

Rising 7th Math Summer Assignment

Hello Rising 7th Grade Families and Students!

Welcome to 7th Grade Pre-Algebra! I am Mr. O'Donnell and I was the 7th grade math teacher. This was my 7th year teaching at Boston Prep, sixth year in 7th grade math. Throughout my time in 7th grade, there have been many challenging areas that help students grow as math thinkers. This summer work's intention is to boost skills so that these challenging areas are more comprehensible for students throughout their 8th grade year.

Throughout this summer, students should complete this packet in its entirety. The skills practiced in this packet are going to carry throughout the entire 7th grade year and create the foundation for students to be successful. Along with Independent Practice, notes will be attached so that students have a basis of what they should be doing in case they are stuck.

While it is summer, I am still invested in students' learning and will be available all summer to help via email or by phone (these can be found at the bottom of the page). Completing this assignment is essential to the success of the beginning of the year as **students will be tested on this material at the end of the first week of school** after they have had time to review and ensure all misconceptions are cleared up. This will be a student's FIRST assessment grade for 7th grade math. A suggested schedule is provided on the next page to help students stay on track towards completion of the packet this summer.

While I will be transitioning into a different role at Boston Prep next year, I am still **beyond** excited to see the growth these future 7th graders will have! Please do not hesitate to reach out to me with any questions, comments or concerns that you may have! Have an amazing, restful, and restorative summer so we can hit the ground running come August when your student is part of the NEW class of 7th graders!

Best,
Dan O'Donnell

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| Mr. O'Donnell Contact Information | |
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Suggested Summer Work Schedule

| Topic | Suggested Completion Date |
|--|---------------------------|
| Ratios and Proportions | June 27 |
| Fractions, Decimals, and Percents | July 4 |
| Dividing Fractions | July 11 |
| Multiplying, Dividing, Adding and Subtracting Decimals | July 18 |
| Area of Triangles | July 25 |
| Expressions and Equations | August 1 |
| Greatest Common Factor | August 8 |
| Missing Values in a table | August 15 |

RATIOS AND PROPORTIONS

Ratios and Proportions

Ratio: the relationship between two quantities

ex) For every one basketball shot you make, you score two points (1:2)

Proportions: A statement that expresses equality between two ratios

ex) $\frac{3}{4} = \frac{6}{8}$ or $3:4 = 6:8$

Ratio Examples

ex1) There are 8 oranges and 5 lemons in a fruit bowl. What is the ratio of oranges to lemons? (8:5)

Lemons to oranges? (5:8)

ex2) What situation could describe a ~~ratio~~ ratio of 5:9?

For every 5 cups of sugar, there are 9 oz of water

How would you rephrase that situation for 9:5?

For every 9 oz of water, there are 5 cups of sugar

Proportion Examples

ex1) Why is $\frac{1}{2} = \frac{2}{4}$ (or 1:2 = 2:4)?

$$\begin{array}{r} 1 \times 2 = 2 \quad \text{and} \quad 2 \times 2 = 4 \\ \frac{1}{2} \xrightarrow{\times 2} \frac{2}{4} \end{array}$$

ex2) Why is $\frac{3}{4} = \frac{9}{12}$?

Because you multiply 3 and 4 by the same number to get

$$\begin{array}{r} 9 \text{ and } 12 \\ \frac{3}{4} \xrightarrow{\times 3} \frac{9}{12} \end{array}$$

ex3) Why is $\frac{5}{10}$ NOT equal to $\frac{10}{13}$?

Because you can't multiply 5 and 10 by the same number to get 10 and 13

$$\begin{array}{r} \frac{5}{10} \xrightarrow{\times 2} \frac{10}{13} \\ \frac{10}{13} \xrightarrow{\times 1.3} \end{array}$$

2 and 1.3 are not the same

1 a. A math club has 25 members, of which 11 are males and the rest are females. What is the ratio of males to all club members?

2 a. A group of preschoolers has 8 boys and 24 girls. What is the ratio of girls to all children?

3 a. A group of preschoolers has 15 boys and 12 girls. What is the ratio of girls to boys?

4 a. A pattern has 4 blue triangles to every 12 yellow triangles. What is the ratio of blue triangles to all triangles?

5 a. A gardening club has 21 members, of which 13 are males and the rest are females. What is the ratio of females to all club members?

1 a. A jar pinto beans and black beans in a ratio of 1 : 1, and 300 of the beans are pinto beans. How many beans in total are there in the jar?

2 a. Jayden and Caden share a reward of \$140 in a ratio of 2 : 5. What fraction of the total reward does Jayden get?

3 a. Gavin has nickels, dimes, and quarters in the ratio of 8 : 1 : 2. If 30 of Gavin's coins are quarters, how many nickels and dimes does Gavin have?

4 a. The ratio of girls to boys in a swimming club was 2 : 4. There were 14 girls. How many total members were there in the club?

5 a. A jar contains 550 beans. Of all the beans, $\frac{2}{5}$ are white beans and the rest are navy beans. What is the ratio of white beans to navy beans?

FRACTIONS, DECIMALS, AND PERCENTS

(FDP's) FRACTIONS, DECIMALS, PERCENTS

It is important to show how FDP's are related and all represent the same amount.

F → D

Given $\frac{1}{2}$, divide top number (numerator) by the bottom number (denominator)

$$\frac{1}{2} = 0.5$$

$$\begin{array}{r} 0.5 \\ 2 \overline{) 10} \\ \underline{-10} \\ 0 \end{array}$$

D → P

After calculating $\frac{1}{2} = 0.5$, to get to a percent, multiply by 100 (or just move the decimal to the right twice) $0.5 \times 100 = 50$ or 0.5

Fill in a zero when no numbers are left to still be able to move your decimal

| Fractions | Decimals | Percents |
|-----------------|----------|----------|
| $\frac{1}{2}$ | 0.5 | 50% |
| $\frac{1}{20}$ | 0.05 | 5% |
| $\frac{3}{4}$ | 0.75 | 75% |
| $\frac{7}{5}$ | 1.4 | 140% |
| $\frac{2}{100}$ | 0.02 | 2% |

| FRACTION | DECIMAL | PERCENT |
|----------------|---------|---------|
| $\frac{1}{2}$ | | |
| $\frac{3}{4}$ | | |
| | 0.6 | |
| | | 80% |
| | 0.25 | |
| | | 10% |
| $\frac{7}{10}$ | | |
| | 0.9 | |

| FRACTION | DECIMAL | PERCENT |
|------------------|---------|---------|
| $\frac{3}{5}$ | | |
| | 0.64 | |
| | | 55% |
| | 0.16 | |
| $\frac{17}{100}$ | | |
| | 0.35 | |
| | | 28% |
| | | 62.5% |
| | 0.59 | |
| $\frac{4}{7}$ | | |
| | 0.44 | |

DIVIDING FRACTIONS

Dividing Fractions

To divide by fractions you need to multiply your first number by the reciprocal

Reciprocal - the inverse of a number or the number flipped

Reciprocal Examples

ex 1) $2/5$ reciprocal $5/2$

ex 2) $1/6$ reciprocal 6

ex 3) 12 reciprocal $1/12$

(KCF)

Steps to divide fractions

① Keep first number

② Change \div to \times

③ Flip second number

ex) $1/2 \div 1/4$

$\frac{1}{2} \times \frac{4}{1} = \frac{4}{2} = 2$
keep change flip

ex 1) $5 \div 1/2$ \rightarrow K C F
 $5 \times 2 = 10$

ex 2) $4/3 \div 2/6$ \rightarrow K C F
 $4/3 \times 3/6 = \frac{4 \times 2}{3 \times 6} = \frac{8}{18}$

ex 3) $1/5 \div 4$ \rightarrow K C F
 $1/5 \times 1/4 = \frac{1 \times 1}{5 \times 4} = \frac{1}{20}$

1. $\frac{1}{4} \div \frac{9}{10} =$ _____

2. $\frac{5}{9} \div \frac{1}{2} =$ _____

3. $\frac{1}{3} \div \frac{6}{9} =$ _____

4. $\frac{8}{10} \div \frac{2}{5} =$ _____

5. $\frac{3}{8} \div \frac{7}{8} =$ _____

6. $\frac{2}{5} \div \frac{1}{2} =$ _____

7. $\frac{5}{10} \div \frac{6}{12} =$ _____

8. $\frac{7}{11} \div \frac{1}{6} =$ _____

9. $\frac{5}{6} \div \frac{5}{10} =$ _____

10. $\frac{1}{4} \div \frac{1}{7} =$ _____

MULTIPLYING, DIVIDING, ADDING AND SUBTRACTING DECIMALS

MULTIPLYING, DIVIDING, ADDING AND SUBTRACTING DECIMALS

Multiplying

① Count how many decimal places there are to the right

ex) 4.5×1.23 \rightarrow 3 decimal places

② Multiply then move that many places to the left

ex) 4.5×1.23

$$\begin{array}{r} 4.5 \\ \times 1.23 \\ \hline 135 \\ 900 \\ +4500 \\ \hline 5.535 \end{array}$$

5.535 (5.535)

Adding and Subtracting

Simply line your decimals up and then add or subtract

ex 1) $13.5 + 5.2$

$$\begin{array}{r} 13.5 \\ +5.2 \\ \hline 18.7 \end{array} \rightarrow 18.7$$

ex 2) $24.8 - 11.4$

$$\begin{array}{r} 24.8 \\ -11.4 \\ \hline 13.4 \end{array} \rightarrow 13.4$$

Dividing

By far the toughest in my opinion

① The "outside number" can't be a decimal, so move it to the right until it's a whole number

$\rightarrow 1.2 \overline{) 1.36}$

② However many places you moved it to the right, do the same with the inside number and bring the decimal up

$\rightarrow 12 \overline{) 13.6}$

③ Divide as you normally would

$\rightarrow 12 \overline{) 13.6}$

$$\begin{array}{r} 0.3 \\ 12 \overline{) 13.6} \\ -36 \\ \hline 0 \end{array}$$

Therefore, $.36 \div 1.2 = 0.3$

a. $2.7 + 4.4 =$ _____

b. $18.7 - 6 =$ _____

c. $39.9 + 1.5 =$ _____

d. $70 - 7.7 =$ _____

e. $42.1 + 6.9 =$ _____

f. $15.6 - 2.8 =$ _____

$$\begin{array}{r} 1.6 \\ \times 20 \\ \hline \end{array}$$

$$\begin{array}{r} 0.46 \\ \times 20 \\ \hline \end{array}$$

$$\begin{array}{r} 10.2 \\ \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 6.42 \\ \times 60 \\ \hline \end{array}$$

$$\begin{array}{r} 23.98 \\ \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} 30.69 \\ \times 70 \\ \hline \end{array}$$

1.

$$7 \overline{) 0.224}$$

2.

$$6 \overline{) 73.002}$$

3.

$$6 \overline{) 0.042}$$

4.

$$6 \overline{) 0.768}$$

5.

$$8 \overline{) 0.04}$$

6.

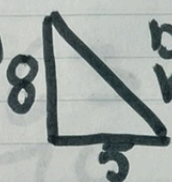
$$2 \overline{) 34.16}$$

AREA OF TRIANGLES

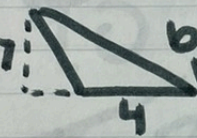
Area of Triangles

Formula $\rightarrow \frac{1}{2} \cdot b \cdot h$ or $\frac{b \cdot h}{2}$

b = base
h = height

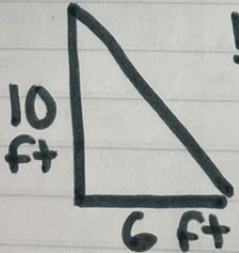
ex 1)  $b = 5$
 $h = 8$

$$\frac{1}{2} \cdot b \cdot h = 20$$
$$\frac{b \cdot h}{2} = \frac{5 \cdot 8}{2} = 20$$

ex 2)  $b = 4$
 $h = 7$

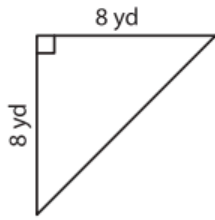
$$\frac{1}{2} \cdot 4 \cdot 7 = 14$$
$$\frac{4 \cdot 7}{2} = 14$$

Any answer should be in units²

ex) 

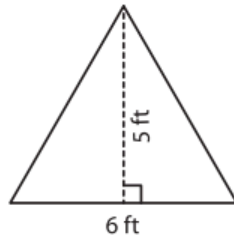
$$\frac{10 \times 6}{2} = \frac{60}{2} = 30 \text{ ft}^2$$

1)



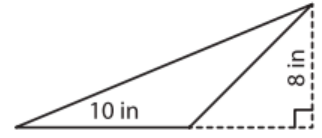
Area =

2)



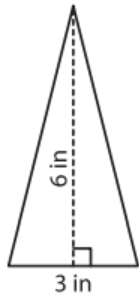
Area =

3)



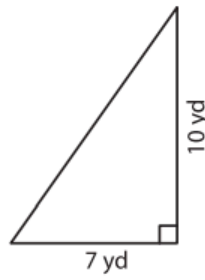
Area =

4)



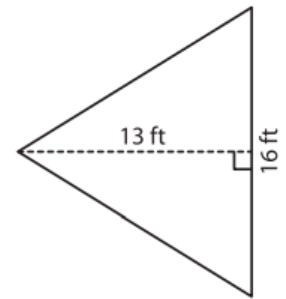
Area =

5)



Area =

6)



Area =

EXPRESSIONS AND INEQUALITIES

Expressions and Equations

Expressions: no equal sign
ex) $5x+4$

Equations: include equal sign
ex) $5x+4=24$

Create expressions from sentences

ex 1) 5 less than 2 times a number

-5 $2x$
 $(2x - 5)$

ex 2) 8 more than the quotient of a number and 4

$+8$ $\frac{x}{4}$
 $(\frac{x}{4} + 8)$

Create sentences from expressions

ex) $3x - 10$

3 times a number

10 less

10 less than 3 times a number

Write an expression that matches the statement.

| STATEMENT | | EXPRESSION |
|-----------|-------------------------------|------------|
| Example: | 3 more than x | $x + 3$ |
| 1) | 4 more than a | |
| 2) | 2 less than b | |
| 3) | double the value of c | |
| 4) | three times the value of d | |
| 5) | subtract 15 from e | |
| 6) | subtract f from 10 | |
| 7) | add 8 to g | |
| 8) | divide h by 4 | |
| 9) | half the value of i | |
| 10) | multiply j by 7 | |
| 11) | add k to 35 | |
| 12) | divide l by 10 | |
| 13) | subtract 15 from m | |
| 14) | multiply 3 by n | |
| 15) | subtract o from 27 | |
| 16) | divide 32 by p | |
| 17) | multiply q by $\frac{1}{3}$ | |
| 18) | divide 15 by r | |
| 19) | subtract 30 from s | |
| 20) | multiple $\frac{1}{4}$ by t | |

GREATEST COMMON FACTOR

Greatest Common Factor (GCF)

GCF - the largest number that can evenly go into two numbers

ex) 14: 1, 2, (7), 14
21: 1, 3, (7), 21 $\boxed{\text{GCF} = 7}$

ex2) 8: 1, (2), 4, 8 $\boxed{\text{GCF} = 2}$
18: 1, (2), 3, 6, 9, 18

ex3) 15: 1, 3, 5, (15) $\boxed{\text{GCF} = 15}$
30: 1, 2, 3, 5, 6, 10, (15)

1) 2, 8

$$\text{GCF}(2, 8) = \underline{\hspace{2cm}}$$

2) 10, 20

$$\text{GCF}(10, 20) = \underline{\hspace{2cm}}$$

3) 24, 20

$$\text{GCF}(24, 20) = \underline{\hspace{2cm}}$$

4) 4, 14

$$\text{GCF}(4, 14) = \underline{\hspace{2cm}}$$

5) 16, 12

$$\text{GCF}(16, 12) = \underline{\hspace{2cm}}$$

6) 6, 21

$$\text{GCF}(6, 21) = \underline{\hspace{2cm}}$$

7) 11, 22

$$\text{GCF}(11, 22) = \underline{\hspace{2cm}}$$

8) 21, 14

$$\text{GCF}(21, 14) = \underline{\hspace{2cm}}$$

MISSING VALUES IN A TABLE

Find out how you are getting from x to y by either multiplying or dividing and then fill in the remaining spots

1)

| x | y |
|---|---|
| 2 | 6 |
| 3 | 9 |
| 4 | |
| 5 | |

4)

| x | y |
|----|----|
| 1 | 3 |
| 4 | |
| 7 | 21 |
| 10 | |

2)

| x | y |
|---|----|
| 1 | 5 |
| 2 | 10 |
| 3 | |
| 4 | |

5)

| x | y |
|----|----|
| 4 | |
| 7 | 14 |
| 10 | |
| 13 | 26 |

3)

| x | y |
|---|----|
| 2 | 8 |
| 4 | 16 |
| 6 | |
| 8 | |

6)

| x | y |
|----|----|
| 6 | |
| 8 | |
| 10 | 50 |
| 12 | 60 |

Complete the following ratio tables.

| | | | |
|---|---|---|----|
| | 4 | | |
| 6 | 8 | 4 | 16 |

| | | | |
|----|----|----|----|
| 20 | | 12 | 4 |
| | 40 | | 16 |

| | | | |
|----|----|----|-----|
| | | 10 | 200 |
| 12 | 15 | 30 | |

| | | | |
|----|---|----|----|
| | | | 11 |
| 40 | 8 | 14 | 22 |

| | | | |
|---|---|----|---|
| 1 | 2 | | 5 |
| 9 | | 27 | |

| | | | |
|---|----|----|----|
| 9 | | 30 | 40 |
| | 20 | 60 | |