Name: Key Per: Date:

# Pre Algebra Ch. 4 Group Review

**1)** Simplify each expression by Combining Like Terms. Show supporting work.

a) $2x + 8y + 6x + 4y + 10x$

$18x + 12y$

Ans: $18x + 12y$

b) $5x + 8y + 2z + 4x + 2y + 8z$

$9x + 10y + 10z$

Ans: $9x + 10y + 10z$

c) $10x + 4z + 8y + 2x - 3z - y$

$12x + 7y + z$

Ans: $12x + 7y + z$

d) $8x + 4y - 10z - x + 10y - 20z$

$7x + 14y - 30z$

Ans: $7x + 14y - 30z$

**2)** Simplify the following expressions using the Distributive Property, then Combining Like Terms if possible.

a) $8(4m - 5n)$

$(8 \cdot 4m) + (8 \cdot -5n)$

Ans: $32m - 40n$

b) $5(x + y - z)$

$(5 \cdot x) + (5 \cdot y) + (5 \cdot -z)$

Ans: $5x + 5y - 5z$

c) $4(3) - 2(2x + 4)$

$12 - 4x - 8$

Ans: $-4x + 4$

d) $4 - |(x + 2) + 3(2x + 6)$

$4 - x - 2 + 6x + 18$

Ans: $5x + 20$

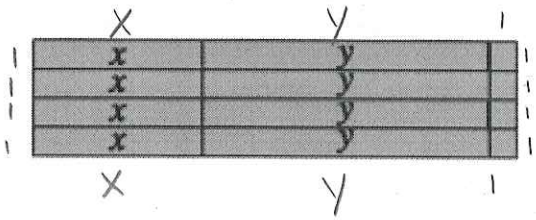
**3)** According to a scale on a map, 1 inch = 16 miles. How many inches on the map would represent 24 miles?

$\frac{\text{inch}}{\text{mile}}$ $\frac{1}{16} = \frac{x}{24}$ $16x = 24$ $\div 16 \quad \div 16$

$16\overline{)24.0}$ $1.5$ $-16$ $80$

Ans: 1.5 inch

**4)** Use the given figure in each of the following:




a) Write two algebraic expressions for the PERIMETER of the algebra tiles.

other options too → $2(x+y+1)+8$

Un-simplified: $x+y+6+y+x+4$ Simplified: $2x+2y+10$

b) Write two algebraic expressions for the AREA of the algebra tiles. One of your expressions should include parentheses, while the second expression should not.

Un-simplified: $4(x+y+1)$ Simplified: $4x+4y+4$

**5)** Simplify each using Order of Operations

a) $12+3\cdot4^2\div12+(9\cdot2)$

$12+3\cdot16\div12+(18)$

$12+48\div12+18$

$12+4+18$

$16+18$

Ans: 34

b) $2^4-4^2\div(2\cdot2)-3(2-3)$

$16-16\div(4)-3(-1)$

$16-4+3$

$12+3$

Ans: 15

c) $6+4\cdot5\div2-6\cdot2(4-5+2)$

$6+20\div2-12(-1+2)$

$6+10-12(1)$

$6+10-12$

$16-12$

Ans: 4

d) $\frac{-9-7(3^2-4\cdot2)}{2(4\div2-4)} = \frac{-9-7(9-8)}{2(2-4)} = \frac{-9-7(1)}{2(-2)} =$

$\frac{-9-7}{-4} = \frac{-16}{-4} = 4$

Ans: 4

**6)** Decide which expressions listed in "a – d" are equivalent to the expression below. Simplify the original expression AND each of the possible matches to show evidence of your choices. Circle your choice(s).

**3(2x – 5)**

$6x-15$

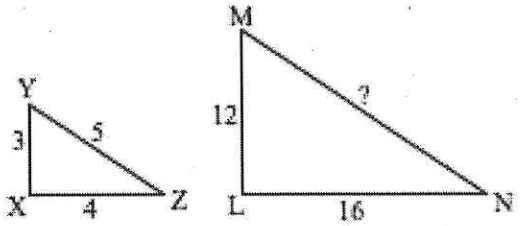
a) $2x-5+2x-5+2x-5$ $6x-15$

b) $(3)(2x)-(3)(5)$ $6x-15$

c) $(3)(2x)+(3)(-5)$ $6x+(-15)$

d) $(2x\cdot2x\cdot2x)-(5\cdot5\cdot5)$ $8x^2-125$

**7)** Triangles XYZ and LMN are similar.




a) By what ratio was triangle XYZ enlarged by to create triangle LMN?

$\frac{16}{4} = 4 \quad \frac{12}{3} = 4$

Ratio: 4:1

b) What is the ratio of the side lengths of triangle XYZ to triangle LMN? (This is the opposite of part a).

Ratio: 1:4

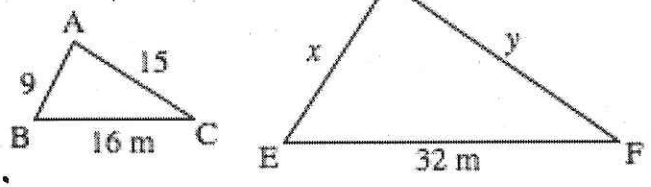
c) Calculate the length of the missing side of triangle LMN. Show your supporting work.

$5 \cdot 4 = 20$

Length: 20

**8)** Each pair of figures below is similar. Identify the scale factor in each (from small figure to large figure), then calculate the length of the unknown side(s) for each.

a)



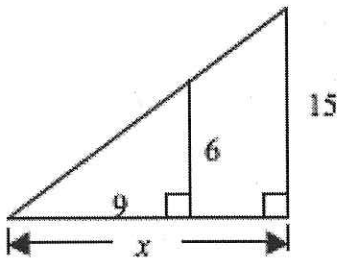

$\frac{32}{16} = 2$

$9 \cdot 2 = x$

$15 \cdot 2 = y$

a) Scale Factor: 2 x: 18 y: 30

b)




$\frac{15}{6} = 2.5 \quad 9(2.5)$

b) Scale Factor: 2.5 x: 22.5

**9)** Steve thought of the following steps in a number trick:

Think of a number, double it, add four and then multiply by five.

Let x represent the number in the trick above. Write the result of these four steps both as an expression with parentheses and another expression without parentheses.

Parentheses: $5(2x+4)$

None: $10x+20$

**10)** Jeremy is building a birdhouse that is a scale model of his own house. If his house is 16 feet tall, and he wants to build his birdhouse 24 inches tall, what scale should he use? The front door is 8 feet tall. How tall should the door on the birdhouse be?

$\frac{24}{16} = 1.5$ $\quad 8(1.5) = 12$

Scale Factor: 3:2 Birdhouse Door: 12 inches

**11)** Jack's car used 18 gallons of gasoline to go 468 miles. At that rate, how many gallons would be used to go 754 miles?

$\frac{\text{gallons}}{\text{miles}}$ $\quad \frac{18}{468} = \frac{x}{754}$ or $\quad 13572 = 468x$

$\div 468 \quad \div 468$

$29 = x$

reduce $\quad \frac{1}{26} = \frac{x}{754}$ ($\times 29$ on both)

Ans: 29

**12)** Solve each of the following proportions for the variable. Check your solution (show that it works).

a) $\frac{x}{12} = \frac{25}{75}$ reduce $\frac{x}{12} = \frac{1}{3}$ ($\times 4$ on both)

Ans: 4

b) $\frac{55}{y} = \frac{495}{45}$ reduce $\frac{55}{y} = \frac{11}{1}$ ($\times 5$ on both)

Ans: 5

**13)** Write a proportion to solve each problem.

a) A sweater that costs $30 is sold at a 20% discount. What is the sale price?

$\frac{\text{sale}}{\text{original}}$ $\quad \frac{80}{100} = \frac{x}{30}$ reduce $\frac{4}{5} = \frac{x}{30}$ ($\times 6$ on both)

Price: $24

b) The owner of a store buys calculators for $12. If she marks them up by 30%, at what price does she sell them?

$\frac{\text{new price}}{\text{original}}$ $\quad \frac{130}{100} = \frac{x}{12}$ reduce $\frac{13}{10} = \frac{x}{12}$

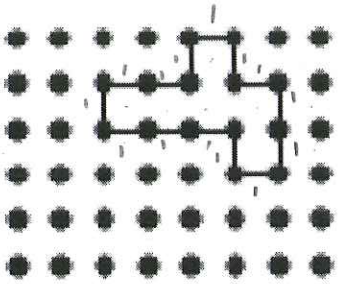
$156 = 10 \cdot x$

$\div 10 \quad \div 10$

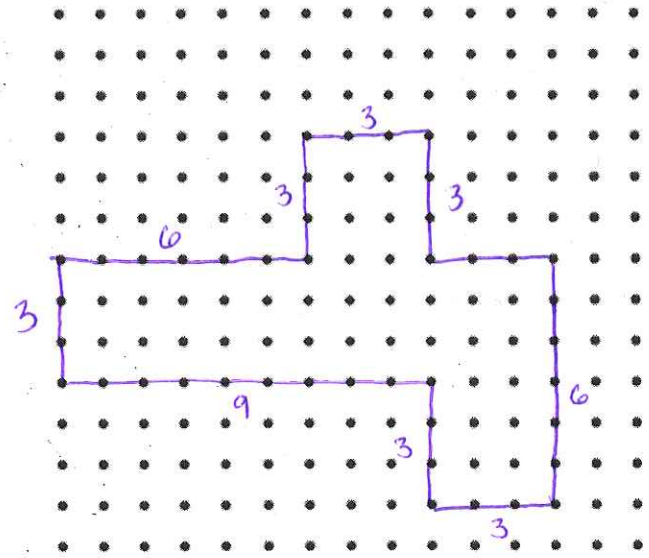
$15.60$

Price: $15.60

**14)** Use the figure at the right to answer the following.



a) Create a dilation of the figure with a scale factor of 3:1.




b) Calculate the perimeter and the area of the original shape and your dilation.

$14 \cdot 3 = 42$ (scale factor)

$6 \cdot 3^2$ (scale factor squared)

Perim (orig): 14 Perim (new): 42 Area (orig): 6 Area (new): 54

c) What is the ratio of the perimeters of the original to the dilation?

Ratio: 3:1 (scale factor)

d) What is the ratio of the areas of the original to the dilation?

Ratio: 9:1 $(\text{scale factor})^2$