

## Review packet for students entering Geometry

## I. Adding and Subtracting Fractions.

## A. Examples

1)  $-\frac{3}{8} + \frac{1}{8} = -\frac{2}{8} = -\frac{1}{4}$

2)  $\frac{5}{6} - \frac{3}{4} =$

$$\frac{10}{12} - \frac{9}{12} = \frac{1}{12}$$

**Remember:**

When adding or subtracting fractions, you must have a common denominator.

B. Exercises (all answers must be fully simplified)

1)  $\frac{3}{8} + \frac{1}{8} =$

2)  $\frac{2}{3} + \frac{3}{4} =$

3)  $\frac{3}{5} + \frac{-2}{3} =$

4)  $\frac{7}{12} - \frac{3}{8} =$

5)  $\frac{2}{5} + \frac{1}{3} =$

6)  $\frac{3}{7} - \frac{1}{4} =$

7)  $-\frac{7}{8} + \frac{3}{10} =$

8)  $\frac{2}{9} - \frac{3}{5} =$

## II. Multiplying and Dividing Fractions

### A. Examples

$$1) \frac{5}{\cancel{6}} \cdot \frac{\cancel{2}}{3} = \frac{5}{3} \cdot \frac{-1}{3} = \frac{-5}{9}$$

$$2) \frac{5}{6} \div \frac{2}{3} =$$

$$\frac{5}{\cancel{6}} \cdot \frac{\cancel{3}}{2} = \frac{5}{2} \cdot \frac{1}{2} = \frac{5}{4}$$

**Remember:**

When dividing by a fraction change the sign to multiplication and flip the second fraction.

### B. Exercises (all answers must be fully simplified)

$$1) \frac{3}{8} \cdot \frac{7}{9} =$$

$$2) \frac{15}{16} \cdot \left(-\frac{24}{30}\right) =$$

$$3) \left(-\frac{5}{6}\right) \div \frac{25}{18} =$$

$$4) \frac{2}{5} \cdot \frac{3}{4} =$$

$$5) \left(-\frac{14}{3}\right) \div 6 =$$

$$6) \left(-\frac{5}{12}\right) \cdot \frac{3}{10} =$$

$$7) \frac{2}{7} \div \frac{5}{14} =$$

$$8) \left(-\frac{7}{12}\right) \div \left(-\frac{21}{24}\right) =$$

### III. Solving Equations

#### A. Examples

$$\begin{aligned} 1) \quad & 3(5x-3x) + 5 = 47 \\ & 3(2x) + 5 = 47 \quad (\text{combine like terms}) \\ & 6x + 5 = 47 \quad (\text{multiply}) \\ & 6x = 42 \quad (\text{subtract 5}) \\ & x = 7 \quad (\text{divide by 6}) \end{aligned}$$

$$\begin{aligned} 2) \quad & 5x + 8 = 24 - 3x \\ & 8x + 8 = 24 \quad (\text{add } 3x) \\ & 8x = 16 \quad (\text{subtract 8}) \\ & x = 2 \quad (\text{divide by 8}) \end{aligned}$$

#### B. Solve the equations for x

$$1) \quad 4x + 3 = 11$$

$$2) \quad 4x + 18 = 7(x + 3)$$

$$3) \quad 2(7x - 3) + 4 = 40$$

$$4) \quad 3x + 2(x + 2) = 13 - (2x + 2)$$

$$5) \quad 3x - 7 = 7x + 13$$

$$6) \quad 4x + 8 = -5x - 19$$

$$7) \quad 2x - 5x + 12 = 4x - 23$$

$$8) \quad 3x^2 - 17 = 2x^2 + 19$$

#### IV. Simplifying Radicals

There are many different techniques available to simplify radical expressions. If the technique demonstrated below is not what you know, feel free to use any other technique (provided it applies legitimate mathematics).

##### A. Examples

$$1) \sqrt{20} = \sqrt{(4)(5)} = (\sqrt{4})(\sqrt{5}) = 2\sqrt{5}$$

$$2) 3\sqrt{24} = 3\sqrt{(4)(6)} = 3(\sqrt{4})(\sqrt{6}) = 3(2)(\sqrt{6}) = 6\sqrt{6}$$

$$3) \frac{\sqrt{9}}{\sqrt{2}} = \frac{\sqrt{9}}{\sqrt{2}} = \frac{3}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{2}$$

$$4) \frac{\sqrt{48}}{\sqrt{3}} = \frac{\sqrt{(16)(3)}}{\sqrt{3}} = \frac{(\sqrt{16})(\sqrt{3})}{\sqrt{3}} = \sqrt{16} = 4$$

**Remember:**

You cannot have a radical in the denominator, so you have to multiply the numerator and denominator by the radical to get the final answer.

##### B. Exercises (all answers must be fully simplified)

$$1) \sqrt{32}$$

$$2) \sqrt{75}$$

$$3) 4\sqrt{50}$$

$$4) 2\sqrt{108}$$

$$5) \frac{4}{\sqrt{8}}$$

$$6) \sqrt{\frac{2}{3}}$$

$$7) \sqrt{\frac{16}{5}}$$

$$8) \frac{\sqrt{24}}{\sqrt{2}}$$

## V. Graphing

### A. The Slope Formula

$$\text{Slope} = \frac{y_1 - y_2}{x_1 - x_2}$$

**Remember:**

The slopes of two parallel lines are the same, and the slopes of two perpendicular lines are opposite reciprocals!

### B. Exercises

1) Find the slope of a line from the given points.

a) C (9,-2) D (3,4)

b) C (2,1) D (2,3)

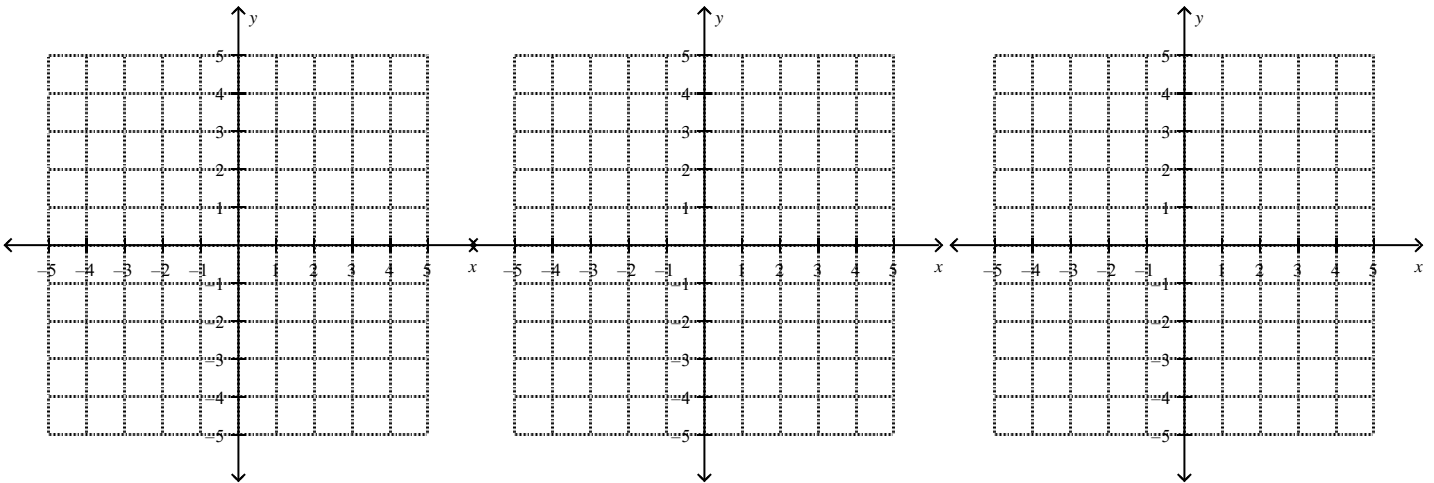
c) C (0, 30) D(-5,0)

2) Graph the equation. Which lines are parallel? Which are perpendicular? Explain your answer.

a)  $y = -2x + 4$

b)  $2x - 4y = 12$

c)  $2x - y = -5$



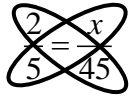
3) A line has the equation  $y = \frac{2}{3}x - 3$ . What is the slope of a line that is parallel to the given line?

4) A line has the equation  $y = -\frac{4}{5}x + 4$ . What is the slope of a line that is perpendicular to the given line?

## VI. Ratios and Proportions

### A. Example

$$\frac{2}{5} = \frac{x}{45}$$


$$\frac{2}{5} = \frac{x}{45}$$

$$5x = 2 \cdot 45$$

$$\frac{5x}{5} = \frac{90}{5}$$

$$x = 18$$

**Remember:**

We solve proportions by cross multiplying!

### B. Exercises

1)  $\frac{3}{8} = \frac{x}{136}$

2)  $\frac{5}{7} = \frac{x}{42}$

3)  $\frac{2}{15} = \frac{10}{x}$

4)  $\frac{x}{12} = \frac{6}{4}$

5)  $\frac{11}{4} = \frac{x}{24}$

6)  $\frac{7}{x} = \frac{4}{14}$

7) David paints 3 rooms in 7 hours. At the same pace, how long will it take him to paint 15 rooms?

8) Sarah makes cookies at the rate of 2 dozen per hour. She has to make a total of 216 cookies for a wedding party. How long will it take her?

## VII. Segments and Angles

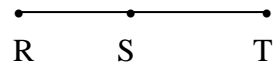
### A. Vocabulary (use the vocabulary to apply these concepts some of which may be new to you!)

- Complementary angles: angles that add up to  $90^\circ$
- Supplementary angles: angles that add up to  $180^\circ$
- Vertical angles: angles opposite each other on two intersecting lines, vertical angles are congruent
- Congruent: having the same measurement

### B. Exercises

1) Using the diagram on the right

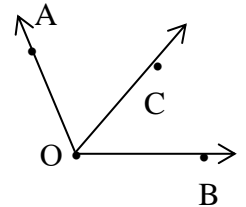
a) Find RT if RS = 15 and ST = 9



b) Find RS if ST = 15 and RT = 40

2) Using the diagram on the right

a) Find  $m\angle AOB$  if  $m\angle AOC = 53^\circ$ ,  $m\angle COB = 30^\circ$



b) Find x, if  $m\angle AOB = 7x - 3$ ,  $m\angle AOC = 2x + 14$  and  $m\angle BOC = 118^\circ$

3) The angles ABC and BCD are supplementary. If  $m\angle ABC = 73^\circ$ , find  $\angle BCD$ .

4) The angles MNO and NOP are complementary. If  $m\angle MNO = 29^\circ$ , find  $\angle NOP$ .

5) The angles PQR and SQT are vertical. If  $m\angle PQR = 58^\circ$ , find  $\angle SQT$ .

## VIII. Area and Volume

### A. Formulas

Rectangle:

$$A = lw$$

$$P = 2l + 2w$$

Circle:

$$A = \pi r^2$$

$$C = 2\pi r$$

$$D = 2r$$

Parallelogram:

$$A = bh$$

$$P = 2s + 2b$$

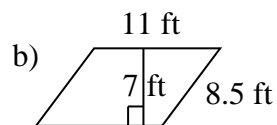
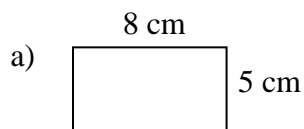
Rectangular Prism:

$$V = lwh$$

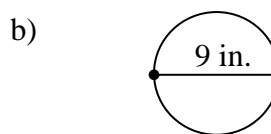
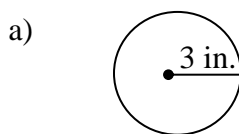
$$S.A. = 2lw + 2lh + 2wh$$

### B. Exercises

1) Find the perimeter and the area.



2) Find the area and the circumference.



3) Find the volume and the surface area.

