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Contents

**Chapter 1: Whole Numbers** ..... 11

Add and Subtract Integers ..... 12

Multiplication and Division ..... 13

Absolute Value ..... 14

Ordering Integers and Numbers ..... 15

Order of Operations ..... 16

Factoring ..... 17

Great Common Factor (GCF) ..... 18

Least Common Multiple (LCM) ..... 19

Divisibility Rule ..... 20

Answers of Worksheets ..... 21

**Chapter 2: Fractions** ..... 25

Adding Fractions – Like Denominator ..... 26

Adding Fractions – Unlike Denominator ..... 27

Subtracting Fractions – Like Denominator ..... 28

Subtracting Fractions – Unlike Denominator ..... 29

Converting Mix Numbers ..... 30

Converting improper Fractions ..... 31

Addition Mix Numbers ..... 32

Subtracting Mix Numbers ..... 33

Simplify Fractions ..... 34

Multiplying Fractions ..... 35

Multiplying Mixed Number ..... 36

Dividing Fractions ..... 37

Dividing Mixed Number ..... 38

Comparing Fractions ..... 39

Answers of Worksheets ..... 40

**Chapter 3: Decimal** ..... 45

Round Decimals ..... 46

Decimals Addition ..... 47

Decimals Subtraction ..... 48

Decimals Multiplication ..... 49

Decimal Division ..... 50

Comparing Decimals ..... 51

Convert Fraction to Decimal ..... 52

Convert Decimal to Percent ..... 53

Convert Fraction to Percent ..... 54

Answers of Worksheets ..... 55

**Chapter 4: Equations and Inequality** ..... 59

Distributive and Simplifying Expressions ..... 60

Factoring Expressions ..... 61

Evaluate One Variable Expressions ..... 62

Evaluate Two Variable Expressions ..... 63

Graphing Linear Equation ..... 64

One Step Equations ..... 65

Two Steps Equations.....	66
Multi Steps Equations.....	67
Graphing Linear Inequalities.....	68
One Step Inequality.....	69
Two Steps Inequality.....	70
Multi Steps Inequality.....	71
Systems of Equations.....	72
Systems of Equations Word Problems.....	73
Finding Distance of Two Points.....	74
Answers of Worksheets.....	75
<b>Chapter 5: Exponent and Radicals.....</b>	<b>81</b>
Positive Exponents.....	82
Negative Exponents.....	83
Add and subtract Exponents.....	84
Exponent multiplication.....	85
Exponent division.....	86
Scientific Notation.....	87
Square Roots.....	88
Simplify Square Roots.....	89
Answers of Worksheets.....	90
<b>Chapter 6: Ratio, Proportion and Percent.....</b>	<b>93</b>
Proportions.....	94
Reduce Ratio.....	95
Percent.....	96
Discount, Tax and Tip.....	97
Percent of Change.....	98
Simple Interest.....	99
Answers of Worksheets.....	100
<b>Chapter 7: Monomials and Polynomials.....</b>	<b>102</b>
Adding and Subtracting Monomial.....	103
Multiplying and Dividing Monomial.....	104
Binomial Operations.....	105
Polynomial Operations.....	106
Squaring a Binomial.....	107
Factor polynomial.....	108
Answers of Worksheets.....	109
<b>Chapter 8: Functions.....</b>	<b>111</b>
Relation and Functions.....	112
Slope form.....	113
Slope and Y-Intercept.....	113
Slope and One Point.....	114
Slope of Two Points.....	115
Equation of Parallel and Perpendicular lines.....	116
Quadratic Equations - Square Roots Law.....	117
Quadratic Equations - Factoring.....	118
Quadratic Equations - Completing the Square.....	119
Quadratic Equations - Quadratic Formula.....	120
Arithmetic Sequences.....	121
Geometric Sequences.....	122
Answers of Worksheets.....	123
<b>Chapter 9: Geometry.....</b>	<b>127</b>
Area and Perimeter of Square.....	128

Area and Perimeter of Rectangle.....	129
Area and Perimeter of Triangle .....	130
Area and Perimeter of Trapezoid.....	131
Area and Perimeter of Parallelogram.....	132
Circumference and Area of Circle .....	133
Perimeter of Polygon.....	134
Volume of Cubes.....	135
Volume of Rectangle Prism.....	136
Volume of Cylinder.....	137
Volume of Spheres .....	138
Volume of Pyramid and Cone .....	139
Surface Area Cubes.....	140
Surface Area Rectangle Prism.....	141
Surface Area Cylinder .....	142
Answers of Worksheets .....	143
<b>Chapter 10: Statistics and probability.....</b>	<b>145</b>
Mean, Median, Mode, and Range of the Given Data .....	146
Box and Whisker Plot.....	147
Bar Graph.....	148
Histogram .....	149
Dot plots.....	150
Scatter Plots .....	151
Stem-And-Leaf Plot.....	152
Pie Graph.....	153
Probability .....	154
Answers of Worksheets .....	155
<b>Common Core Mathematics Test Review .....</b>	<b>159</b>
Common Core Test Mathematics Formula Sheet .....	160
Common Core Practice Test 1 .....	161
Common Core Practice Test 2 .....	173
<b>Answers and Explanations .....</b>	<b>185</b>
Answer Key.....	187
Common Core Practice Test 1 .....	189
Common Core Practice Test 2 .....	196

# Chapter 8: Functions

### Relation and Functions

Determine whether each relation is a function. Then state the domain and range of each relation.

1)

Function:

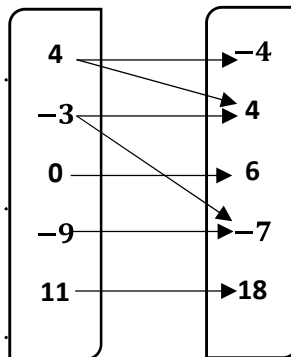
.....

Domain:

.....

Range:

.....



2)

Function:

.....

Domain:

.....

Range:

.....

$x$	$y$
1	3
4	0
-9	-2
1	-2
-10	5

3)

Function:

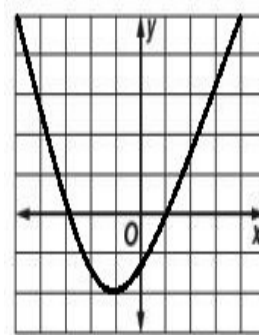
.....

Domain:

.....

Range:

.....



4)  $\{(1, -1), (6, 0), (0, 8), (4, 3), (2, 5)\}$

Function:

.....

Domain:

.....

Range:

.....

5)

Function:

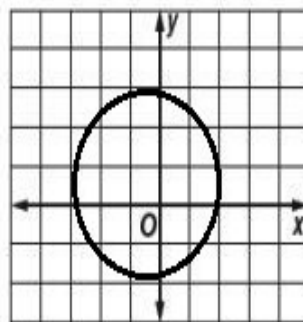
.....

Domain:

.....

Range:

.....



6)

Function:

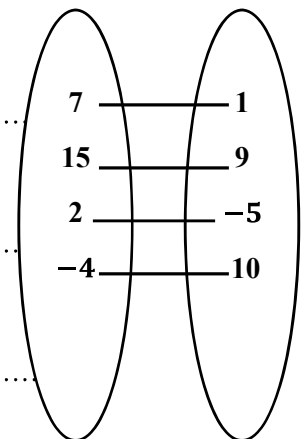
.....

Domain:

.....

Range:

.....



**Slope form**

Write the slope-intercept form of the equation of each line.

1)  $5x + 3y = 15$

8)  $7x - 5y = -3$

2)  $4x + 12y = 3$

9)  $-0.3x + 5y = 25$

3)  $7x + y = -9$

10)  $-6x + \frac{1}{2}y = 10$

4)  $-3x + 8y = 5$

11)  $12x + y = 0$

5)  $3x - 2y = 9$

12)  $9x = -45y - 10$

6)  $-14x + 2y = 4$

13)  $3.5x = 7y + 7$

7)  $5x + y = 2$

14)  $8x = -\frac{2}{5}y + 10$

**Slope and Y-Intercept**

Find the slope and y-intercept of each equation.

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

6)  $y = -8x + 5$

2)  $y = 9x + 5$

7)  $x = -16$

3)  $x - 7y = 21$

8)  $y = 2x$

4)  $y = 3x + 20$

9)  $y - 6 = 7(x + 1)$

5)  $y = 7$

10)  $x = -\frac{12}{5}y - 12$

**Slope and One Point**

Find a Point-Slope equation for a line containing the given point and having the given slope.

1)  $m = -3, (0, 1)$

14)  $m = \text{undefined}, (7, -7)$

2)  $m = 2, (2, 1)$

15)  $m = -\frac{1}{4}, (4, 2)$

3)  $m = -1, (-1, -1)$

16)  $m = \frac{1}{5}, (2, 4)$

4)  $m = 4, (2, 2)$

17)  $m = -5, (1, 3)$

5)  $m = 3, (1, 5)$

18)  $m = 3, (-1, -2)$

6)  $m = \frac{1}{2}, (4, 2)$

19)  $m = \frac{1}{7}, (7, 1)$

7)  $m = 1, (-1, -4)$

20)  $m = \frac{-2}{3}, (1, -1)$

8)  $m = 0, (4, -7)$

21)  $m = \frac{1}{3}, (3, 3)$

9)  $m = 5, (1, 0)$

22)  $m = -6, (0, -2)$

10)  $m = \frac{1}{7}, (-3, -2)$

23)  $m = 1, (1, -5)$

11)  $m = -2, (4, -1)$

24)  $m = -\frac{3}{4}, (4, -4)$

12)  $m = -3, (1, -3)$

25)  $m = 0, (-1, 15)$

13)  $m = 4, (0, 2)$

26)  $m = \text{Undefined}, (-5, -6)$



**Slope of Two Points**

Write the slope-intercept form of the equation of the line through the given points.

1)  $(3, 0), (-3, 6)$

13)  $(1, 1), (-2, 13)$

2)  $(4, 1), (-4, 5)$

14)  $(7, 7), (-5, 10)$

3)  $(5, 2), (-2, 9)$

15)  $(6, 5), (-2, 13)$

4)  $(1, 10), (-1, 12)$

16)  $(3, 6), (8, 11)$

5)  $(5, 15), (-7, 9)$

17)  $(9, 0), (5, 2)$

6)  $(2, 14), (-8, 4)$

18)  $(1, 8), (-2, 9)$

7)  $(3, 2), (-4, 16)$

19)  $(4, -2), (-11, 8)$

8)  $(4, 7), (-8, 10)$

20)  $(3, -4), (-7, 1)$

9)  $(3, 5), (4, 6)$

21)  $(5, 1), (-11, 5)$

10)  $(6, 2), (5, 2)$

22)  $(3, -7), (7, 9)$

11)  $(1, 2), (2, 4)$

23)  $(4, -6), (12, 2)$

12)  $(2, 5), (-4, 7)$

24)  $(9, 5), (8, 4)$

**Equation of Parallel and Perpendicular lines**

Write the slope-intercept form of the equation of the line described.

- 1) Through:  $(-2, 6)$ , parallel to  $y = 3x + 15$
- 2) Through:  $(-1, -8)$ , parallel to  $y = -5x$
- 3) Through:  $(-5, 5)$ , perpendicular to  $y = \frac{1}{3}x + 4$
- 4) Through:  $(4, 2)$ , parallel to  $y = -7x + 10$
- 5) Through:  $(-10, -1)$ , parallel to  $y = \frac{2}{5}x - 9$
- 6) Through:  $(3, 2)$ , perpendicular to  $y = -\frac{1}{4}x + 8$
- 7) Through:  $(3, -4)$ , perpendicular to  $y = -3x - 7$
- 8) Through:  $(-2, 4)$ , perpendicular to  $y = -\frac{1}{9}x + 6$
- 9) Through:  $(0, -5)$ , parallel to  $3y + 6x = 7$
- 10) Through:  $(1, 1)$ , parallel to  $y = \frac{1}{8}x - 3$
- 11) Through:  $(2, -2)$ , parallel to  $y = 3$
- 12) Through:  $(5, 1)$ , perpendicular to  $y = \frac{4}{3}x + 1$
- 13) Through:  $(-1, 8)$ , perpendicular to  $4y - x = 16$
- 14) Through:  $(5, 7)$ , parallel to  $5y + x = 2\frac{1}{4}$
- 15) Through:  $(2, 1)$ , perpendicular to  $y = 3x + 12$
- 16) Through:  $(-4, 2)$ , parallel to  $8y - x = 10$
- 17) Through:  $(0, -2)$ , perpendicular to  $y = -x + \frac{1}{4}$
- 18) Through:  $(-3, -3)$ , perpendicular to  $7y - 3x - 4 = 0$

## Answers of Worksheets

### Relation and Functions

- 1) No,  $D_f = \{4, -3, 0, -9, 11\}$ ,  $R_f = \{-4, 4, 6, -7, 18\}$
- 2) No,  $D_f = \{1, 4, -9, -10\}$ ,  $R_f = \{3, 0, -2, 5\}$
- 3) Yes,  $D_f = (-\infty, \infty)$ ,  $R_f = \{-2, \infty\}$
- 4) Yes,  $D_f = \{1, 6, 0, 4, 2\}$ ,  $R_f = \{-1, 0, 8, 3, 5\}$
- 5) No,  $D_f = [-3, 2]$ ,  $R_f = [-2, 3]$
- 6) Yes,  $D_f = \{7, 15, 2, -4\}$ ,  $R_f = \{1, 9, -5, 10\}$

### Slope form

- |                                      |                                     |                                       |
|--------------------------------------|-------------------------------------|---------------------------------------|
| 1) $y = -\frac{5}{3}x + 5$           | 6) $y = 7x + 2$                     | 12) $y = -\frac{1}{5}x - \frac{2}{9}$ |
| 2) $y = -\frac{1}{3}x + \frac{1}{4}$ | 7) $y = -5x + 2$                    | 13) $y = 0.5x - 1$                    |
| 3) $y = -7x - 9$                     | 8) $y = \frac{7}{5}x + \frac{3}{5}$ | 14) $y = -20x + 25$                   |
| 4) $y = \frac{3}{8}x + \frac{5}{8}$  | 9) $y = 0.06x + 5$                  |                                       |
| 5) $y = \frac{3}{2}x - \frac{9}{2}$  | 10) $y = 12x + 20$                  |                                       |
|                                      | 11) $y = -12x$                      |                                       |

### Slope and Y-Intercept

- |                              |   |                                 |
|------------------------------|---|---------------------------------|
| 1) $m = \frac{1}{4}, b = 3$  | 5) $m = 0, b = 7$                                     | 9) $m = 7, b = 13$              |
| 2) $m = 9, b = 5$            | 6) $m = -8, b = 5$                                    | 10) $m = -\frac{5}{12}, b = -5$ |
| 3) $m = \frac{1}{7}, b = -3$ | 7) $m = \text{undefind},$<br>$b: \text{no intercept}$ |                                 |
| 4) $m = 3, b = 20$           | 8) $m = 2, b = 0$                                     |                                 |

### Slope and One Point

- |                       |                                       |                                       |
|-----------------------|---------------------------------------|---------------------------------------|
| 1) $y = -3x + 1$      | 8) $y = -7$                           | 15) $y = -\frac{1}{4}x + 3$           |
| 2) $y = 2x - 3$       | 9) $y = 5x - 5$                       | 16) $y = \frac{1}{5}x + \frac{18}{5}$ |
| 3) $y = -x - 2$       | 10) $y = \frac{1}{7}x - \frac{11}{7}$ | 17) $y = -5x + 8$                     |
| 4) $y = 4x - 6$       | 11) $y = -2x + 7$                     | 18) $y = 3x + 1$                      |
| 5) $y = 3x + 2$       | 12) $y = -3x$                         | 19) $y = \frac{1}{7}x$                |
| 6) $y = \frac{1}{2}x$ | 13) $y = 4x + 2$                      | 20) $y = -\frac{2}{3}x - \frac{1}{3}$ |
| 7) $y = x - 3$        | 14) $x = 7$                           | 21) $y = \frac{1}{3}x + 2$            |

# Common Core Practice Test 1

## Mathematics

### GRADE 8

Administered *Month Year*

1) Which equation can be equal “10 more than the ratio of a number to 4 is equal to 7 less than the number”?

A.  $10x - 4 = 7 - x$

C.  $\frac{10}{7}x - 4 = 4x$

B.  $10 + \frac{x}{4} = x - 7$

D.  $10 + 4x = 7 - x$

2) Arrange the following fractions in order from least to greatest.

$$\frac{3}{8}, \frac{4}{7}, \frac{1}{5}, \frac{23}{25}, \frac{14}{19}$$

A.  $\frac{1}{5}, \frac{3}{8}, \frac{4}{7}, \frac{14}{19}, \frac{23}{25}$

C.  $\frac{23}{25}, \frac{14}{19}, \frac{3}{8}, \frac{4}{7}, \frac{1}{5}$

B.  $\frac{3}{8}, \frac{4}{7}, \frac{1}{5}, \frac{14}{19}, \frac{23}{25}$

D.  $\frac{14}{19}, \frac{23}{25}, \frac{1}{5}, \frac{4}{7}, \frac{3}{8}$

3) Elena earns \$7.00 an hour and worked 33 hours. Her brother earns \$8.25 an hour. How many hours would her brother need to work to equal Elena’s earnings over 36 hours?

A. 22.25

C. 40

B. 28

D. 30.5

4) In a library, 30% of the books are fiction and the rest are non-fiction. Given that there are 1,200 more non-fiction books than fiction books, what is the total number of books in the library?

A. 2,000

C. 3,000

B. 2,800

D. 3,500

## Common Core Practice Test 2

### Answers and Explanations

**1) Answer: C**

The smallest prime number is 2, and the largest even negative integer is  $-2$ .

$$2 + 5(-2) = 2 - 10 = -8.$$

**2) Answer: D**

State the problem in a mathematical sentence:

$$a + 29 = 244 - 4a$$

$$a + 4a = 244 - 29$$

$$5a = 215 \rightarrow a = 43$$

**3) Answer: A**

$$8\frac{7}{24} - 6\frac{2}{3} + 2\frac{5}{6} = (8 - 6 + 2)\frac{7}{24} - \frac{16}{24} + \frac{20}{24} = 4\left(\frac{-9}{24} + \frac{20}{24}\right) = 4\left(\frac{20-9}{24}\right) = 4\frac{11}{24}$$

**4) Answer: A**

Use the formula for Percent of Change:

$$\frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100\% = \frac{32.10 - 30}{30} \times 100\% = \frac{2.10}{30} \times 100\% = 7\%$$

**5) Answer: A**

$$|2x - 3| = 7 \rightarrow \begin{cases} 2x - 3 = 7 \rightarrow 2x = 10 \rightarrow x = 5 \\ 2x - 3 = -7 \rightarrow 2x = -4 \rightarrow x = -2 \end{cases}$$

**6) Answer: C**

Multiply equation (2) by 5. Add two equations [(1) + 5(2)]:

$$\begin{cases} 2x - 5y = 16 \\ 10x + 5y = 20 \end{cases} \rightarrow 12x = 36 \rightarrow x = 3$$

**Substitute**  $x = 3$  into equation (1):  $2(3) - 5y = 16 \rightarrow -5y = 10 \rightarrow y = -2$

**7) Answer: C**

$$V = l \times w \times h = 19 \times 15 \times 8 = 2,280 \text{ in}^3$$

**8) Answer: D**

$$\sqrt[4]{5^{-8}} = \sqrt[4]{\frac{1}{5^8}} = \frac{\sqrt[4]{1}}{\sqrt[4]{5^8}} = \frac{1}{5\left(\frac{8}{4}\right)} = \frac{1}{5^2} = 5^{-2} = \frac{1}{25}$$

**9) Answer: A**

There are no values of the variable that make the equation true.