
# Grade 8
# Summer Advanced Math Packet

This assignment is to be handed in no later than Friday, September 5, 2014. Late work **will not be accepted.** This assignment will be graded and included in the first marking period grades.

*All students re-registering, regardless of the date of registration, will be responsible for turning in this Summer Math Packet on time.*

Name: _____

## 8th Grade Advanced Math

Students entering 8th grade advanced math should be proficient in:

- Adding, subtracting, multiplying, and dividing fractions and mixed numbers
- Adding, subtracting, multiplying, and dividing positive and negative integers
- Finding greatest common factor and least common multiple
- Graphing ordered pairs
- Writing and graphing inequalities
- Finding area, perimeter, and circumference
- Finding surface area and volume
- Finding mean, median, mode, range, and outliers
- Solving two-step equations
- Finding slope
- Solving and graphing two-step inequalities
- Using the commutative, associative and distributive properties
- Creating line plots, histograms, box and whisker plots, and stem and leaf plots
- Using the order of operations to simplify expressions

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**Whole Numbers**

**Shade in the circle of the correct answer.**

**1.** Which equation shows the commutative property of addition?

(A) $72 + 0 = 72$

(B) $72 + 28 = 28 + 72$

(C) $72 + {}^{-}72 = 0$

(D) $(72 + 28) + 5 = 72 + (28 + 5)$

**2.** What is the value of $4^3$?

(A) 12 (B) 16

(C) 32 (D) 64

**3.** What is $\sqrt{225}$?

(A) 14

(B) 15

(C) 25

(D) None of these answers.

**4.** Find the value of $9 + 12 \div 3 - 1$.

(A) 12 (B) $10\frac{1}{2}$

(C) 6 (D) 15

**5.** Which expression has a value of 21?

(A) $3 \cdot 2^2 + 12 \div 4$

(B) $(3 \cdot 2)^2 + 12 \div 4$

(C) $3 \cdot (2^2 + 12 \div 4)$

(D) $3 \cdot (2^2 + 12) \div 4$

**6.** Given $x = 5$, $y = 2$, and $z = 4$, evaluate the expression:

$$\frac{4x + z}{y}$$

(A) 12 (B) 14

(C) 18 (D) 22

**7.** Which equation matches "one more than twice a number is seven"?

(A) $1 + (n + 2) = 7$

(B) $2n + 1 = 7n$

(C) $1 + 2 = 7$

(D) $2n + 1 = 7$

**8.** Solve for $x$. $5x = 15$

(A) $x = 75$ (B) $x = 10$

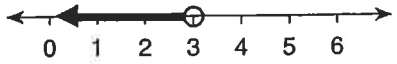
(C) $x = 3$ (D) $x = 20$

**9.** Solve for $x$. $2x + 3 = 21$

(A) $x = 12$ (B) $x = 18$

(C) $x = 9$ (D) $x = \frac{23}{2}$

**10.** Which inequality matches the graph?




(A) $x > 3$ (B) $x < 3$

(C) $x \geq 3$ (D) $x = 3$

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# Fractions, Decimals, Percents

**Shade in the circle of the correct answer.**

1. Which decimal is equivalent to $3 \times 10^{-2}$?

   (A) 0.03

   (B) 0.003

   (C) $^{-}300.0$

   (D) $^{-}0.006$

2. Which percent is equivalent to the decimal 0.2?

   (A) 0.2% (B) 2%

   (C) 20% (D) 200%

3. Which fraction is equivalent to 85%?

   (A) $\frac{2}{3}$

   (B) $\frac{3}{4}$

   (C) $\frac{7}{8}$

   (D) None of these answers.

4. Solve:
   15 is 60% of what number?

   (A) 9 (B) 21

   (C) 25 (D) 90

5. Add $4\frac{1}{2} + 3\frac{5}{7}$.

   (A) $7\frac{6}{9}$ (B) $8\frac{3}{14}$

   (C) $7\frac{3}{14}$ (D) $\frac{3}{14}$

6. Which expression is equal to $\frac{17}{24}$?

   (A) $\frac{18}{30} - \frac{1}{6}$

   (B) $\frac{2}{3} - \frac{3}{8}$

   (C) $\frac{1}{6} - \frac{3}{4}$

   (D) $\frac{5}{6} - \frac{1}{8}$

7. Which expression is equal to $\frac{3}{5}$?

   (A) $\frac{6}{25} \cdot \frac{5}{12}$

   (B) $2 \cdot \frac{3}{10}$

   (C) $\frac{3}{5} \cdot \frac{1}{5}$

   (D) $\frac{1}{3} \cdot 5$

8. Divide $\frac{5}{12} \div \frac{2}{3}$.

   (A) $\frac{10}{4}$ (B) $\frac{5}{18}$

   (C) $\frac{5}{8}$ (D) $\frac{3}{4}$

9. Solve for $x$. $5x = \frac{10}{11}$

   (A) $x = \frac{2}{11}$ (B) $x = \frac{45}{11}$

   (C) $x = \frac{50}{11}$ (D) $x = \frac{55}{11}$

10. Solve for $x$. $x + \frac{1}{3} = \frac{8}{9}$

    (A) $x = \frac{11}{9}$ (B) $x = \frac{5}{9}$

    (C) $x = \frac{7}{6}$ (D) $x = 3\frac{8}{9}$

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# Integers

**Shade in the circle of the correct answer.**

**1.** Which number is equal to $|-4|$ ?

(A) $-4$ (B) 4

(C) $-16$ (D) $\frac{1}{4}$

**2.** What is $-29 + -7$ ?

(A) $-22$ (B) 22

(C) $-36$ (D) 36

**3.** What is $12 - 30$ ?

(A) $-42$

(B) 18

(C) 42

(D) None of these answers.

**4.** Which expression is equal to $-81$ ?

(A) $9^2$ (B) $3(-27)$

(C) $-3 \cdot -3 \cdot -3 \cdot -3$ (D) $-9(-9)$

**5.** What is $-56 \div -8$ ?

(A) 7 (B) $-7$

(C) 8 (D) $-8$

**6.** Follow the order of operations to find the value of $3 + -15 \div 3$ .

(A) $-2$ (B) $-4$

(C) $-6$ (D) $-8$

**7.** Given $x = -6$, $y = 9$, and $z = -2$, evaluate the expression $x^2 + z$ .

(A) $-38$ (B) 38

(C) $-14$ (D) 34

**8.** Given $x = -6$, $y = 9$, and $z = -2$, evaluate the expression.

$$\frac{-5y - x}{y - 2z}$$

(A) $-3$ (B) 3

(C) $\frac{43}{5}$ (D) $-\frac{51}{5}$

**9.** Solve for $x$. $x + 20 = -25$

(A) $x = -5$ (B) $x = -45$

(C) $x = 5$ (D) $x = 45$

**10.** Solve for x. $\frac{x}{6} = -12$

(A) $x = -2$ (B) $x = 2$

(C) $x = -72$ (D) $x = 72$

**11.** Solve for $x$. $-8x - 4 = -20$

(A) $x = 2$ (B) $x = 3$

(C) $x = -2$ (D) $x = -3$

**12.** Solve for $x$. $\frac{x}{5} + 10 = 0$

(A) $x = 0$ (B) $x = -10$

(C) $x = -2$ (D) $x = -50$

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# Graphing

**Shade in the circle of the correct answer.**

**1.** What is the name of the point (0, 0), where the $x$- and $y$-axes intersect?

(A) double goose egg

(B) slope

(C) origin

(D) center-intercept

**2.** Which ordered pair represents a point on the $x$-axis?

(A) (0, 5) (B) (5, 0)

(C) (5, 5) (D) $(^{-}5, ^{-}5)$

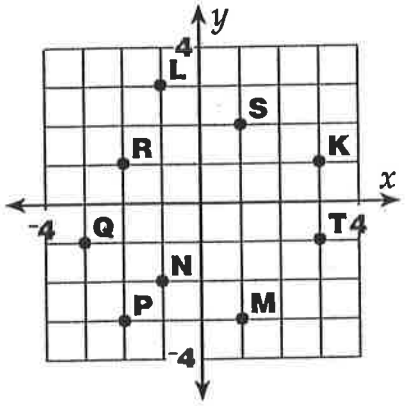
**3.** Which letter is at the point $(3, ^{-}1)$?

(A) Q

(B) K

(C) L

(D) T




**4.** Which is the ordered pair for point R?

(A) $(2, ^{-}1)$ (B) $(^{-}2, 1)$

(C) $(1, ^{-}2)$ (D) $(^{-}2, ^{-}1)$

**5.** Which equation matches the table?

(A) $y = x + 1$

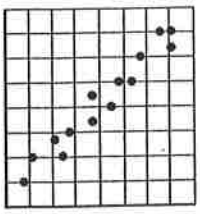
(B) $y = x - 1$

(C) $y = 2x$

(D) $y = ^{-}2x$

| $x$ | $y$ |
|---|---|
| $^{-}1$ | $^{-}2$ |
| 0 | 0 |
| 1 | 2 |
| 2 | 4 |

**6.** This scatterplot shows a



(A) positive trend.

(B) negative trend.

(C) function.

(D) no trend.

**7.** Which term refers to the steepness of a line?

(A) quadrant (B) intercept

(C) linear (D) slope

**8.** At what point will the line of this equation cross the $y$-axis? $y = 3x - 2$

(A) $(0, ^{-}2)$ (B) $(3, ^{-}2)$

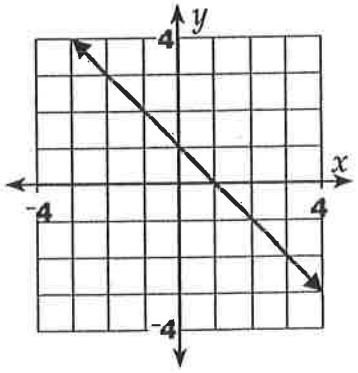
(C) (3, 0) (D) $(^{-}2, 0)$

**9.** Solve for $y$ to write this equation in slope-intercept form: $4y - 20x = 8$

(A) $y = 4x + 2$ (B) $y = ^{-}5x + 2$

(C) $y = 5x + 2$ (D) $y = ^{-}4x + 4$

**10.** Which equation matches the graph?




(A) $y = x + 1$

(B) $y = ^{-}x + 1$

(C) $y = x - 1$

(D) $y = ^{-}2x + 1$

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# Order of Operations

**Order of Operations:** A mathematical procedure to evaluate an expression involving more than one mathematical operation.

**The Order of Operations**

1. First, evaluate any operations in PARENTHESES or brackets.
2. Second, evaluate any EXPONENTS.
3. Third, evaluate any MULTIPLICATION and DIVISION in order from left to right. If both operations are in an equation, evaluate whichever comes first from left to right.
4. Finally, evaluate any ADDITION and SUBTRACTION in order from left to right.

Evaluate the following expressions.

1. $[(6 + 7) + 3^2] \times (4 \div 8) =$ _____
2. $(2 + 3)^2 + (3 + 1)^2 =$ _____
3. $9 + 6 \div 3 \times 6 =$ _____
4. $7 + 14 - 3 + 5 \times 2^3 =$ _____
5. $11 + 3^2 - 4 \times (80 \div 10) =$ _____
6. $3^2 + 4 \times 3 \div 6 =$ _____
7. $[4 \times (5 + 6)] \div (4^2 - 12) =$ _____
8. $[(5 + 6) \times (9 - 2)] \div (2^4 - 5) =$ _____
9. $[4 + 7 \times (^-1 + 10)] - [^-3^2 - (^-8)] =$ _____
10. $[(^-10 \div 2) \times (^-8 - 3)] - (2^2 \times 2) =$ _____
11. $^-1 \times [^-4 \times (5 + 6)] \div (^-1) \times (5^0) =$ _____
12. $(5^3) \times (9 - 2) \div (2^4 \div 2^2) =$ _____

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# Distribute It!

**Distributive Property:** The product of a number and a sum is equal to the sum of the number multiplied by each number added in the sum.

$5 \times (3 + 6) = 5 \times 3 + 5 \times 6$

$5(x + y) = 5x + 5y$

We can prove this true with the *Order of Operations.*

$5 \times (3 + 6) = 5 \times 3 + 5 \times 6$
$5 \times (9) = 15 + 30$
$45 = 45$

$3x + 4x + 7 =$
$7x + 7$ or $7(x + 1)$

Use the distributive property to simplify each mathematical expression. Show your work.

1. $7(100 + 70)$

2. $5(x + 4)$

3. $(x + y)6$

4. $5(100 + x + y)$

5. $10(3x + 12 + z)$

6. $a + b + 3(2a + b)$

7. $a + a + b$

8. $x + 2x + 5x$

9. $5x + 3x + 3$

10. $8x + 2x + 5$

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# All Together

Solve.

1. $y \div 4 = -8$
2. $x + 10 = 12$
3. $a - 9 = 16$
4. $2y = -10$
5. $y \div 7 = -56$
6. $3y = -12$
7. $b - 4 = -7$
8. $y \div -6 = 24$
9. $z + -5 = -7$
10. $2a \div 4 = 3$
11. $5y \times 5 = 30$
12. $3x + 5x = 2x + 2$
13. $4x + 3 = 23$
14. $7x + 8 = 57$
15. $\frac{3x}{4} + 11 = 22 - 5$
16. $\frac{36}{x} = 18$

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# Advanced Proportions

**Cross Product Property:** Given two equivalent ratios, $\frac{a}{b}$ and $\frac{c}{d}$, the cross product property states that $a \times d = b \times c$.

$$\frac{a}{2} = \frac{3}{4}$$

$$a \times 4 = 3 \times 2$$

$$a \times 4 = 6$$

$a \times 4 = 6$ ▲

$$a = \frac{3}{2}$$

$a \times 4 \div 4 = 6 \div 4$ ▲

Use the cross product property to solve the equations.

1. $\frac{4}{6} = \frac{3}{d}$
2. $\frac{6}{b} = \frac{3}{5}$
3. $\frac{1}{b} = \frac{4}{16}$
4. $\frac{1}{3} = \frac{c}{24}$
5. $\frac{a}{7} = \frac{14}{49}$
6. $\frac{a}{3} = \frac{2}{6}$
7. $\frac{4}{10} = \frac{6}{d}$
8. $\frac{11}{12} = \frac{22}{d}$
9. $\frac{15}{4} = \frac{x}{20}$
10. $\frac{6}{a} = \frac{4}{32}$
11. $\frac{x}{6} = \frac{55}{66}$
12. $\frac{5}{a} = \frac{45}{54}$

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# Percent Problems

4 is what percent of 5?

4 · 5 = 20%

**Wrong!**

**Right!**

4 is what percent of 5?

$4 = x \cdot 5$

$\frac{4}{5} = x$

$80\% = x$

$5\overline{)4.0}$ → $-40$ → $0.8$

**Tip**

Change the question to an equation: replace *is* with =, *of* with • (times), and *what* with a variable, *x*. Write a given percent as a decimal. Then solve the equation.

**a.** What is 5% of 80? **$x = 0.05 \cdot 80$** **$x = 4$**

**b.** 9 is what percent of 12? **$9 = x \cdot 12$** **$\frac{9}{12} = x$** **$75\% = x$**

**c.** 150 is 30% of what? **$150 = 0.3 \cdot x$** **$\frac{150}{0.3} = x$** **$500 = x$**

**$12\overline{)9.0}$** → **$-84$** → **$60$** → **$-60$** → **$0.75$**

**$0.3.\overline{)1500.0}$** → **$-15$** → **$500.0$**

Change each question to an equation. Then solve it.
Shade in your answers to reveal a mathematical symbol.

1. What is 85% of 20? _____
2. 6 is what percent of 24? _____
3. 42 is 75% of what? _____
4. 36 is what percent of 40? _____
5. What is 70% of 250? _____
6. 91 is 100% of what? _____
7. What is 8% of 50? _____
8. 27 is what percent of 90? _____
9. 48 is 60% of what? _____
10. What is 50% of 1,200? _____
11. 300 is 12% of what? _____
12. 1 is what percent of 10? _____