $g$ is at most 81.
   
d. Half of $d$ is less than or equal to 16.
   
e. The quotient of $v$ divided by -6 is less than 4.
   
f. The product of 7 and $x$ is no less than -42.

Expressions & Equations Multiple Choice Questions
Determine whether the given terms are like terms. Circle your response.

134) \(3x\) and \(-2x\)  Are Like Terms  Are Unlike Terms
135) \(5a\) and \(5b\)  Are Like Terms  Are Unlike Terms
136) \(4y\) and \(5xy\)  Are Like Terms  Are Unlike Terms
137) \(x2y\) and \(xy2\)  Are Like Terms  Are Unlike Terms
138) \(22\) and \(14\)  Are Like Terms  Are Unlike Terms
139) \(xy\) and \(-xy\)  Are Like Terms  Are Unlike Terms

140) Match the expression \(3(-4 + 3)\) with an equivalent expression.
   a) \(4(3) + 4(3)\)  b) \(3(-4) + 3(3)\)
   c) \(4(3) - 4(3)\)  d) \(3(4) + 3(3)\)

141) What is the inverse of Subtraction?
   a) addition  b) division
c) subtraction  d) multiplication

142) Identify the following as:
   Commutative Property of Addition
   Commutative Property of Multiplication
   Associative Property of Addition
   Associative Property of Multiplication.
   a. \(4 \times 7 = 7 \times 4\)
   b. \(19 \times (4 \times 12) = (19 \times 4) \times 12\)
   c. \(14 + (6 + 4) = (14 + 6) + 4\)
   d. \(22 + 5 = 5 + 22\)

143) Edgar, Mufasa, and Ben shoveled the walkway of their houses. Edgar shoveled \(\frac{3}{8}\) of his walkway, Mufasa shoveled 27%, and Ben shoveled 0.34. Who is the furthest along?
   a. Edgar  b. Mufasa  c. Ben

144) Erika bought a necklace that listed for $49.50. She had a coupon for 14% off and then had to pay 7% tax. What was the total cost of the necklace?
   a. $42.75  c. $39.11
   b. $52.97  d. $45.55

145) Jason went to a carnival where he could go on all rides for a flat fee of $30 but he had to pay $2 for each arcade game he played. Jason spent $44. How many arcade games did he play?
Expressions & Equations Short Constructed Response

146) Simplify the expressions:
   a. $2x + 3x - 7$
   b. $17b + 9 - 2b + 16$
   c. $2x^2 + 4x + 13x^2 + x^2$
   d. $4(g - 5) + 9g$
   e. $12h - (6h - 5) + 18$

147) Solve the following equations:
   a. $2b = -94$
   b. $r + 19 = -52$
   c. $9x + 6 = 33$
   d. $\frac{m}{4} + 8 = 14$
   e. $6(p + 2) = 30$
   f. $\frac{2}{3} (6t + 12) = 28$
   g. $4(k + 3) + 5k = 75$
   h. $\frac{3}{5} (h + 10) = 9$
   i. $\frac{4}{7} (2c + 9) = \frac{3}{7}$
   j. $\frac{4}{5} (3n + 2) = \frac{1}{2}$

148) Milan has 4 times as many baseball cards as Richard. Together they have 125 baseball cards. How many cards does Milan have? How many cards does Richard have?

149) A rectangle is 6 inches longer than it is wide. The perimeter of the rectangle is 44 inches. Write and solve an equation for the length and width of the rectangle.

150) You and a friend worked in the school store last week. You worked 4 hours less than your friend. Together, you worked 36 hours. Write and solve an equation to find the total number of hours you both worked.
151) A trail mix contains peanuts, raisins, and M&Ms. In the mix, the amount of peanuts is three times the amount of M&Ms; and the amount of raisins is two times the amount of M&Ms. There is a total of 96 items in the trail mix. Write and solve an equation for the total number of each type of food in the trail mix.

152) Write an expression containing three terms that is in simplest form. One of the terms should be a constant.

153) Simplify: \(5 - 2(3x - 4) + x\)

**Expressions & Equations Extended Constructed Response**

154) At the video arcade, Jenny buys 25 tokens. She uses two tokens for each game she plays.

a) Write an expression for the number of tokens Jenny has left after playing \(g\) games.

b) Find the number of tokens Jenny has left after playing 1, 4, 6, 10 and 12 games.

155) Bob wants to go to the movies with his friends. The movie theater charges $8 per ticket. Bob’s friends reserve $48.00 worth of tickets in advance. How many people in total can attend the movie?

a) Identify the variable
b) Write an equation which includes the number of people attending the movie, the price of each ticket, and the total cost of the movie.

c) Solve the equation you wrote in part (b), make sure to show all steps.

156) Write an expression that has four terms and simplifies to 16x.

a) Identify the like terms

b) Identify the coefficients

c) Identify the constant terms

157) Mary is 5 years older than Bob. If the sum of their ages is 39, write and solve an equation to find their ages.

158) A cell phone company is offering 2 different monthly plans. Each plan charges a monthly fee plus an additional cost per minute.

**Plan A:** $40 fee plus $0.45 per minute

**Plan B:** $70 fee plus $0.35 per minute
a) Write an expression to represent the cost of Plan A

b) Write an expression to represent the cost of Plan B

c) Which plan would be least expensive for a total of 100 minutes?

159) Chad complained to his friend that he had five equations to solve for homework. Are all of the homework problems equations? Justify your answer.

Math Homework

1) \(3x^2 \cdot 2x^4\)
2) \(5 - 2x = 3x\)
3) \(3(2x + 7)\)
4) \(7x^2 + 2x - 3x^2 - 9\)
5) \(\frac{2}{3} = \frac{x + 2}{6}\)


Answer Key

1.
   a. Associative Property of Multiplication
   b. Commutative Property of Addition
   c. Commutative Property of Multiplication
   d. Associative Property of Addition
   e. Commutative Property of Addition
   f. Associative Property of Multiplication

2.
   a. Commutative Property of Addition
   b. Associative Property of Multiplication
   c. Commutative Property of Multiplication
   d. Associative Property of Addition
   e. Associative Property of Multiplication
   f. Associative Property of Addition
3.
   a. Multiple Answers
   b. Multiple Answers
   c. Multiple Answers
   d. Multiple Answers
   e. Multiple Answers

4.
   a. Multiple Answers
   b. Multiple Answers
   c. Multiple Answers
   d. Multiple Answers
   e. Multiple Answers

5.
   a. 15x
   b. 8x + 8y
   c. 20x^2
   d. -6y
   e. 3x
   f. 6x^2
   g. 6x + 3
   h. 3y
   i. 12y

6.
   a. 20x^2 + 2x
   b. -6y - 5
   c. 9x
   d. 11x^2
   e. 26x + 3y
   f. 3y + 10xy
   g. 12y
   h. 12
   i. 15

7.
   a. x + 4
   b. 8x - 16
   c. 6x + 24
   d. -x + 4
   e. 8x + 16
   f. 2 \frac{1}{2} x + 7 \frac{1}{2}
   g. 3.6x - 8.52

8.
   a. 5(x + 7)
   b. 2(x + 12)
   c. 7(r + 6t)
   d. 3(j + 8k + 11m)
   e. 4x(x + 5)
   f. 3(-3p + 2q)
   g. -15(n + 3v)

9.
   2x + 9

10.
   a. 5x + 20
   b. 7x - 84
   c. 3x - 42
   d. -x + 2

11.
   a. 12(b + 4)
   b. 2m (3 + 7)
   c. 8(2y + 7z)
   d. 4(2e + 6f + 7g)
   e. 3d(4d + 5)
   f. 7(-2r + 3t)
   g. -3(3c + 5h)

12. 4w + 6

13.
   a. 10x + 10y + 9
   b. 4x + 7y
   c. 4x + 7
   d. 7x + 12
   e. 7x + 15
   f. 35x + 3
   g. 10x + 10y
   h. 2x + 6
   i. 7x + 16
   j. 16x + 24
   k. 2x
   l. 7x + 19
   m. 16x - 24
   n. 3x + 45

14.
   a. 9x + 10y + 12
   b. 8x + 3y
   c. 25x - 15
   d. 53x + 13
   e. -9
   f. 51x + 11
   g. 21x + 11y
   h. 7x + 2
   i. 11x + 35
   j. 52v + 46
   k. -8k + 44
   l. 12j + 3x + 37
   m. 26x + 34
   n. -3t + 29

15.
   a. Subtraction
   b. Addition
   c. Subtraction
   d. Multiplication
   e. Division

16.
   a. Addition
   b. Division
   c. Subtraction
   d. Division
   e. Multiplication
17.  
a. 13  
b. -17  
c. 42  
d. 6  
e. 42  
f. 22  
g. 128  
h. 2 ½  
i. -5  
j. 72  
k. 8  
l. 6  
m. 62  
n. -10  
o. 10.5  
p. 4.5  
q. 9  
r. ¾  
s. 1 ½  

18.  
a. 4  
b. 35  
c. 4  
d. -5  
e. 4  
f. 17  
g. 99  
h. 20  
i. 15  
j. 75  
k. 5  
l. 35  
m. -16  
n. -8  
o. 16  
p. 7.48  
q. 7  
r. ¾  
s. -2 ⁵⁄₁²  

19. 4  
20. 27  
21. -6  
22. -8  
23. -6  
24. -19/14  
25. 15/7  
26. -21/8  
27. 0  
28. 24  
29. 8  
30. 0.5  
31. -15.3  
32. 4.2  
33. 8 ½  
34. -10  
35. 99  
36. -5  
37. -48  
38. 1  
39. 81  
40. -6  
41. -5  
42. -2  
43. 10  
44. 3.1  
45. 3.3  
46. -16.8  
47. 5  
48. 18.66 or 18 33/₅₀  
49. 14  
50. 0.166  
51. 11  
52. 14  
53. 3  
54. 1  
55. 2  
56. ½  
57. -9  
58. 1  
59. 2.5  
60. 3  
61. 6.1  
62. 5.2  
63. -8  
64. 3  
65. 3  
66. -3/7  
67. 13  
68. 10  
69. 24  
70. 0.86  
71. 11  
72. 4.7  
73. -5  
74. 8.4  
75. 6  
76. 11  
77. 14  
78. 1  
79. ½  
80. -6  
81. -4 ½  
82. 2  
83. 3  
84. 23  
85. 3
92. a. \(4 + 3x + x = 112; x = 85\)
b. \(4w + 10 = 90; 20\)
c. \(4(x - 3) = x - 27; -5\)
d. \(3(21 + n) = 12; -17\)
93. a. \(6b + 36 = 84; 8\) and \(20\)
b. \(4L - 26 = 90; 29\)
c. \(6(n - 9) = n - 19; 35\)
d. \(56 + 8n = 16; -5\)
94. Selina
95. $76
96. $51.36
97. 31 red, 93 blue
98. 7 games
99. Jerrell
100. $45
101. $927.72
102. brother = 9, Lorena = 18
103. 3 sodas
104. 
   a. \(y < 8\)
   \[
   \begin{array}{c}
   8 \\
   \hline
   \end{array}
   \]
   b. \(f > -5\)
   \[
   \begin{array}{c}
   -5 \\
   \hline
   \end{array}
   \]
   c. \(j \geq 4\)
   \[
   \begin{array}{c}
   4 \\
   \hline
   \end{array}
   \]
   d. \(s \leq 55\)
   \[
   \begin{array}{c}
   55 \\
   \hline
   \end{array}
   \]
   e. \(10 \leq x\)
   \[
   \begin{array}{c}
   10 \\
   \hline
   \end{array}
   \]
   f. \(x \geq 15\)
   \[
   \begin{array}{c}
   15 \\
   \hline
   \end{array}
   \]
111. 
   a. \(w > 7\)
   \[
   \begin{array}{c}
   7 \\
   \hline
   \end{array}
   \]
   b. \(p < -4\)
   \[
   \begin{array}{c}
   -4 \\
   \hline
   \end{array}
   \]
   c. \(m < -5\)
   \[
   \begin{array}{c}
   -5 \\
   \hline
   \end{array}
   \]
   d. \(11 \geq k\)
   \[
   \begin{array}{c}
   11 \\
   \hline
   \end{array}
   \]
e. \( f > 0 \)

f. \( t < 4 \)

g. \( 4 < n \)

h. \( s \leq 25 \)

i. \( x \geq 12 \)

j. \( w \leq 50 \)

k. \( g \geq 8 \)

l. \( h \geq -5 \)

m. \( t \leq 30 \)

n. \( 25 \geq s \)

o. \( g > 92 \)

112. \( x \geq -6 \)

113. \( x \leq -2 \)

114. \( x < 4 \)

115. \( x > 0 \)

116. \( x > -10 \)

117. \( x \geq 2.5 \)

118. Opened: if possibility of being not equal to, Closed: if possibility of equal to

119. a. \( x > 5 \)

b. \( x < -5 \)

c. \( -4 \geq x \)

d. \( x \leq -2 \)

e. \( x > 10 \)

f. \( x \geq 0 \)

g. \( -6 \leq x \)

h. \( x < 3.5 \)

i. \( -2.5 \leq x \)

j. \( 6.5 > x \)

120. a. \( w + 9 < 18, w < 9 \)

b. \( g - 25 \leq 5, g \leq 30 \)

c. \( x - 6 \geq 15, x \geq 21 \)

d. \( 14 > 10 + x, 4 > x \)

e. \( 25 + x \geq 13, x \geq -12 \)

121. \( 542 - 57 + x \geq 500, x \geq 15 \)

122. \( 650 + 825 + c \leq 2200, c \leq 725 \)

123. a. \( x > -9 \)

b. \( x < -6 \)

c. \( -23 < x \)

d. \( x \leq 5 \)

e. \( x > 7 \)

f. \( x \geq -4 \)

g. \( -4 \leq x \)

h. \( x < 3.5 \)
124.
   a. $x-7 \leq 16$, $x \leq 23$
   b. $18 < x + 7$, $11 < x$
   c. $h - 3 > 1$, $h > 4$
   d. $14 \geq 18 - x$, $-42 \geq x$
   e. $b + 22 \geq 6$, $b \geq -16$

125. $612 + 79 \geq 500$, $191 \geq x$

126. $720 + 1000 + c \leq 2200$, $c \leq 480$

127.
   a. $x > -5$
   b. $x \geq 3$
   c. $9 \geq x$
   d. $x \geq 4$
   e. $b + 22 \geq 6$, $b \geq -16$

128.
   a. $x \geq 10$
   b. $x < 28$
   c. $18 \geq x$

129.
   a. $5r \leq 55$, $r \leq 11$
   b. $v/(4) \geq 2$, $v \leq -8$
   c. $(d/2) > 40$, $d > 80$
   d. $2x \leq 24$, $x < 12$
   e. $(y/4) \leq 12$, $y \leq 48$
   f. $-8x \geq 64$, $x \leq 8$

130.
   a. Nothing
   b. Nothing
   c. Nothing
   d. Nothing
   e. Change to the opp. inequality sign
   f. Change to the opp. inequality sign

131.
   a. $x \leq -4$
   b. $4 \leq x$
   c. $x < -7$
   d. $x > 11$
Unit Review

134. Like terms
135. Unlike terms
136. Unlike terms
137. Unlike terms
138. Like terms
139. Like terms
140. B
141. A
142. a. Commutative Property of Multiplication
   b. Associative Property of Multiplication
   c. Associative Property of Addition
   d. Commutative Property of Addition
143. a. Edgar
144. d. $45.55
145. c. 7 games
146. a. 5x – 7
   b. 15b + 25
   c. 16x² + 4x
   d. 13g – 20
   e. 6h + 23
147. a. -47
   b. -71
   c. 3
   d. 24
   e. 3
   f. 5
   g. 7
   h. 5
   i. -4 1/2
   j. -11/24
148. Milan = 100, Richard = 25
149. 4w + 12 = 44; w = 8, L = 14
150. 2f = 4 = 36; friend = 20, you = 16
151. 6m = 96; M & Ms = 16, Raisins = 32, Peanuts = 48
152. Answers will vary
153. -5x + 13
154. a. 25 – 2g
   b. 1 23
      4 17
      6 13
      10 5
      12 1
155. a. t = tickets
    b. 8t = 48
    c. 6 people
156. Answers will vary
157. 2b + 5 = 39; Bob = 17, Mary = 22
158. a. 40 + 0.45m
    b. 70 + 0.35m
    c. Plan A
159. There are only 2 equations as only two of the questions have equal signs. The others are expressions.