# OAK HALL SCHOOL

## 2024-2025

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Suggested Review Exercises
for students entering

# Prealgebra 8

Mathematics is a subject that is cumulative in nature as it constructs new knowledge from foundational prior knowledge. Therefore, as it is imperative to our students' success, we require them to have mastered certain skills and concepts before entering a new math course.

Each course in the math department has provided suggested exercises for incoming students as a resource for them to review the required prerequisites that are critical to their success in the course. While we will not be requiring students to complete these exercises as a formal assignment to be turned in, we have the highest expectations of our students as self-aware, proactive learners. Each student is responsible for gauging which prerequisites they need to reinforce and how much studying they need to do for them to start the new school year feeling confident, prepared, and accomplished.

We recommend that our students begin this process mid to late summer in order for everything to be fresh in their minds but also to give them time to recover from the school year they just completed. Rest is not an indulgence; it is a human necessity. We hope everyone has a safe, fun, and restful summer and we look forward to having another great school year when we come back in August!

# I. add and subtract fractions/mixed numbers – need a common denominator

**a.** $\dfrac{17}{45} + \dfrac{3}{5} = \dfrac{17}{45} + \dfrac{27}{45}$   Write $\dfrac{3}{5}$ using LCD.

$\qquad\qquad = \dfrac{17+27}{45}$   Write sum of numerators over denominator.

$\qquad\qquad = \dfrac{44}{45}$   Add.

**b.** $\dfrac{11}{15} - \dfrac{5}{12} = \dfrac{44}{60} - \dfrac{25}{60}$   Write fractions using LCD.

$\qquad\qquad = \dfrac{44-25}{60}$   Write difference of numerators over denominator.

$\qquad\qquad = \dfrac{19}{60}$   Subtract.

**c.** Adding or Subtracting Mixed Numbers

$$3\tfrac{1}{6} - 1\tfrac{2}{3}$$

$$= \tfrac{19}{6} - \tfrac{5}{3} \qquad \text{Rewrite as Improper Fractions}$$

$$= \tfrac{19}{6} - \tfrac{10}{6} \qquad \text{Rewrite with LCD}$$

$$= \tfrac{9}{6} \qquad \text{Subtract}$$

$$= \tfrac{3}{2} \qquad \text{Simplify when needed}$$

# I Practice.

1) $2 - \dfrac{1}{4}$

2) $3 - \dfrac{8}{5}$

3) $\dfrac{3}{2} - \dfrac{3}{5}$

4) $8 + \dfrac{1}{7}$

5) $\dfrac{7}{4} + 3\dfrac{6}{7}$

6) $\dfrac{3}{2} + \dfrac{8}{5}$

7) $3\dfrac{1}{8} + \dfrac{6}{5}$

8) $3\dfrac{2}{3} - \dfrac{5}{3}$

9) $4\dfrac{3}{5} + 4\dfrac{5}{6}$

10) $1 + 2\dfrac{5}{7}$

11) $1\dfrac{1}{2} + 3\dfrac{3}{4}$

12) $2 - 1\dfrac{1}{3}$

13) $\dfrac{5}{6} + \dfrac{7}{4}$

14) $\dfrac{1}{3} + \dfrac{1}{6}$

15) $2\dfrac{1}{2} - 2\dfrac{1}{5}$

16) $2 - 1\dfrac{1}{7}$

17) $2\dfrac{1}{5} - \dfrac{7}{8}$

18) $1 - \dfrac{1}{6}$

## II Multiply fractions

Example for fractions

$$-\frac{8}{15} \cdot \left(-\frac{3}{8}\right) = \frac{-8}{15} \cdot \left(\frac{-3}{8}\right)$$     Assign negative signs to numerators.

$$= \frac{-8 \cdot (-3)}{15 \cdot 8}$$     Use rule for multiplying fractions.

$$= \frac{\overset{-1}{\cancel{-8}} \cdot (\overset{-1}{\cancel{-3}})}{\underset{5}{\cancel{15}} \cdot \underset{1}{\cancel{8}}}$$     Divide out common factors.

$$= \frac{1}{5}$$     Multiply.

Example for mixed numbers

$$12\frac{3}{5} \cdot 3\frac{1}{3} = \frac{63}{5} \cdot \frac{10}{3}$$     Write mixed numbers as improper fractions

$$= \frac{\overset{21}{\cancel{63}} \cdot \overset{2}{\cancel{10}}}{\underset{1}{\cancel{5}} \cdot \underset{1}{\cancel{3}}}$$     Use rule for multiplying fractions.
Divide out common factors.

$$= 42$$     Multiply.

### *Practice.*

19) $-\dfrac{9}{5} \times -\dfrac{6}{5}$

20) $1\dfrac{1}{4} \times -\dfrac{3}{8}$

21) $1\dfrac{3}{8} \times -\dfrac{3}{2}$

22) $3\dfrac{1}{9} \times -\dfrac{4}{3}$

23) $-\dfrac{9}{10} \times \dfrac{5}{4}$

24) $5\dfrac{1}{4} \times -2\dfrac{3}{7}$

## III. Divide fractions

$$\frac{15}{16} \div \frac{10}{24} = \frac{15}{16} \cdot \frac{24}{10}$$ 　　　　Multiply by reciprocal.

$$= \frac{\overset{3}{\cancel{15}} \cdot \overset{3}{\cancel{24}}}{\underset{2}{\cancel{16}} \cdot \underset{2}{\cancel{10}}}$$ 　　　Use rule for multiplying fractions.
Divide out common factors.

$$= \frac{9}{4}$$ 　　　　Multiply.

$$= 2\frac{1}{4}$$ 　　　　Write fraction as a mixed number.

Example for mixed numbers

$$-3\frac{1}{8} \div \left(-1\frac{1}{14}\right) = -\frac{25}{8} \div \left(-\frac{15}{14}\right)$$ 　　Write mixed numbers as improper fractic

$$= -\frac{25}{8} \cdot \left(-\frac{14}{15}\right)$$ 　　Multiply by reciprocal.

$$= \frac{\overset{-5}{\cancel{25}} \cdot (\overset{-7}{\cancel{14}})}{\underset{4}{\cancel{8}} \cdot \underset{3}{\cancel{15}}}$$ 　　Use rule for multiplying fractions.
Divide out common factors.

$$= \frac{35}{12}$$ 　　　　Multiply.

$$= 2\frac{11}{12}$$ 　　　　Write fraction as a mixed number.

### *Practice.*

25) $1\frac{1}{3} \div \frac{1}{3}$ 　　　　　　　　　　　　26) $\frac{11}{10} \div -7$

27) $-2\frac{1}{2} \div \frac{1}{2}$ 　　　　　　　　　　　28) $\frac{-3}{2} \div \frac{2}{3}$

29) $-3\frac{7}{8} \div -1\frac{1}{6}$ 　　　　　　　　　30) $\frac{-9}{8} \div \frac{4}{5}$

## IV. Adding positive and negative integers

**1. Same Sign**  Add the absolute values and use the common sign.

**2. Different Signs**  Subtract the lesser absolute value from the greater absolute value and use the sign of the number with the greater absolute value.

Find the sum $-32 + (-27)$.

Same sign:  Add $|-32|$ and $|-27|$.

$-32 + (-27) = -59$

Both integers are negative, so the sum is negative.

Find the sum $-63 + 39$.

Different signs:  Subtract $|39|$ from $|-63|$.

$-63 + 39 = -24$

$|-63| > |39|$, so the sum has the same sign as $-63$.

### *Practice.*

31) $1 + (-1)$

32) $(-8) + (-5)$

33) $(-5) + (-1)$

34) $2 + (-3)$

35) $1 + (-3)$

36) $1 + (-7)$

37) $(-1) + 5$

38) $7 + (-3)$

39) $(-7) + (-4)$

40) $(-8) + (-6)$

41) $(-5) + 6$

42) $(-3) + 6$

43) $7 + (-7)$

44) $(-3) + (-8)$

45) $(-8) + 1$

46) $2 + (-5)$

## V. Subtracting positive and negative integers

**Words**   To subtract an integer, add its opposite.

**Numbers**   $4 - 8 = 4 + (-8) = -4$

$9 - 20 = 9 + (-20)$          To subtract 20, add its opposite, $-20$.

$\quad\quad = -11$          Add 9 and $-20$.

$10 - (-3) = 10 + 3$          To subtract $-3$, add its opposite, 3.

$\quad\quad = 13$          Add 10 and 3.

> Remember two negatives next to each other make a positive!!

$-6 - (-4) = -6 + 4$          To subtract $-4$, add its opposite, 4.

$\quad\quad = -2$          Add $-6$ and 4.

### *Practice. Show the your work as modeled above.*

47) $3 - (-8)$                               48) $(-4) - 5$

49) $(-2) - (-8)$                          50) $1 - (-3)$

51) $7 - 2$                                    52) $(-8) - (-4)$

53) $(-3) - 8$                                54) $2 - (-3)$

55) $7 - (-8)$                               56) $(-5) - 8$

57) $2 - (-4)$                               58) $(-7) - (-5)$

59) $(-3) - (-6)$                          60) $5 - (-5)$

61) $2 - (-8)$                               62) $(-2) - 3$

## VI. Order of operations

1. Evaluate expressions inside grouping symbols. (Parentheses, brackets, and fraction bars are common grouping symbols.)
2. Evaluate powers.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

$12 \cdot 3 - 18 \div 6 = 36 - 3$          Multiply and divide.

$= 33$          Subtract.

*Practice. Show all work.*

63) $(2+3) \div 5$

64) $4 \times 5 - 6$

65) $4 + 9 \div 3$

66) $5 + 6 \times 6$

67) $4 \times 5 + 1$

68) $(9-5) \div 2$

69) $2 \times 4 + 4 - (3-1)$

70) $(6 + 6 \times 2 - 6) \div 2$

71) $\dfrac{12}{4+5-5} + 4$

72) $\dfrac{18}{4-1+3} + 2$

73) $\dfrac{18 \times 2}{2 \times 3}$

## VII. Two step equations

To solve an equation means to **find the value** of the variable. We solve equations by isolating the variable using opposite operations.

**Example:**
Solve.

$$3x - 2 = 10$$
$$\phantom{3x} +2 \quad +2 \qquad \text{Isolate 3x by adding 2 to each side.}$$

$$\frac{3x}{3} = \frac{12}{3} \qquad \begin{array}{l}\text{Simplify}\\ \text{Isolate x by dividing each side by 3.}\end{array}$$

$$x = 4 \qquad \text{Simplify}$$

Check your answer.

$$3(4) - 2 = 10 \qquad \text{Substitute the value in for the variable.}$$
$$12 - 2 = 10 \qquad \text{Simplify}$$
$$10 = 10 \qquad \text{Is the equation true?} \quad \text{If yes, you solved it correctly!}$$

> **Opposite Operations:**
> Addition (+) & Subtraction (–)
> Multiplication (x) & Division (÷)

> **Please remember...**
> to do the same step on
> each side of the equation.

> **Always check your
> work by substitution!**

Practice: Solve each equation.

1. $98 = b + 34$

2. $-14 + y = -2$

3. $8k = -64$

4. $\dfrac{2}{5}x = 6$

5. $14n - 8 = 34$

6. $8 + \dfrac{n}{12} = 13$

## VIII. Percent's as fractions and fractions as percent's

Write 80% and 4% as fractions in simplest form.

**a.** $80\% = \dfrac{80}{100} = \dfrac{4}{5}$

**b.** $4\% = \dfrac{4}{100} = \dfrac{1}{25}$

Write $\dfrac{19}{20}$ and $\dfrac{13}{50}$ as percents.

**a.** $\dfrac{19}{20} = \dfrac{19 \cdot 5}{20 \cdot 5} = \dfrac{95}{100} = 95\%$

**b.** $\dfrac{13}{50} = \dfrac{13 \cdot 2}{50 \cdot 2} = \dfrac{26}{100} = 26\%$

**c.** $\dfrac{9}{32} = 0.28125$     Write fraction as a decimal.

$= 28.125\%$     Write decimal as a percent.

## Write each fraction as a percent.

1) $\dfrac{1}{2}$

2) $\dfrac{1}{5}$

3) $2\dfrac{7}{10}$

4) $\dfrac{3}{8}$

## Write each percent as a fraction.

5) 7%

6) 65%

7) 0.3%

8) 445%

## IX. Solving Proportions

**Solve Proportions** If a proportion involves a variable, you can use cross products to solve the proportion. In the proportion $\frac{x}{5} = \frac{10}{13}$, $x$ and 13 are called **extremes**. They are the first and last terms of the proportion. 5 and 10 are called **means**. They are the middle terms of the proportion. In a proportion, the product of the extremes is equal to the product of the means.

| Means-Extremes Property of Proportions | For any numbers $a$, $b$, $c$, and $d$, if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$. |
| --- | --- |

**Example 1:**

$$\frac{x}{5} = \frac{10}{13}$$

$$x \cdot 13 = 5 \cdot 10$$

$$13x = 50$$

$$\frac{13x}{13} = \frac{50}{13}$$

$$x = \frac{50}{13}$$

**Example 2:**

$$\frac{x+1}{4} = \frac{3}{4}$$

$$4(x+1) = 3 \cdot 4$$

$$4x + 4 = 12$$
$$\quad -4 \quad -4$$

$$4x = 8$$

$$\frac{4x}{4} = \frac{8}{4}$$

$$x = 2$$

Practice: Solve each proportion.

1. $\dfrac{x}{21} = \dfrac{3}{63}$

4. $\dfrac{9}{y+1} = \dfrac{18}{54}$

2. $\dfrac{-3}{x} = \dfrac{2}{8}$

5. $\dfrac{a-8}{12} = \dfrac{15}{3}$

3. $\dfrac{0.1}{2} = \dfrac{0.5}{x}$

6. $\dfrac{3+y}{4} = \dfrac{-y}{8}$

# X. Percents

| Percent Proportion | PART (IS) / WHOLE (OF) = PERCENT / 100 |
|---|---|

$$\frac{\text{PART (IS)}}{\text{WHOLE (OF)}} = \frac{\text{PERCENT}}{100}$$
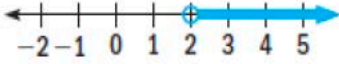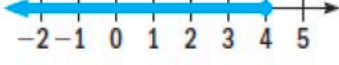
**Complete each problem below using the percent proportion. Round your answers to the nearest hundredth, if necessary. Show all work!**

1. What percent of 140 is 30?

2. 25% of what number is 85?

3. 32% of 118 is what number?

4. 56 is what percent of 65?
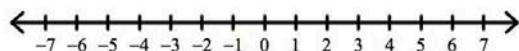
5. What is 170% of 40?

6. 45% of what number is 30?

# XI. Inequalities

## Just remember
- if the symbol is (≥ or ≤) then you **fill in** the dot
- if the symbol is (> or <) then you do not fill in the dot

| Inequality | Words | Graph |
|---|---|---|
| $x < 3$ | All numbers less than 3 | |
| $y > 2$ | All numbers greater than 2 | |
| $z \leq 4$ | All numbers less than or equal to 4 | |
| $n \geq 2$ | All numbers greater than or equal to 2 | |

## *Graph the inequality.*

1) $b < 4$

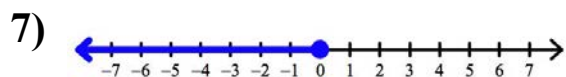2) $-3 \leq n$
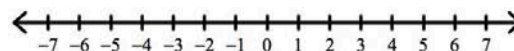
3) $2 < k$
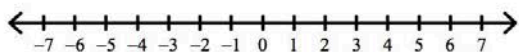
4) $k \leq -5$
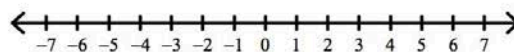
5) $x < -5$
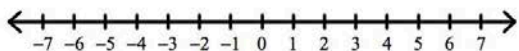
6) $-4 \geq k$
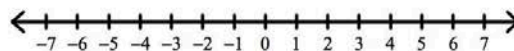
## *Write an inequality to represent the graphed solutions.*

7)

8)

9)

10)
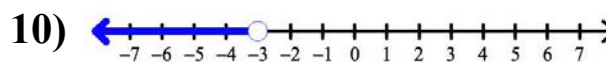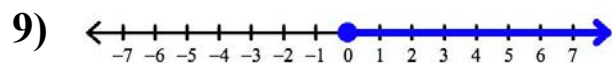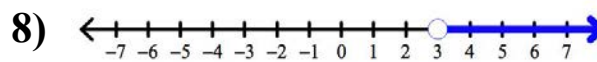
# ANSWERS to ODDS so you can check your answers.

## Parts I - VI

1) $1\frac{3}{4}$     3) $\frac{9}{10}$     5) $5\frac{17}{28}$     7) $4\frac{13}{40}$

9) $9\frac{13}{30}$     11) $5\frac{1}{4}$     13) $2\frac{7}{12}$     15) $\frac{3}{10}$

17) $1\frac{13}{40}$     19) $2\frac{4}{25}$     21) $-2\frac{1}{16}$     23) $-1\frac{1}{8}$

25) 4     27) $-5$     29) $3\frac{9}{28}$     31) 0

33) $-6$     35) $-2$     37) 4     39) $-11$
41) 1     43) 0     45) $-7$     47) 11
49) 6     51) 5     53) $-11$     55) 15
57) 6     59) 3     61) 10     63) 1
65) 7     67) 21     69) 10     71) 7    73) 6

## Part VII

1. 64     3. $-8$.     5. 3

## Part VIII

1. 50%     3. 270%     5. $\frac{7}{100}$     7. $\frac{3}{100}$

## Part IX

1. 1     3. 10     5. 68

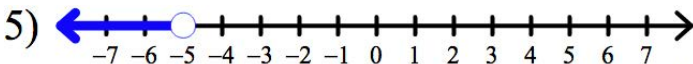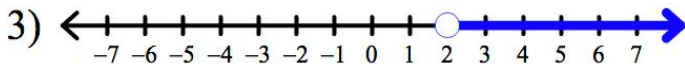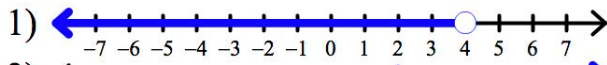## Part X

1. $\approx 21.43\%$     3. 37.76     5. 68

## Part XI

1) 

3) 

5) 

7. $x \le 0$
9. $x \ge 0$