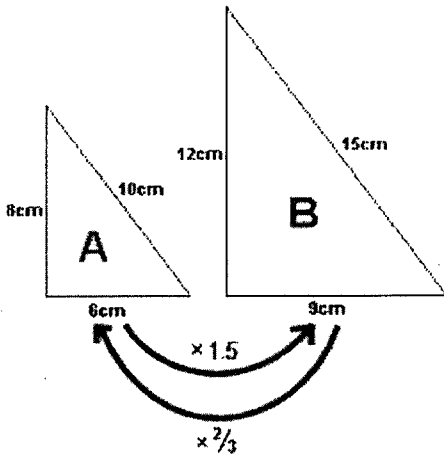
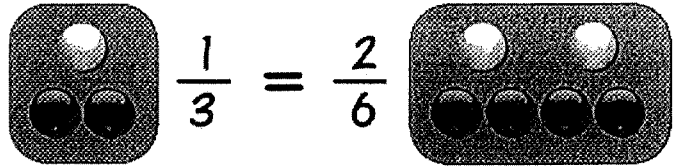


Skill #1:
Scale Factor

Skill #2:
Proportions

Scale factor is the number used to multiply the lengths of a figure to stretch or shrink it to a similar image.

A **proportion** is an equation stating that two ratios are equal.



$$\frac{x}{10} = \frac{4}{5}$$

In order to identify an unknown variable:

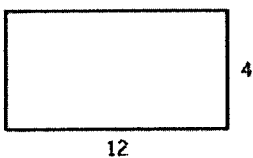
1. Find the scale factor between the known quantities. ($5 \times \underline{2} = 10$)
2. Use the scale factor to find the value of the variable. ($4 \times \underline{2} = x$ so $x = 8$)

Check out these links for more practice...

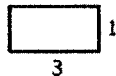
- <https://www.mathsisfun.com/algebra/proportions.html>
- <http://www.ixl.com/math/grade-7/scale-drawings-and-scale-factors>

Now try these problems

Original Rectangle



Scaled Rectangle



1. What is the scale factor from the original rectangle to the scaled rectangle?
2. What is the scale factor from the scaled rectangle to the original rectangle?

Solve for x in each proportion.

3. $\frac{8}{11} = \frac{16}{x}$

4. $\frac{x}{10} = \frac{10}{25}$

Check your answers on the back of this sheet...

1. $\frac{1}{4}$

2. 4

3. $x = 22$

4. $x = 4$

Great Work! Now it's time to practice.

1. The triangles at the right are similar.

- a. Use the side lengths of triangle DEF and the fact that the triangles are similar to find the lengths of sides AC and AB and the measure of angle E .

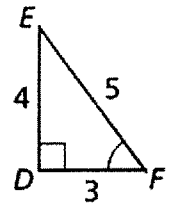
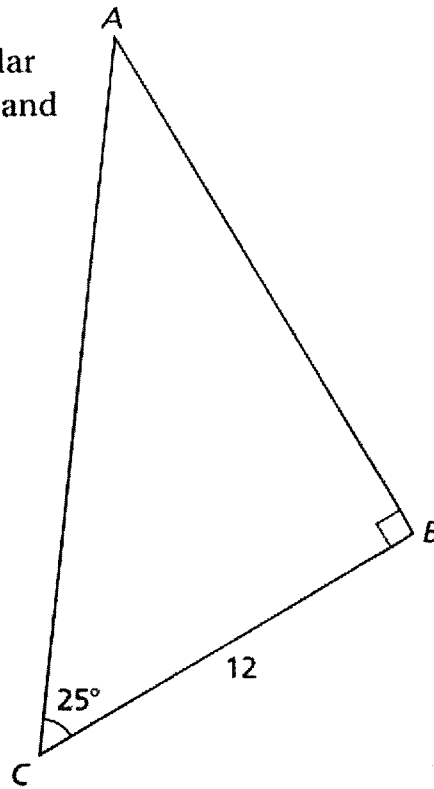
side $AC =$ _____

side $AB =$ _____

angle $E =$ _____

- b. What is the scale factor from triangle DEF to triangle ABC ?

- c. What is the scale factor from triangle ABC to triangle DEF ?



2. Find the value of x that will make each proportion true.

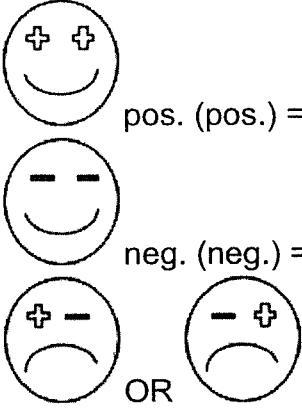
a. $\frac{3}{4} = \frac{24}{x}$

b. $\frac{2}{3} = \frac{x}{15}$

c. $\frac{x}{5} = \frac{5}{25}$

d. $\frac{4}{x} = \frac{10}{30}$

Summer Math Packet
Week #2

Skill #1: Adding & Subtracting Integers	Skill #2: Multiplying & Dividing Integers								
<p>ADDITION pos. + pos. = pos. neg. + neg. = neg. pos. + neg OR neg. + pos. = Subtract the numbers and take the sign of the greater number.</p> <p>Examples: $10 + 25 = 35$ $-10 + (-25) = -35$ $10 + (-25) = -15$ $-10 + 25 = 15$</p>	 <p>pos. (pos.) = pos. neg. (neg.) = pos. pos. (neg.) = neg. neg. (pos.) = neg.</p> <p>Examples:</p>								
<p>SUBTRACTION "add the opposite" then follow the rules for adding integers</p> <p>Examples: $10 - 25 \rightarrow 10 + (-25) = -15$ $-10 - (-25) \rightarrow -10 + 25 = 15$ $10 - (-25) \rightarrow 10 + 25 = 35$ $-10 - 25 \rightarrow -10 + (-25) = -35$</p> <p>Note: A double negative makes a positive.</p>	<p>Examples:</p> <table border="0"> <tr> <td>$10 (15) = 150$</td> <td>$150/10 = 15$</td> </tr> <tr> <td>$-10 (-15) = 150$</td> <td>$-150/-10 = 15$</td> </tr> <tr> <td>$10 (-15) = -150$</td> <td>$150/-10 = -15$</td> </tr> <tr> <td>$-10 (15) = -150$</td> <td>$-150/10 = -15$</td> </tr> </table>	$10 (15) = 150$	$150/10 = 15$	$-10 (-15) = 150$	$-150/-10 = 15$	$10 (-15) = -150$	$150/-10 = -15$	$-10 (15) = -150$	$-150/10 = -15$
$10 (15) = 150$	$150/10 = 15$								
$-10 (-15) = 150$	$-150/-10 = 15$								
$10 (-15) = -150$	$150/-10 = -15$								
$-10 (15) = -150$	$-150/10 = -15$								

Check out these links for more practice...

- <http://www.mathgoodies.com/lessons/vol5/addition.html>
- <http://www.mathgoodies.com/lessons/vol5/subtraction.html>
- <http://www.mathgoodies.com/lessons/vol5/multiplication.html>
- http://www.aaamath.com/div65_x2.htm

Now try these problems

1. $46 + (-13)$

2. $-16 + (-2)$

3. $-13 - (-16)$

4. $13 - (-13)$

5. $-12 (-5)$

6. $\frac{30}{-15} =$

Check your answers on the back of this sheet...

1. 33

2. -18

3. 3

4. 26

5. 60

6. -2

Great Work! Now it's time to practice. NO calculator! =)

1.) $-37 + 22 =$ _____

2.) $4 - (-14) =$ _____

3.) $16 - 25 =$ _____

4.) $-25 \div -5 =$ _____

5.) $12 (-11) =$ _____

6.) $56 \div -7 =$ _____

7.) $-3 - (-9) =$ _____

8.) $-19 + (-21) =$ _____

9.) $-6 (-6) =$ _____

10.) $-4 (8) =$ _____

11.) $\frac{-144}{-12} =$ _____

12.) $-9 + 17 =$ _____

Summer Math Packet
Week #3

Skill: Fractions

Rules for Fractions

If working with a MIXED NUMBER, change to an IMPROPER FRACTION first

Addition: (same denominators)	
$\frac{A}{B} + \frac{C}{B} = \frac{A + C}{B}$	
Subtraction: (same denominators)	
$\frac{A}{B} - \frac{C}{B} = \frac{A - C}{B}$	
Multiplication:	
$\frac{A}{B} \times \frac{C}{D} = \frac{AC}{BD}$	
Addition: (different denominators)	
$\frac{A}{B} + \frac{C}{D} = \frac{AD}{BD} + \frac{BC}{BD} = \frac{AD + BC}{BD}$	
Subtraction: (different denominators)	
$\frac{A}{B} - \frac{C}{D} = \frac{AD}{BD} - \frac{BC}{BD} = \frac{AD - BC}{BD}$	
Division:	
$\frac{A}{B} \div \frac{C}{D} = \frac{A}{B} \times \frac{D}{C} = \frac{AD}{BC}$	

Check out these links for more practice...

- www.khanacademy.org/math/cc-fifth-grade-math/cc-5th-fractions-topic/cc-5th-add-sub-fractions/e/adding_fractions

Now try these problems

1. $3/5 + 1/5$

2. $5/7 - 2/7$

3. $2/4 \times 1/9$

4. $3/7 + 4/5$

5. $5/6 - 2/5$

6. $2/3 \div 3/2$

Check your answers on the back of this sheet...

1. $\frac{4}{5}$ 2. $\frac{3}{7}$ 3. $\frac{2}{36}$ or $\frac{1}{18}$ 4. $\frac{43}{35}$ or 1 and $\frac{8}{35}$
5. $\frac{13}{30}$ 6. $\frac{4}{9}$

Great Work! Now it's time to practice.

1. $\frac{3}{2} + \frac{6}{2}$

2. $\frac{8}{12} + \frac{5}{12}$

3. $\frac{9}{7} - \frac{4}{7}$

4. $\frac{12}{5} - \frac{8}{5}$

5. $\frac{4}{5} \times \frac{2}{3}$

6. $\frac{5}{8} \times \frac{6}{9}$

7. $\frac{3}{2} + \frac{4}{3}$

8. $\frac{7}{8} + \frac{2}{5}$

9. $\frac{3}{4} + \frac{1}{6}$

10. $\frac{3}{5} - \frac{1}{6}$

11. $\frac{2}{3} - \frac{2}{7}$

12. $\frac{3}{5} \div \frac{2}{3}$

13. $\frac{1}{4} \div \frac{3}{5}$

14. $\frac{7}{5} \div \frac{6}{5}$

15. $\frac{9}{12} \div \frac{3}{4}$

Summer Math Packet
Week #4

Skill: Order of Operations

Following the Order of Operations	<u>P</u> lease	$\begin{aligned} & 8 \times 2 + 3 - 10 \div 5 + 6 - 3 \times 4 \\ & \underbrace{} + 3 - \underbrace{} + 6 - \underbrace{} \\ & = 16 + 3 - 2 + 6 - 12 \\ & = 16 + 3 - 2 + 6 - 12 \\ & \underbrace{} - 2 + 6 - 12 \\ & = 19 - 2 + 6 - 12 \\ & \underbrace{} + 6 - 12 \\ & = 23 - 12 \\ & \underbrace{} \\ & = 11 \end{aligned}$
1 st <u>P</u> arentheses and brackets	<u>E</u> xcuse	
2 nd <u>E</u> xponents	<u>M</u> y	
3 rd <u>M</u> ultiply or <u>D</u> ivide from left to right.	<u>D</u> ear	
4 th <u>A</u> dd or <u>S</u> ubtract from left to right.	<u>A</u> unt <u>S</u> ally	

Check out these links for more practice...

- <https://www.khanacademy.org/math/pre-algebra/order-of-operations>

Now try these problems

1. $7 + (6 \times 5^2 + 3)$

2. $3 + 6 \times (5 + 4) \div 3 - 7$

3. $(8-1) \times (5-4)$

4. $9 - (3 - 8 \div 4 \div (1 \times 1))$

5. $(8-7) \times (2+1) + 1$

6. $16 \div 2[8 - 3(4 - 2)] + 1$

Check your answers on the back of this sheet...

1. 160

2. 14

3. 7

4. 8

5. 4

6. 17

Great Work! Now it's time to practice.

a. $5 + (7 + 1^2) - 2$

b. $(6 - 9) - 3$

c. $1 + (3 + 6) + 9 \div 9$

d. $8^2 \times (8 + 2^2) \div 6 \times 3$

e. $(2 + 8 \times 5 - 4) \times 4$

f. $(2 + 7^2) - 9^2 - 8$

g. $(4 - 2 \times 2) \div 5 \times 4$

h. $(9^2 \times 9 - 9) \times 3^2 + 5$

Summer Math Packet
Week #5

Skill:
2-Step Equations

Steps:

- 1) Decide whether to use addition or subtraction to isolate the variable term.
- 2) Add or subtract the constant on both sides of the equation.
- 3) Eliminate the variable's coefficient through division or multiplication.

Example:

$$3x + 4 = 15$$

$$3x + 4 = 15$$

$$\underline{-4} \quad \underline{-4}$$

$$3x = 11$$

$$\underline{3x} = \underline{11}$$

$$3 \quad 3$$

$$x = \frac{11}{3}$$

Check out these links for more practice...

- <http://tinyurl.com/omd32c2>
- <http://tinyurl.com/yjrgdpb>

Now try these problems

1. $3b+9 = -18$

2. $3z-2 = -26$

3. $2x+8 = 4$

4. $-2y-6 = 6$

5. $2a+9 = 11$

6. $3y-5 = -32$

Check your answers on the back of this sheet...

$$1. b = -9$$
$$6. y = -9$$

$$2. z = -8$$

$$3. x = -2$$

$$4. y = -6$$

$$5. a = 1$$

Great Work! Now it's time to practice.

$$1.) 5x + 9 = 39$$

$$2.) 9 - c = -13$$

$$3.) 9p + 11 = -7$$

$$4.) 6 - 2d = 42$$

$$5.) 2m + 5 = 17$$

Summer Math Packet
Week #6

Skill:

Solving Equations With a Variable on Both Sides

<p>Work to get the variable isolated on one side of the equation and the number on the other side of the equation. Remember what you do to 1 side of the equation you have to do to the other side of the equation too!</p>	<p>Example:</p> $-2x + 8 = -6x - 4$
<p>1. Use addition or subtraction to move the variable to one side. Then simplify like terms.</p>	$ \begin{array}{r} +2x \qquad +2x \\ 8 = -4x - 4 \end{array} $
<p>2. Use addition or subtraction to move the number to the opposite side of step 1. Then simplify like terms.</p>	$ \begin{array}{r} +4 \qquad +4 \\ 12 = -4x \end{array} $
<p>3. Use multiplication or division so that the variable has a coefficient of +1.</p>	$ \begin{array}{r} \frac{12}{-4} = \frac{-4x}{-4} \\ -3 = x \end{array} $
<p>4. Check your solution by substituting your answer back into your original equation!</p>	$ \begin{array}{l} -2(-3) + 8 = -6(-3) \\ 6 + 8 = 18 - 4 \\ 14 = 14 \end{array} $

Check out this link for more practice...

<https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/basic-equation-practice/v/equations-3>

Now try these problems

1. $7 - 2x = x - 14$

2. $3y + 8 = 2y - 7$

3. $6 - 4x = 16 - 9x$

4. $3.6y = 5.4 + 3.3y$

Check your answers on the back of this sheet . . .

Answers:

1. $x = 7$

2. $y = -15$

3. $x = 2$

4. $y = 18$

Great Work! Now it's time to practice.

1. $6 - 3x = 10 - 5x$

2. $12 - 8y = 25 - 9y$

3. $2x + 4 = 5x - 5$

4. $8 - 4x = -2x - 10$

5. $6.1x = 9.3 - 3.2x$

6. $7y - 8 = 3y + 12$

Challenge:

7. $\frac{1}{2}x - \frac{3}{4} = \frac{3}{5}x$

8. $\frac{2}{3}y - \frac{3}{4} = \frac{3}{4}y$

Summer Math Packet
Week #7

Skill #1: Distribution	Skill #2: Combining Like Terms
<p>The Distributive Property says that: $a(b+c) = ab + ac$</p> <p>This means that: $3(2x + 4) =$ $3(2x) + 3(4) =$ $6x + 12$</p> <p>Pay attention to the signs: $-2(3x - 5) =$ $-2(3x) + -2(-5) =$ $-6x + 10$ (this is called distributing the negative)</p>	<p>If you have 2 apples and you get 2 more apples, you have 4 apples.</p> <p>If you have 2 apples and you get 2 oranges, then you have 2 apples and 2 oranges.</p> <p>This is the idea behind combining like terms. When you add or subtract you can only combine terms that are exactly alike.</p>
<p style="text-align: center;">$4(-3x + 6) =$</p> <p style="text-align: center;">$4(-3x) + 4(6) =$</p> <p style="text-align: center;">$-12x + 24$</p>	<p>$3x + 4x = 7x$ (these terms can be combined.)</p> <p>$3x + 4y = 3x + 4y$ (these terms cannot be combined.)</p>

Putting the two concepts together:

$$3(x+2) - 6(x+1) =$$

$$3(x) + 3(2) - 6(x) - 6(1) =$$

$$3x + 6 - 6x - 6 =$$

$$-3x$$

Now try these problems

1. $4(2x + 2) =$

2. $-2x - 3 + 4x + 5x + 6 =$

3. $-3(x - 3) =$

4. $3y - 2y + 5 + y - 2 =$

5. $3(x + 2) + 2(2x + 1) =$

6. $-4(x - 1) + 2(x - 2) =$

Check your answers on the back of this sheet...

1. $8x+8$ 2. $7x+3$ 3. $-3x+9$ 4. $2y+3$ 5. $7x+8$ 6. $-2x$

Great Work! Now it's time to practice.

1. $2x + 4 + 2x + 3 + x$

2. $3(x - 2)$

3. $-2(-3x + 6)$

4. $2y + 7 - 5 - 6y + 3$

5. $5(x + 2) - 3(4x + 8)$ (This one is tricky. Remember to distribute the negative)

6. $6(x - 3) + 4(-2x - 3)$

7. $12(3 - x) - 1(x + 2)$ (Remember to distribute the negative)

8. $9x(3x + 2)$