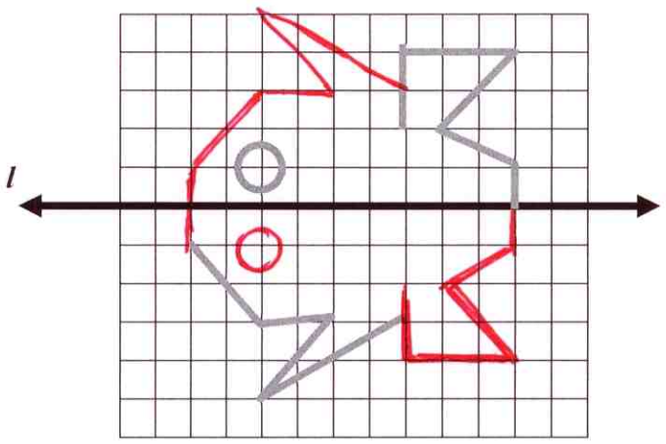
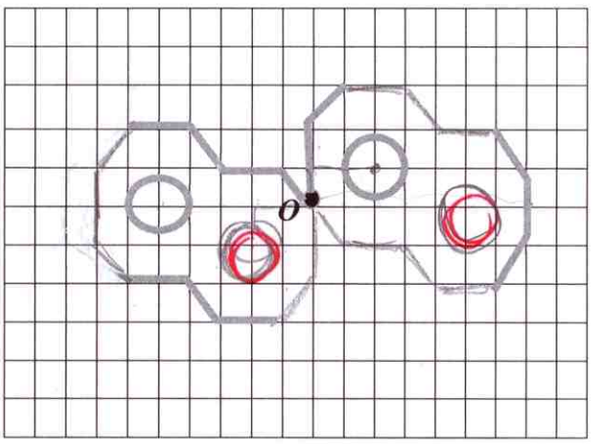
MATH 304 Review for Exam 3 Name _____ Seat # _____

1. Complete the picture by reflecting the figure about line ***l***.



2. Complete the picture by reflecting the figure through the point O.



3. Put a check in each box under the type of symmetry possessed by the figure at the left.

	Vertical Line Symmetry	Horizontal Line Symmetry	Rotational Symmetry other than 0° or 180°	Point Symmetry	No Symmetry at all
A	✓				
	✓				
N			(180°)	✓	
	✓				
			(180°)	✓	

4. List all of the rotational symmetries these shapes have, as degrees, and starting with 0° up to 360°.

a. 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°, 360°

360 ÷ 8 = 45°

b. 0, 72°, 144°, 216°, 288°, 360°

5. A tree casts a shadow 40 feet long. In the same place, and at the same time, a yard-stick is held perpendicular to the ground and it casts a shadow 45 inches long.

a. Draw a diagram of the situation.

36 inches in 1 yard

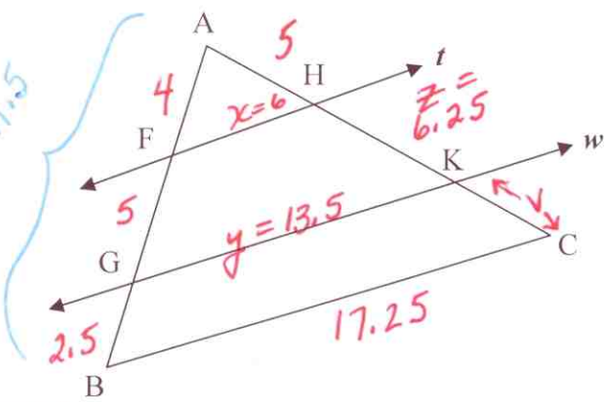
b. Show how to find the height of the tree.

$\frac{x}{40} = \frac{36}{45}$ $\quad 45x = 1440$ $\quad x = \frac{1440}{45} =$ **32 feet**

c. Give a mathematically correct explanation of why you can find the height of the tree this way.

the triangles formed by the sun's rays are similar triangles (angle of sun, angle to ground) and so the corresponding sides are proportional.

6. Lines t, w, and $\overleftrightarrow{BC}$ are parallel.
Segment AF is 4 units long.
Segment FG is 5 units long
Segment BC is 17.25 units long.
Segment AH is 5 units long.
Segment GB is 2.5 units
Find the following lengths:



(a) Segment FH **6 units**

$\frac{4}{x} = \frac{11.5}{17.25}$ so $11.5x = 69$ $\quad x = \frac{69}{11.5} = 6$

must both be on parallels

(b) Segment GK **13.5 units**

$\frac{4}{6} = \frac{9}{y}$ so $4y = 54$ and $y = \frac{54}{4} = 13.5$

previous answer →

parallel lines cut proportional segments of transversals

(c) Segment HK **6.25 units**

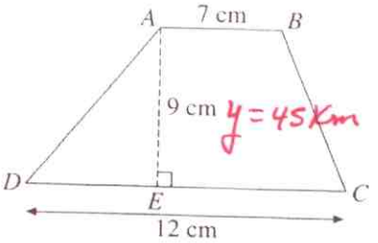
$\frac{4}{5} = \frac{5}{(HK)_z}$ $\quad 4(HK)_z = 25$ $\quad HK_z = \frac{25}{4} = 6.25$

(d) Segment KC **3.125 units**

$\frac{4}{5} = \frac{2.5}{V}$ $\quad 4V = 2.5(5)$ $\quad = 12.5$ $\quad V = \frac{12.5}{4} = 3.125$

7. The drawing at the right is a scale drawing of a plot of land. The actual length of AB is 35 km.

7cm = 35 km
1 cm = 5 km



a. Find the actual length of CD.

$\frac{7}{35} = \frac{12}{x}$ $\quad 7x = 420$

$x = \frac{420}{7} = \boxed{60 \text{ km}}$

x = 60 km

b. Find the actual length of AE.

$\frac{7}{35} = \frac{9}{y}$ $\quad 7y = 315$

$y = \frac{315}{7} = \boxed{45 \text{ km}}$

b. Find the actual area of the plot of land.

find area using km measurements

$A_{Trapezoid} = \frac{1}{2}(B+b)h$

$= \frac{1}{2}(60+35)\,45 = \frac{1}{2}(95)(45) = \frac{1}{2}(4275) = \boxed{2137.5 \text{ km}^2}$

8. Set up a proportion and use it to solve this problem: The ratio of a rectangular floor's width to length is 4:5. The length of the floor is 20 feet. Find the area of the floor in square feet.

$\frac{4 \text{ width}}{5 \text{ length}} = \frac{w}{20}$ $\quad w = \frac{80}{5} = 16 \text{ ft.}$

$\text{Area} = l \times w = 20 \times 16 = \boxed{320 \text{ ft}^2}$

9. Set up a proportion and use it to solve this problem: What percent of 500 is 25?

$\frac{x}{100} = \frac{25}{500}$ $\quad 500x = 2500$

$x = \frac{2500}{500} = \boxed{5}$

10. Set up a proportion and use it to solve this problem: A case of ketchup contains 24 bottles of ketchup. If 1 case of ketchup lasts the diner 3 months, how much ketchup is used per week? (Assume 4 weeks to a month.)

$\frac{24 \text{ bottles}}{3 \text{ months}} = \frac{24 \text{ bottles}}{12 \text{ weeks}} = \frac{x}{1 \text{ week}}$ ← per 1 week

$24 = 12x$

$\frac{24}{12} = x$ $\quad$ so $\boxed{x = 2 \text{ bottles per week}}$

11. Tanya earns a commission of \$15 for every \$80 of home cleaning product she sells. If her total sales are \$784, how much does she make on her commission?

$\frac{15}{80} = \frac{x}{784}$

$80x = 15(784)$

$80x = 11,760$

$x = \frac{11,760}{80}$

$x = \$147$

12. RiverValley snack bars are packed 12 to a box and each bar contains 20 g of fat. Forty such boxes contain how much fat?

$\frac{1 \text{ bar}}{20\text{g fat}} = \frac{12 \text{ bars}}{x}$

$x = 240\text{g per box}$

40 boxes (240g)/box

= 9600 grams of fat in 40 boxes

13. Triangle ABC has vertices $A\ (3, 4)$, $B\ (2, -8)$, *and* $C\ (-1, 6)$.

(a) What are the coordinates of the vertices of $A'B'C'$ under the mapping $(x, y) \rightarrow (x-4,\ y-5)$?

$A'(-1, -1)$ $B'(-2, -13)$ $C'(-5, 1)$

(b) What transformations of the shape of the triangle does this mapping produce? Be specific and complete in your answer.

Size stays same. image is 4 units left and 5 units below the original $\triangle ABC$.

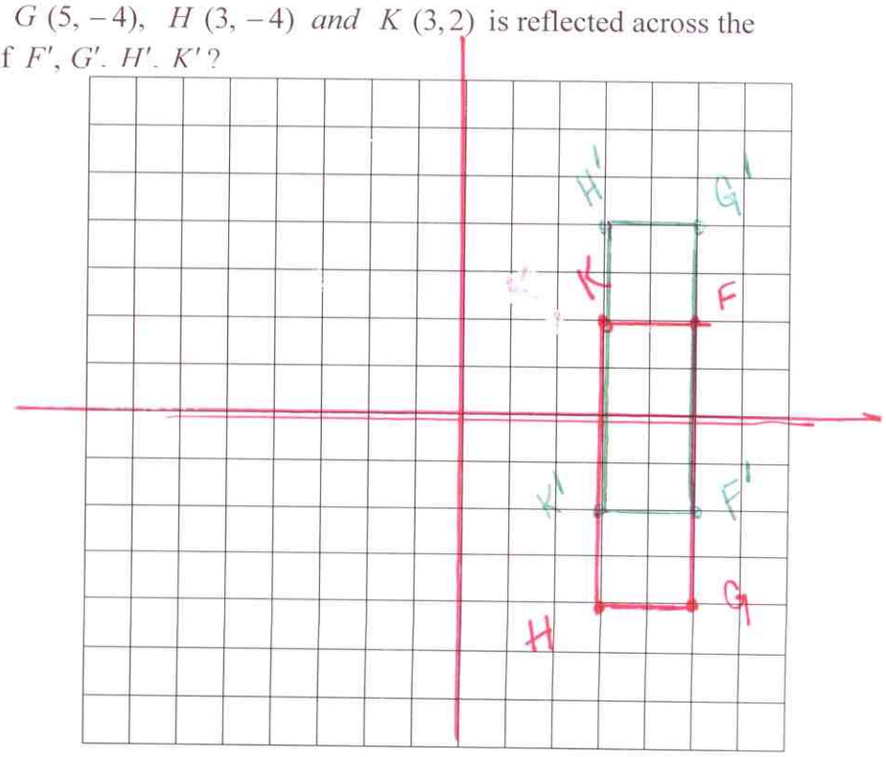
14. A rectangle with vertices $F\ (5, 2)$, $G\ (5, -4)$, $H\ (3, -4)$ *and* $K\ (3, 2)$ is reflected across the x-axis. What are the coordinates of F', G', H', K'?

F' $(5, -2)$

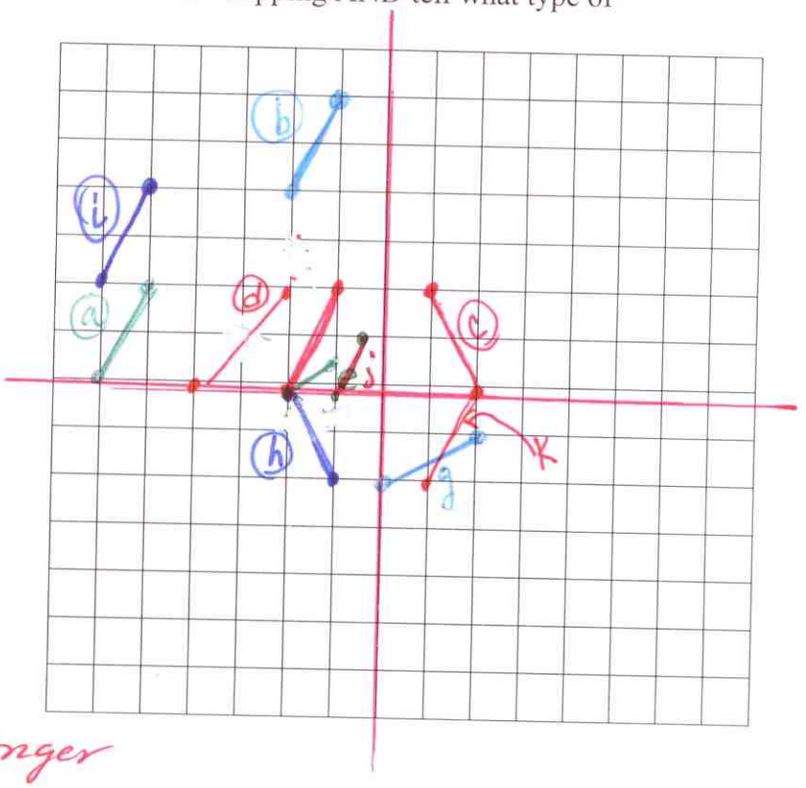
G' $(5, 4)$

H' $(3, 4)$

K' $(3, -2)$



15. The coordinates of two points are $E\ (-1, 2)$ *and* $F\ (-2, 0)$. For each mapping below, describe the transformation in shape that occurs to segment EF under that mapping AND tell what type of transformation it is.



(a) $(x, y) \to (x-4,\ y)$

$E'(-5, 2)$ $F'(-6, 0)$

horizontal shift 4 to left.

(b) $(x, y) \to (x,\ y+4)$

$E''(-1, 6)$ $F''(-2, 4)$

vertical slide up 4

(c) $(x, y) \to (-x, y)$

$(1, 2)$ $(2, 0)$

flip across y-axis

(d) $(x, y) \to (2x, y)$

$(-2, 2)$ $(-4, 0)$

slide left, changed slope, got longer

(e) $(x, y) \to (x, \frac{1}{4}y)$

$(-1, \frac{1}{2})$ $(-2, 0)$

shorter, changed slope

(g) $(x, y) \to (y, x)$

$(2, -1)$ $(0, -2)$

reflection across the line $x = y$

(h) $(x, y) \to (x, -y)$

$(-1, -2)$ $(-2, 0)$

reflection across the x-axis

(i) $(x, y) \to (x-4,\ y+2)$

$(-5, 4)$ $(-6, 2)$

slide left 4, up 2

(j) $(x, y) \to (\frac{1}{2}x, \frac{1}{2}y)$

$(-\frac{1}{2}, 1)$ $(-1, 0)$

moved ½ way to y-axis and shortened by $\frac{1}{2}$

(k) $(x, y) \to (-x, -y)$

$(1, -2)$ $(2, 0)$

point reflection through origin (or flip across x and flip across y.