Ch. 4 Study Guide

Concepts Covered:

- Solving 1 step equations with variables
- Enlarging and reducing ratios
- Absolute Value

IXL Support

- Expressions - Y1, 4, 5, 6
- Variables - Z1, 2, 3, 5, 6, 8
- Ratios - R4, 9, 11, 12, 13, 18
- Absolute Value - M4, 5, 8, P4
- Division - C5, H4, H7
- Fractions, Decimals on a number line - I1, F8,

Variables/Expressions:

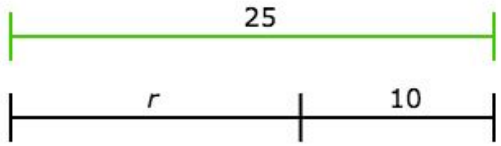
1. If the unknown distance of Cecil's hop is represented by the variable h, write an expression for:
   a. Three equal hops ⇒ h + h + h or 3h
   b. Five equal hops ⇒ h + h + h + h + h or 5h
   c. Two equal hops and walking 3 feet ⇒ h + h + 3 or 2h + 3

2. Evaluate each variable expression for x = 3.
   a. 5x ⇒ 5(3) ⇒ 15
   b. x + 10 ⇒ (3) + 10 ⇒ 13
   c. 18x ⇒ 18(3) ⇒ 6
   d. $\frac{x}{3} \Rightarrow \frac{3}{3} \Rightarrow 1$
   e. 3x – 5 ⇒ 3(3) – 5 ⇒ 9 – 5 ⇒ 4
   f. 5x + 3x ⇒ 5(3) + 3(3) ⇒ 15 + 9 ⇒ 24

3. Write an expression for the sequence of operations described below.
   a. add *y* and 9, then add 6 to the result
   B. divide *r* by 8, then multiply 9 by the result
   C. divide 4 by *t*, then subtract *s* from the result

4. Write Equations:

   Write an equation that says that the length of the green line is equal to the length of the black line.



   B. Solve for *c*.
   $c = 12 \div 4$

C. Solve for n.

$n = 3(5)$

D. Solve for t.

$t + 19 = 97$

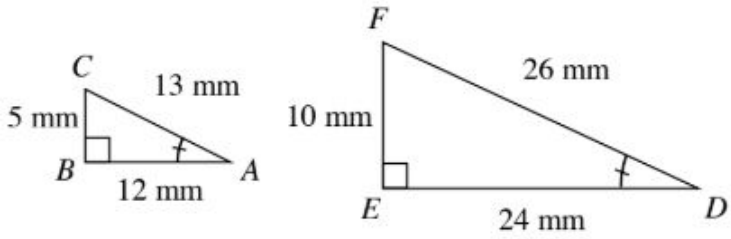
Emily has a bike odometer that shows how far she travels. She bikes 6 miles to her friend's house and then both girls bike to the beach. When they arrive, Emily's odometer shows that she traveled 15 miles in all.

Which equation can Emily use to find the distance d from her friend's house to the beach?

$\frac{d}{6} = 15$	$6d = 15$	$d + 6 = 15$	$d - 6 = 15$

Enlarging/Reducing/Ratios:

Example 1 using a 200% enlargement



original triangle

new triangle

Side length ratios:

$\frac{DE}{AB} = \frac{24}{12} = \frac{2}{1}$

$\frac{FD}{CA} = \frac{26}{13} = \frac{2}{1}$

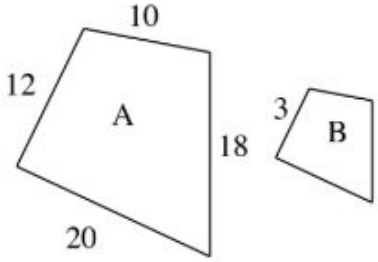
$\frac{EE}{CB} = \frac{10}{5} = \frac{2}{1}$

The scale factor for length is 2 to 1.

Example 2

Figures A and B at right are similar. Assuming that Figure A is the original figure, find the scale factor and find the lengths of the missing sides of Figure B.

The scale factor is $\frac{3}{12} = \frac{1}{4}$. The lengths of the missing sides of Figure B are: $\frac{1}{4}(10) = 2.5$, $\frac{1}{4}(18) = 4.5$, and $\frac{1}{4}(20) = 5$.



Example 3: Solve the Proportion

$$\frac{t}{6} = \frac{5}{3}$$

Example 4:

Jackie drew a scale drawing of a house and its lot. The house's driveway, which is 12 feet wide in real life, is 2 inches wide in the drawing. What scale did Jackie use for the drawing?

1 inch : ___ feet

Example 5:

Jackie made a scale drawing of a house and its lot. She used the scale 1 millimeter : 3 meters. The actual width of the lawn in the backyard is 27 meters. How wide is the lawn in the drawing?

Example 6:

Eli made a scale drawing of a house and its lot. The backyard, which is 36 feet wide in real life, is 12 inches wide in the drawing. What scale did Eli use for the drawing?

1 inch : ____ feet

CL (Chapter Closure) 4-85. Draw a number line and place a point for each of the following portions on it.

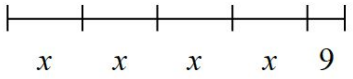
a. $\frac{4}{5}$
b. 0.003
c. 30%
d. $\frac{7}{6}$
e. 0.75
f. $\frac{3}{7}$
g. $\frac{1}{3}$
h. $\frac{112}{112}$

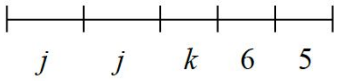
CL 4-86. Evaluate the following algebraic expressions.

a. Find the value of $7m + 9$ for $m = 2$.

b. Find the value of $a \cdot b$ for $a = 10$ and $b = 4$.

CL 4-87. Write an expression to represent the length of each of the ropes shown below. Then find the length of each rope if $x = 20$, $j = 10$, and $k = 7$.

a. 

b. 

CL 4-88. Simplify each expression.

a. $|15|+|-1|$

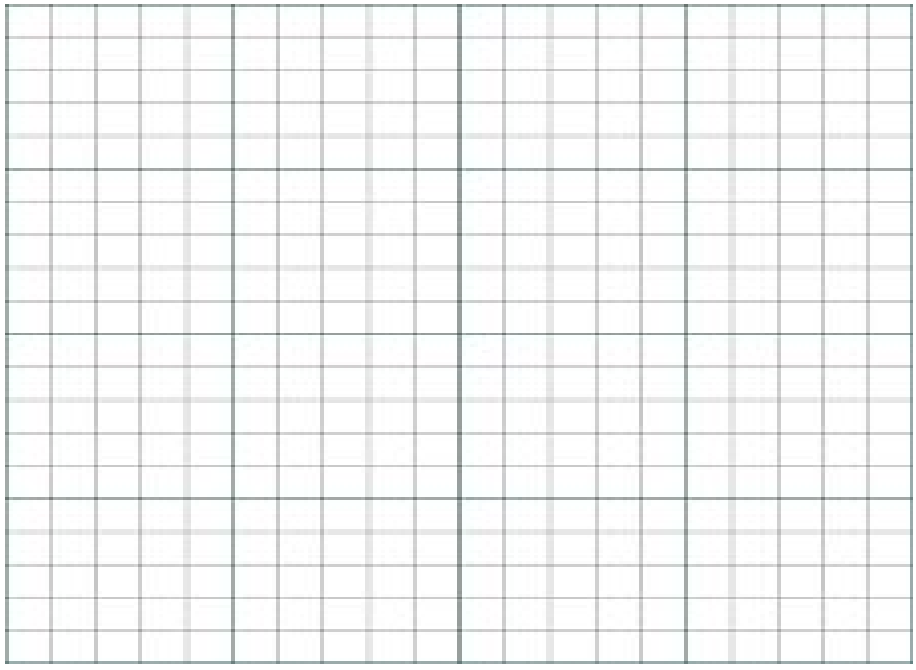
b. $|6|+|0|$

c. $-|2|+|8|$

CL 4-89. Copy the dot pattern below and draw Figures 0, 4, and 7. Write an expression to describe how the pattern is growing.

Figure 1 Figure 2 Figure 3

CL 4-90. Draw a right triangle on graph paper that has a base of 4 units and a height of 2 units. Enlarge it so that each side is 2.5 times as long as the original.



CL 4-91. Describe how each of the following enlargement or reduction ratios would change the size of a photograph. The given ratios are from the new figure to the original figure.

a. $\frac{15}{2}$

b. $\frac{4}{3}$

c. $\frac{5}{6}$

d. $\frac{12}{12}$

CL 4-92. Use a coordinate grid to plot the points (−2, 3) and (4, 5). Then plot two more points so that all four points form vertices of a rectangle with a horizontal length. Next, find the length of each side. Write an absolute value expression to show how you calculated each length.