Bayonne Public Schools

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Dear Parents/Guardians of students entering Pre-Calculus in September 2026,

This summer your child will have the opportunity to prevent summer learning loss and to build a strong foundation in priority Pre-Calculus skills. He or she will also have the opportunity to earn up to ten extra credit points on the first mathematics test of the 2026-2027 school year.

Note: The assignment is attached to this letter. In order to receive credit, students must show ALL written work and submit it to their teacher by September 10, 2026.

Also, please do not wait until the end of summer to begin these skills.

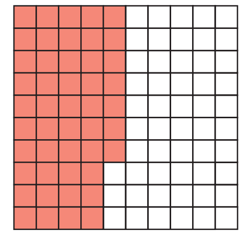
Dawn Aiello
Director of Mathematics

Name ______________________________ Date ______________

Writing Fractions, Decimals, and Percents

A **percent** is a part-to-whole ratio where the whole is 100. The symbol for percent is %.

In the model, 47 of the 100 squares are shaded. You can write the shaded part of the model as a fraction, a decimal, or a percent.



Fraction: forty-seven out of one hundred, or $\frac{47}{100}$

Decimal: forty-seven hundredths, or 0.47

Percent: forty-seven percent, or 47%

Example 1 Write the percent or decimal as a fraction.

a. $86\% = \frac{86}{100} = \frac{43}{50}$

b. $125\% = \frac{125}{100} = \frac{5}{4}$, or $1\frac{1}{4}$

c. $0.2 = \frac{2}{10} = \frac{1}{5}$

Example 2 Write the percent or fraction as a decimal.

a. $19\% = 19. = 0.19$

b. $\frac{3}{8} = 3 \div 8 = 0.375$

c. $\frac{3}{20} = \frac{3 \cdot 5}{20 \cdot 5} = \frac{15}{100} = 0.15$

Example 3 Write the decimal or fraction as a percent.

a. $0.34 = 0.34 = 34\%$

b. $0.915 = 0.915 = 91.5\%$

c. $\frac{3}{2} = \frac{3 \cdot 50}{2 \cdot 50} = \frac{150}{100} = 150\%$

Practice

Check your answers at BigIdeasMath.com.

Write the percent or decimal as a fraction.

1. 0.7 **2.** 0.08 **3.** 0.79 **4.** 1.75

5. 0.125 **6.** 0.744 **7.** 25% **8.** 38%

9. 96% **10.** 1% **11.** 225% **12.** 0.5%

Write the percent or fraction as a decimal.

13. $\frac{3}{4}$ **14.** $\frac{5}{8}$ **15.** $\frac{11}{50}$ **16.** $\frac{17}{25}$

17. $\frac{31}{20}$ **18.** $\frac{101}{200}$ **19.** 10% **20.** 27%

21. 65% **22.** 100% **23.** 0.8% **24.** 350%

Write the decimal or fraction as a percent.

25. 0.35 **26.** 0.91 **27.** 0.5 **28.** 1.4

29. 0.02 **30.** 0.006 **31.** $\frac{3}{25}$ **32.** $\frac{17}{20}$

33. $\frac{7}{8}$ **34.** $\frac{1}{16}$ **35.** $\frac{11}{2}$ **36.** $\frac{23}{40}$

37. Which is greater, $\frac{5}{6}$ or 83%?

38. Which is greater, 11.1% or $0.\overline{1}$?

Name ____________________________ Date ______________

The Distributive Property

To multiply a sum or difference by a number, multiply each number in the sum or difference by the number outside the parentheses, then evaluate.

Distributive Property	
With addition: $5(7 + 3) = 5(7) + 5(3)$	$a(b + c) = a(b) + a(c)$
With subtraction: $5(7 - 3) = 5(7) - 5(3)$	$a(b - c) = a(b) - a(c)$

Example 2 **Simplify each expression.**

a. $6(x + 9)$

$6(x + 9) = 6(x) + 6(9)$

$= 6x + 54$

b. $10(12 + z + 7)$

$10(12 + z + 7) = 10(12) + 10(z) + 10(7)$

$= 120 + 10z + 70$

$= 10z + 190$

c. $16(8w - 3)$

$16(8w - 3) = 16(8w) - 16(3)$

$= 128w - 48$

d. $5(4m - 3n - 1)$

$5(4m - 3n - 1) = 5(4m) - 5(3n) - 5(1)$

$= 20m - 15n - 5$

Practice

Check your answers at BigIdeasMath.com.

Evaluate.

1. $25(7 + 11)$ **2.** $4(13 - 5)$ **3.** $9(16 + 7 - 8)$ **4.** $-4(10 - 9 - 6)$

Simplify the expression.

5. $4(y + 7)$ **6.** $-2(z + 5)$ **7.** $5(b - 11)$ **8.** $-8(d - 1)$

9. $12(4a + 13)$ **10.** $9(20 + 17m)$ **11.** $11(2k - 11)$ **12.** $-7(-2n - 9)$

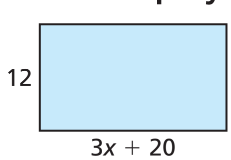
13. $3(x + 4 + 9)$ **14.** $6(25 + 6z + 10)$ **15.** $8(p - 6 - 5)$ **16.** $-10(4 + v - 1)$

17. $7(2x + 7 + 9y)$ **18.** $-4(4r - s + 17)$ **19.** $-3(-12 - 3d - 8)$ **20.** $2 - 6(2n - 9)$

21. $1.5(6c + 10d + 3)$ **22.** $\frac{3}{4}\left(q + \frac{1}{6} + \frac{7}{8}\right)$ **23.** $-2.4(5h - 10 + 4)$ **24.** $0.5(2.6x + 5.8)$

Write and simplify an expression for the area of the rectangle.

7.



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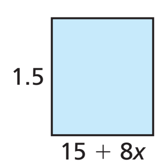

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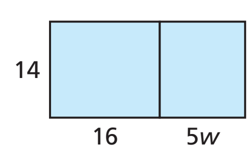

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Adding and Subtracting Fractions

To add or subtract two fractions with *like denominators*, write the sum or difference of the numerators over the denominator.

Adding or Subtracting Fractions with Like Denominators	
$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$, where $c \neq 0$	$\frac{a}{c} - \frac{b}{c} = \frac{a-b}{c}$, where $c \neq 0$

Example 1 Find $\frac{7}{12} + \frac{1}{12}$.

$\frac{7}{12} + \frac{1}{12} = \frac{7+1}{12}$ Add the numerators.

$= \frac{8}{12}$, or $\frac{2}{3}$ Simplify.

Example 2 Find $\frac{7}{9} - \frac{2}{9}$.

$\frac{7}{9} - \frac{2}{9} = \frac{7-2}{9}$ Subtract the numerators.

$= \frac{5}{9}$ Simplify.

To add or subtract two fractions with *unlike denominators*, first write equivalent fractions with a common denominator. There are two methods you can use.

Adding or Subtracting Fractions with Unlike Denominators	
Method 1	Multiply the numerator and the denominator of each fraction by the denominator of the other fraction.
Method 2	Use the **least common denominator** (LCD). The LCD of two or more fractions is the least common multiple (LCM) of the denominators.

Example 3 Find $\frac{1}{8} + \frac{5}{6}$.

Method 1: $\frac{1}{8} + \frac{5}{6} = \frac{1 \cdot 6}{8 \cdot 6} + \frac{5 \cdot 8}{6 \cdot 8}$ Rewrite using a common denominator of $8 \cdot 6 = 48$.

$= \frac{6}{48} + \frac{40}{48}$ Multiply.

$= \frac{46}{48}$, or $\frac{23}{24}$ Simplify.

Example 4 Find $5\frac{3}{4} - 1\frac{7}{10}$.

Method 2: Rewrite the difference as $\frac{23}{4} - \frac{17}{10}$.

The LCM of 4 and 10 is 20. So, the LCD is 20.

$\frac{23}{4} - \frac{17}{10} = \frac{23 \cdot 5}{4 \cdot 5} - \frac{17 \cdot 2}{10 \cdot 2}$ Rewrite using the LCD, 20.

$= \frac{115}{20} - \frac{34}{20}$ Multiply.

$= \frac{81}{20}$, or $4\frac{1}{20}$ Simplify.

Practice

Check your answers at BigIdeasMath.com.

Evaluate.

1. $\frac{1}{14} + \frac{5}{14}$ **2.** $\frac{2}{5} + \frac{1}{5}$ **3.** $\frac{9}{10} - \frac{1}{10}$ **4.** $\frac{11}{16} - \frac{3}{16}$

5. $\frac{5}{8} + \frac{7}{8}$ **6.** $\frac{1}{6} + \frac{1}{6}$ **7.** $\frac{7}{9} + \frac{2}{3}$ **8.** $\frac{3}{5} + \frac{4}{7}$

9. $\frac{3}{4} - \frac{1}{6}$ **10.** $\frac{7}{12} - \frac{5}{9}$ **11.** $\frac{9}{10} - \frac{5}{6}$ **12.** $\frac{5}{12} + \frac{11}{16}$

13. $2\frac{3}{5} + 1\frac{2}{5}$ **14.** $4\frac{6}{7} - 2\frac{4}{7}$ **15.** $5\frac{5}{12} + 3\frac{3}{8}$

16. $8\frac{1}{3} - 3\frac{2}{11}$ **17.** $\frac{1}{2} + 3\frac{2}{9}$ **18.** $4\frac{3}{14} - \frac{1}{7}$

19. $\frac{2}{7} + \frac{3}{4} + \frac{1}{2}$ **20.** $\frac{13}{16} - \frac{1}{4} - \frac{3}{8}$ **21.** $2\frac{1}{6} - \frac{5}{9} + \frac{2}{3}$

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Function Notation

A linear function can be written in the form $y = mx - b$. By naming a linear function f, you can also write the function using **function notation**.

$$f(x) = mx + b \qquad \text{Function notation}$$

The notation $f(x)$ is another name for y. If f is a function, and x is in its domain, then $f(x)$ represents the output of f corresponding to the input x. You can use letters other than f to name a function, such as g or h.

Example 1 **Evaluate the function for the given value of *x*.**

a. $f(x) = 2x + 5;\ x = 7$

$f(7) = 2(7) + 5$ — Substitute 7 for x.

$= 14 + 5$ — Multiply.

$= 19$ — Add.

▶ When $x = 7$, $f(x) = 19$.

b. $g(x) = 4x - x^2;\ x = -3$

$g(-3) = 4(-3) - (-3)^2$ — Substitute -3 for x.

$= -12 - 9$ — Multiply.

$= -21$ — Subtract.

▶ When $x = -3$, $g(x) = -21$.

Example 2 **Determine whether the ordered pair is a solution of the equation.**

a. $h(x) = 8 + x;\ (-6, 2)$

$2 \stackrel{?}{=} 8 + (-6)$ — Substitute -6 for x and 2 for $h(x)$.

$2 = 2$ ✓ — Add.

▶ So, $(-6, 2)$ is a solution.

b. $p(x) = |3x - 1|;\ (-2, -7)$

$-7 \stackrel{?}{=} |3(-2) - 1|$ — Substitute -2 for x and -7 for $p(x)$.

$-7 \stackrel{?}{=} |-7|$ — Evaluate.

$-7 \neq 7$ ✗ — Evaluate.

▶ So, $(-2, -7)$ is *not* a solution.

Practice

Check your answers at BigIdeasMath.com.

Evaluate the function for the given value of *x*.

1. $f(x) = x + 9;\ x = 8$

2. $g(x) = 6 - 5x;\ x = -1$

3. $h(x) = 4x + 3;\ x = 10$

4. $n(x) = -x - 4;\ x = -2$

5. $p(x) = -\frac{3}{4}x^2;\ x = 6$

6. $q(x) = x^2 - 11x;\ x = 4$

7. $k(x) = x^2 + 7x - 1;\ x = -3$

8. $h(x) = |3x - 8|;\ x = 1$

9. $f(x) = |x| + 2;\ x = -15$

Determine whether the ordered pair is a solution of the equation.

10. $f(x) = 3x + 5;\ (-1, 2)$

11. $h(x) = 7x - 2;\ (-3, -19)$

12. $g(x) = -x^2 + x + 5;\ (-5, 25)$

13. $n(x) = x^2 - 6x - 1;\ (4, -7)$

14. $h(x) = |x| - 14;\ (-4, 10)$

15. $p(x) = |-9x - 2|;\ (0, 2)$

16. **TICKETS** The function $C(x) = 49.5x + 19.5$ represents the cost (in dollars) of buying x concert tickets. How much does it cost to buy four tickets? How many tickets can you buy with \$465?

Name ______________________________ Date ______________

Operations with Complex Numbers

A **complex number** written in standard form is a number $a + bi$, where a and b are real numbers. The number a is the real part, and the number bi is the imaginary part. To add (or subtract) two complex numbers, add (or subtract) their real parts and their imaginary parts separately.

Example 1 **Add or subtract. Write the answer in standard form.**

a. $(6 + 3i) + (2 - 5i)$

b. $(13 + 4i) - (8 + 5i)$

a. $(6 + 3i) + (2 - 5i) = (6 + 2) + [3 + (-5)]i$ — Definition of complex addition

$= 8 - 2i$ — Write in standard form.

b. $(13 + 4i) - (8 + 5i) = (13 - 8) + (4 - 5)i$ — Definition of complex subtraction

$= 5 - i$ — Write in standard form.

To multiply two complex numbers, use the Distributive Property, or the FOIL Method, just as you do when multiplying real numbers or algebraic expressions.

Example 2 **Multiply. Write the answer in standard form.**

a. $3i(2 + 9i)$

b. $(4 - 2i)(11 + 8i)$

a. $3i(2 + 9i) = 6i + 27i^2$ — Distributive Property

$= 6i + 27(-1)$ — Use $i^2 = -1$.

$= -27 + 6i$ — Write in standard form.

b. $(4 - 2i)(11 + 8i) = 44 + 32i - 22i - 16i^2$ — Multiply using FOIL.

$= 44 + 10i - 16(-1)$ — Simplify and use $i^2 = -1$.

$= 44 + 10i + 16$ — Simplify.

$= 60 + 10i$ — Write in standard form..

Practice

Check your answers at BigIdeasMath.com.

Perform the operation. Write the answer in standard form.

1. $(6 - i) + (9 + 5i)$

2. $(7 + 3i) + (11 + 2i)$

3. $(12 + 4i) - (2 - 15i)$

4. $(3 - 7i) - (3 + 5i)$

5. $7 - (2 - 3i) + 6i$

6. $-16 + (3 + 4i) - 4i$

7. $3i(6 - 5i)$

8. $-2i(8 + 2i)$

9. $(-5 + i)(8 - 6i)$

10. $(3 - 6i)(-1 + 7i)$

11. $(2 + 5i)(2 - 5i)$

12. $(-3 - i)(-3 + i)$

13. $(4 + i)^2$

14. $(5 - 9i)^2$

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Zeros of Quadratic Functions

A **zero of a function** f is an x-value for which $f(x) = 0$. If a real number k is a zero of the function $f(x) = ax^2 + bx + c$, then k is an x-intercept of the graph of the function.

Example 1 **Find the zeros of each function.**

a. $f(x) = 9x^2 - 1$

Set $f(x)$ equal to 0. Then use square roots to solve for x.

$$9x^2 - 36 = 0$$
$$9x^2 = 36$$
$$x^2 = 4$$
$$x = \pm\sqrt{4}$$
$$x = \pm 2$$

▶ The zeros of the function are $x = -2$ and $x = 2$.

b. $f(x) = x^2 - 2x - 8$

Set $f(x)$ equal to 0. Then use factoring to solve for x.

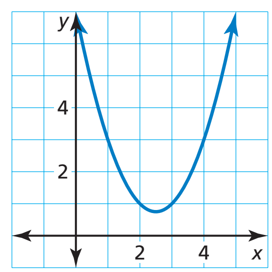
$$x^2 - 2x - 8 = 0$$
$$(x - 4)(x + 2) = 0$$
$$x - 4 = 0 \quad or \quad x + 2 = 0$$
$$x = 4 \quad or \quad x = -2$$

▶ The zeros of the function are $x = -2$ and $x = 4$.

Example 2 **Find the zeros of $f(x) = x^2 - 5x + 7$.**

Set $f(x)$ equal to 0. Then use the Quadratic Formula to solve for x.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$= \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(7)}}{2(1)}$$
$$= \frac{5 \pm \sqrt{-3}}{2}$$
$$= \frac{5 \pm i\sqrt{3}}{2}$$



▶ The zeros of the function are $x = \frac{5}{2} + \frac{\sqrt{3}}{2}i$ and $x = \frac{5}{2} - \frac{\sqrt{3}}{2}i$.

Notice that the graph of f does not intersect the x-axis.

Practice

Check your answers at BigIdeasMath.com.

Find the zero(s) of the function.

1. $f(x) = 8x^2 + 32$

2. $f(x) = -5x^2 + 40$

3. $f(x) = x^2 - 8x + 16$

4. $f(x) = 4x^2 + 12x + 9$

5. $f(x) = 4(x + 5)(x - 1)$

6. $f(x) = -\frac{1}{2}x(x + 3)$

7. $f(x) = 3x^2 + 12x + 15$

8. $f(x) = 2x^2 - x - 15$

9. $f(x) = -(x + 1)^2 + 18$

10. $f(x) = (x - 7)^2 + 9$