

Applied Geometry – Semester 2 Review

Semester 2 Review Topics:

Ch. 7

- Proportions
- Scale drawings
- Similar figures
- Parallel Lines & Proportional Parts

Ch. 8

- Pythagorean Theorem
- Trigonometry – SOH CAH TOA

Ch. 11

- Area
 - Triangle
 - Parallelogram
 - Trapezoid
 - Kite
 - Circle
 - Sector
 - Regular Polygon
 - Composite Shapes

Ch. 12

- Surface Area & Volume
 - Prism
 - Pyramid
 - Cylinder
 - Cone

Ch. 9

- Translation
- Reflection
- Rotation
- Dilation

Applied Geometry – Semester 2 Review

Answer each question below to the best of your ability. Each question has only 1 correct answer. Write your answer in the box to the left of the question.

Solve each proportion.

1) $\frac{b}{6} = \frac{4}{8}$ $6 \cdot 4 = 8b$
 $\frac{24}{8} = \frac{8b}{8}$
 $b = 3$

2) $\frac{3}{r} = \frac{4}{7}$ $3 \cdot 7 = 4r$
 $\frac{21}{4} = \frac{4r}{4}$
 $r = 5.25$

3) $\frac{7}{2} = \frac{8}{m-8}$ $2 \cdot 8 = 7(m-8)$
 $16 = 7m - 56$
 $\frac{72}{7} = \frac{7m}{7}$ $m = \frac{72}{7} = 10.3$

4) $\frac{6}{r+1} = \frac{8}{3}$ $6 \cdot 3 = 8(r+1)$
 $18 = 8r + 8$
 $\frac{10}{8} = \frac{8r}{8}$ $r = 12.5$

5) On a scale drawing, the scale is $\frac{1}{4}$ inch = 1 foot. What are the dimensions on the scale drawing for a room that is 15 feet by 16 feet?

$\frac{0.25 \text{ in}}{1 \text{ ft}} = \frac{x}{15 \text{ ft}}$
 $x = 15(.25)$
 $x = 3.75 \text{ in}$

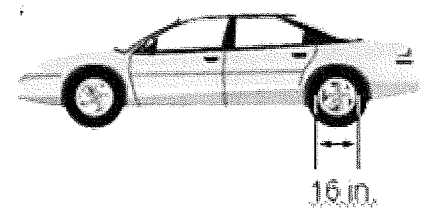
$\frac{0.25 \text{ in}}{1 \text{ ft}} = \frac{x}{16 \text{ ft}}$
 $x = 16(.25)$
 $x = 4 \text{ in}$

6) Tom has a scale model of his car. The scale factor is 1 : 12. If the actual car has 16-inch wheels, what size are the wheels on the scale model?

$\frac{1}{12} = \frac{x}{16 \text{ in}}$

$\frac{12x}{12} = \frac{16 \cdot 1}{12}$

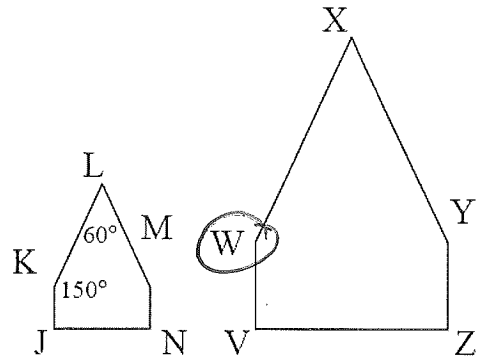
$x = \frac{4}{3} \text{ in} = 1.\bar{3} \text{ in}$



- 7) Pentagon JKLMN is similar to pentagon VWXYZ. What is the measure of angle W?

In similar figures, corresponding angles are congruent.

$$\angle W = 150^\circ$$



- 8) The trapezoids shown below are similar. Find the value of b.

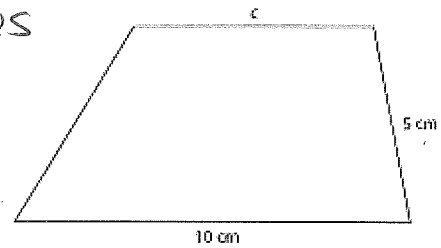
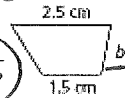
In similar figures, corresponding sides are proportional.

~~$$\frac{b}{5} = \frac{2.5}{10}$$~~

$$10b = 5(2.5)$$

$$\frac{10b}{10} = \frac{12.5}{10}$$

$$b = 1.25 \text{ cm}$$



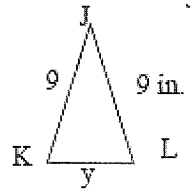
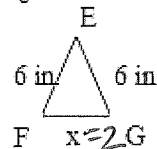
- 9) Triangle EFG is similar to triangle JKL. If $x = 2$, then what does y equal?

$$\frac{6}{2} = \frac{9}{y}$$

$$9 \cdot 2 = 6y$$

$$\frac{18}{6} = \frac{6y}{6}$$

$$y = 3$$

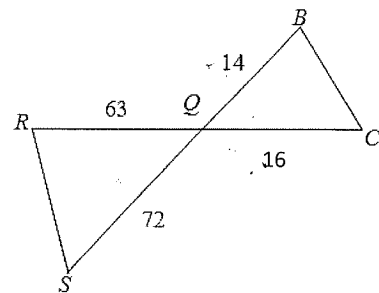


- 10) The triangles shown below are similar. What is the ratio of the side lengths?

$$\frac{14}{16}$$

$$\frac{63}{72}$$

$$\frac{7}{8} = 0.875$$

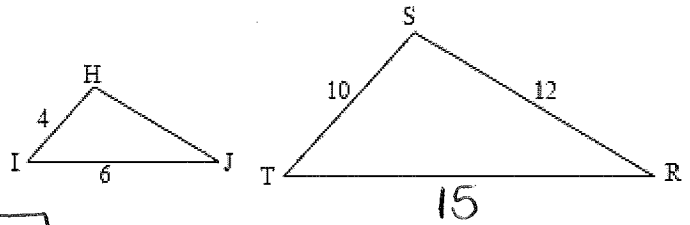


11) Triangle HIJ is similar to triangle STR. What is the perimeter of triangle STR?

$$\frac{4}{10} = \frac{6}{x}$$

$$4x = 6 \cdot 10$$

$$\frac{4x}{4} = \frac{60}{4}$$



$$P = 10 + 15 + 12 = \boxed{37}$$

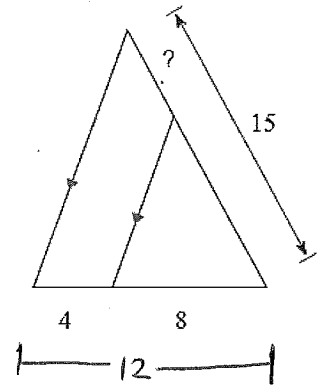
12) The one side of the smaller triangle is parallel to the corresponding side of the larger triangle. If these two triangles are similar, find the indicated value.

~~$$\frac{x}{4} = \frac{15}{12}$$~~

$$12x = 4 \cdot 15$$

$$\frac{12x}{12} = \frac{60}{12}$$

$$x = 5$$



13) Given the three parallel lines shown in the figure, what is the value of x?

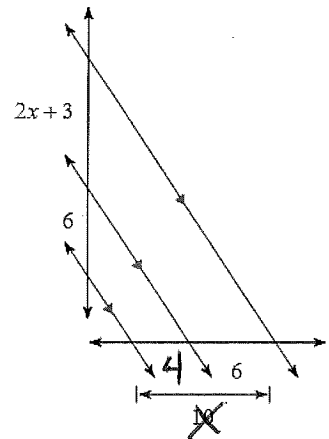
$$\frac{(2x+3)}{6} = \frac{6}{4}$$

$$4(2x+3) = 6 \cdot 6$$

$$\frac{8x+12}{-12} = \frac{36}{-12}$$

$$\frac{8x}{8} = \frac{24}{8}$$

$$x = 3$$



14) Find the missing side of the triangle shown below. Round your answer to the nearest tenth.

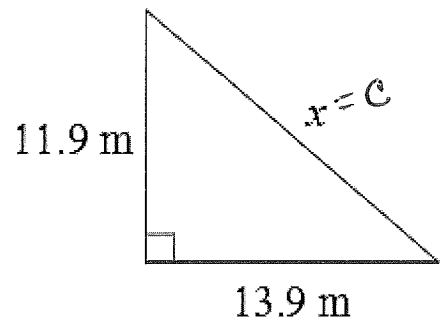
$$a^2 + b^2 = c^2$$

$$11.9^2 + 13.9^2 = c^2$$

$$141.61 + 193.21 = c^2$$

$$\sqrt{334.82} = \sqrt{c^2}$$

$$c = 18.3m$$



15) Find the missing side of the triangle shown below. Round your answer to the nearest tenth.

$$a^2 + b^2 = c^2$$

$$x^2 + 7.7^2 = 9.1^2$$

$$x^2 + 59.29 = 82.81$$

$$\begin{array}{r} -59.29 \\ \hline x^2 = 23.52 \end{array}$$

$$\sqrt{x^2} = \sqrt{23.52}$$

$$x = 4.8 \text{ yd}$$

16) How high up on the wall will a 20-foot ladder reach if the bottom of the ladder is placed 5 feet from the wall?

$$x^2 + 5^2 = 20^2$$

$$x^2 + 25 = 400$$

$$\begin{array}{r} -25 \\ \hline x^2 = 375 \end{array}$$

$$\sqrt{x^2} = \sqrt{375}$$

$$x = 19.4 \text{ ft}$$

17) What is value of sin A in the given triangle?

SOH CAH TOA

$$\sin A = \frac{40}{50} = \frac{4}{5}$$

18) Use trigonometry to find the missing side. Round your answer to the nearest tenth.

$$\frac{x \cdot \tan 41}{\tan 41} = \frac{20 \cdot x}{x \cdot \tan 41}$$

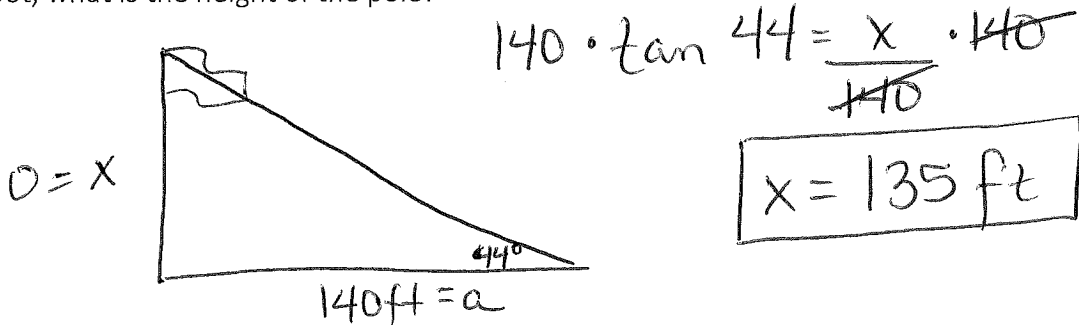
$$x = \frac{20}{\tan 41} = 23$$

19) Find the measure of the indicated angle. Round your answer to the nearest whole degree.

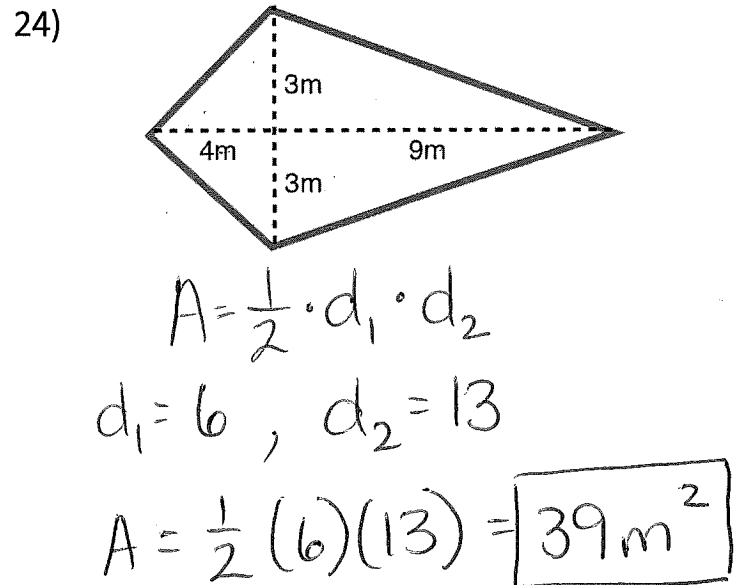
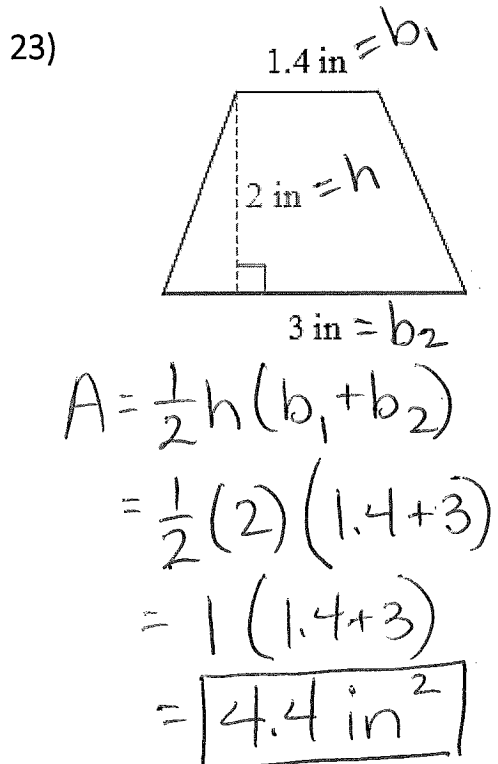
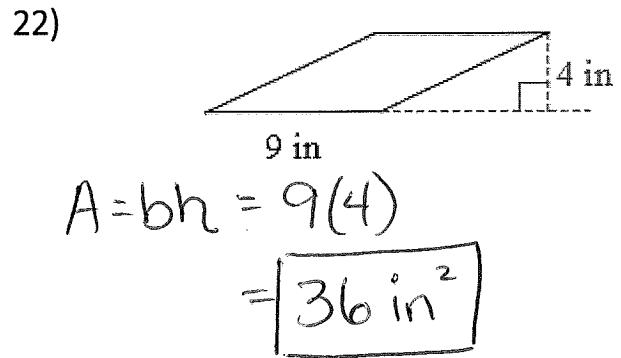
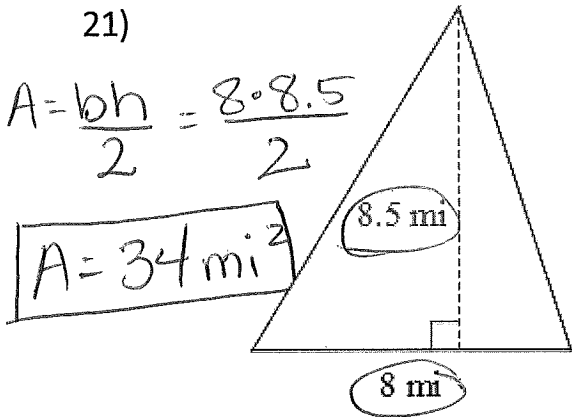
$$\tan X = \frac{11}{24}$$

$$X = \tan^{-1}\left(\frac{11}{24}\right) = 25^\circ$$

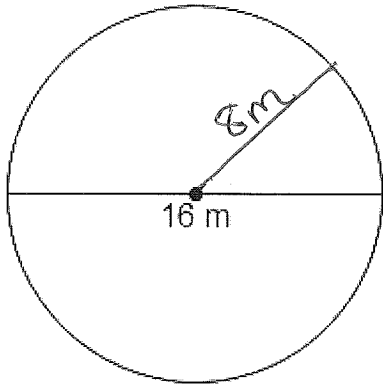
- 20) To find the height of a pole, the surveyor moves 140 feet away from the base. Then, she measures the angle of elevation from her feet to the top of the pole to be 44° . To the nearest foot, what is the height of the pole?



For questions #21-26, find the area of the shape shown.



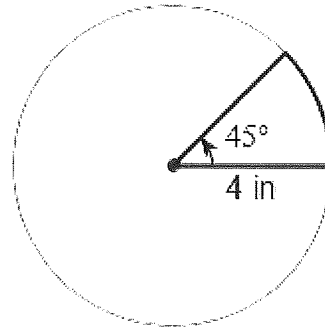
25)



$$A = \pi r^2 = \pi \cdot 8^2$$

$$= \boxed{201.1 \text{ m}^2}$$

26)



$$A = \pi r^2 \cdot \frac{x^\circ}{360}$$

$$= \pi (4)^2 \cdot \frac{45}{360} = \boxed{6.3 \text{ in}^2}$$

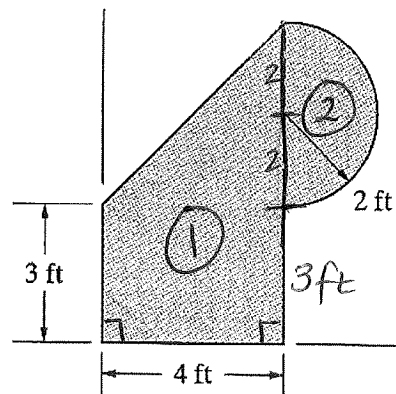
27) Find the area of the composite shape.

$$\textcircled{1} A = \frac{1}{2}(h)(b_1 + b_2)$$

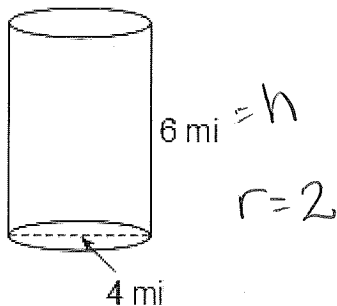
$$= \frac{1}{2}(4)(3 + 7) = 20 \text{ ft}^2$$

$$\textcircled{2} A = \frac{\pi r^2}{2} = \frac{\pi (2)^2}{2} = 6.3 \text{ ft}^2$$

$$\boxed{26.3 \text{ ft}^2}$$



28) Find the surface area of the cylinder.

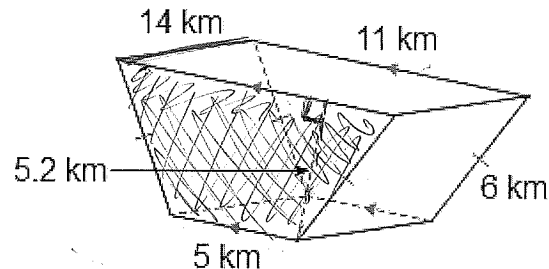


$$S = 2\pi r h + 2\pi r^2$$

$$= 2\pi(2)(6) + 2\pi(2)^2$$

$$= \boxed{100.5 \text{ mi}^2}$$

29) Find the surface area of the prism.



$$S = Ph + 2B$$

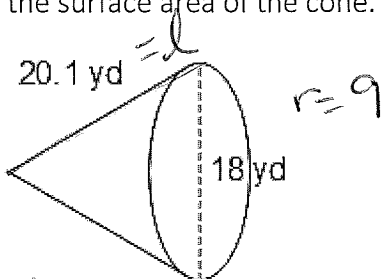
$$P = 5 + 6 + 11 + 6 = 28 \text{ km}$$

$$B = \frac{1}{2}h(b_1 + b_2) = \frac{1}{2}(5.2)(5 + 11) = 41.6$$

$$S = (28)(11) + 2(41.6)$$

$$= \boxed{475.2 \text{ km}^2}$$

30) Find the surface area of the cone.

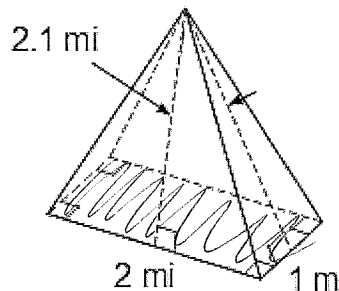


$$S = \pi r l + \pi r^2$$

$$= \pi (9)(20.1) + \pi (9)^2$$

$$= \boxed{822.8 \text{ yd}^2}$$

31) Find the surface area of the pyramid.



$$S = \frac{1}{2} P l + B$$

$$P = 2 + 1 + 2 + 1 = 6$$

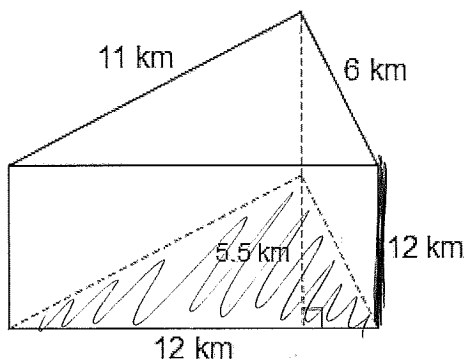
$$B = 2(1) = 2$$

$$l = 2.1$$

$$= \frac{1}{2} (6)(2.1) + 2$$

$$= \boxed{8.3 \text{ mi}^2}$$

32) Find the volume of the prism.

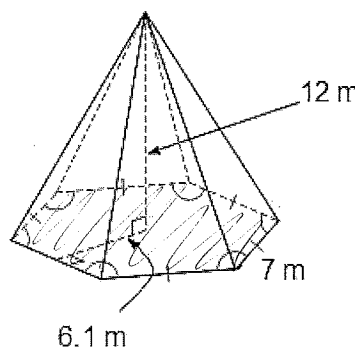


$$V = Bh$$

$$B = \frac{(b)(h)}{2} = \frac{12(5.5)}{2} = 33$$

$$V = 33(12) = \boxed{396 \text{ km}^3}$$

33) Find the volume of the pyramid.



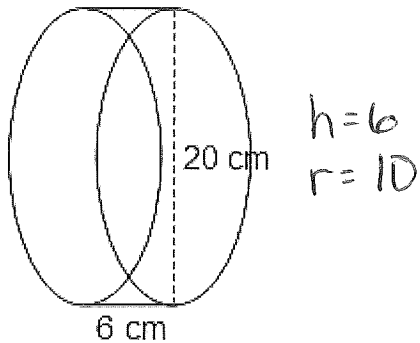
$$V = \frac{1}{3} Bh$$

$$B = \frac{1}{2} a P = \frac{1}{2} (6.1)(42) = 128.1$$

$$= \frac{1}{3} (128.1)(12)$$

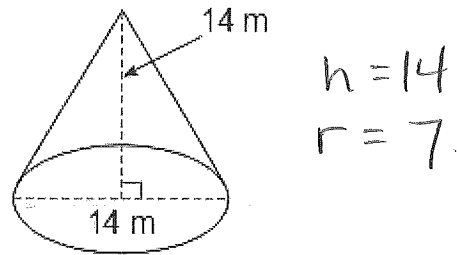
$$= \boxed{512.4 \text{ m}^3}$$

34) Find the volume of the cylinder.



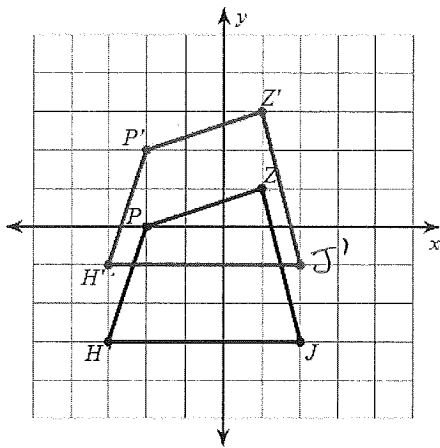
$$\begin{aligned}
 V &= \pi r^2 h \\
 &= \pi (10)^2 (6) \\
 &= \boxed{1885.0 \text{ cm}^3}
 \end{aligned}$$

35) Find the volume of the cone.



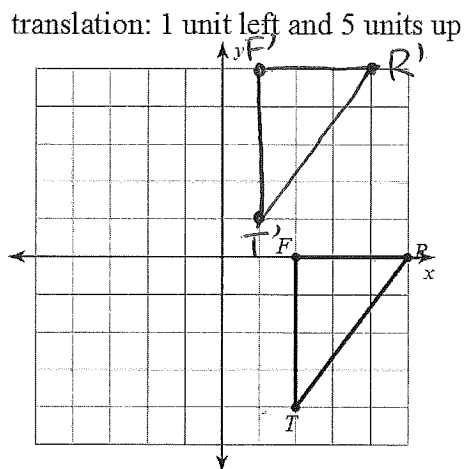
$$\begin{aligned}
 V &= \frac{1}{3} \pi r^2 h \\
 &= \frac{1}{3} \pi (7)^2 (14) \\
 &= \boxed{718.4 \text{ m}^3}
 \end{aligned}$$

36) Write the rule for the transformation.



up 2
 $\langle 0, 2 \rangle$
 $(x, y) \rightarrow (x, y+2)$

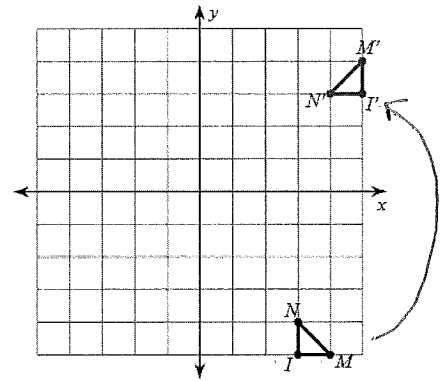
37) Give the coordinates for the transformation.



$T'(1, 1)$
 $F'(1, 5)$
 $R'(4, 5)$

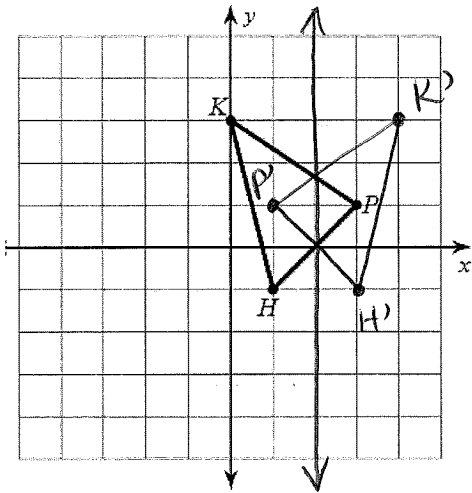
38) Write the rule for the transformation shown.

Rotation 90° counter-clockwise

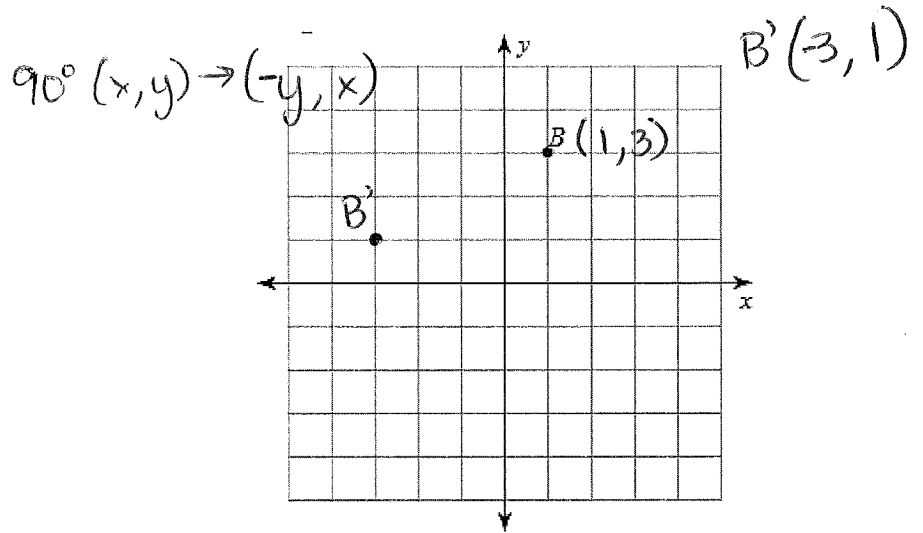


39) Graph the reflection.

reflection across $x = 2$

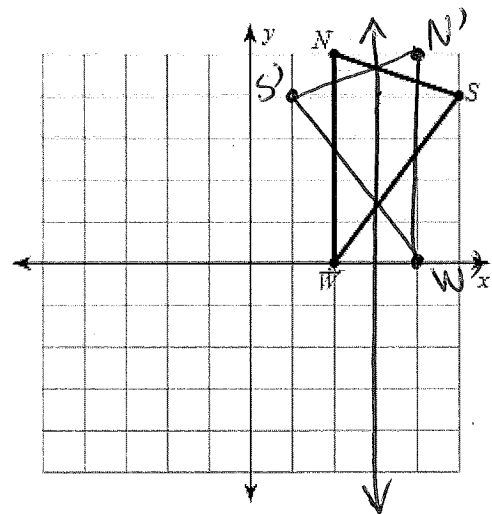


40) Rotate point B 90° counterclockwise about the origin. What are the coordinates of B'?



41) Reflect triangle NSW across the line $x = 3$. What are the coordinates of N'S'W'?

$N'(4, 5)$
 $S'(1, 4)$
 $W'(4, 0)$

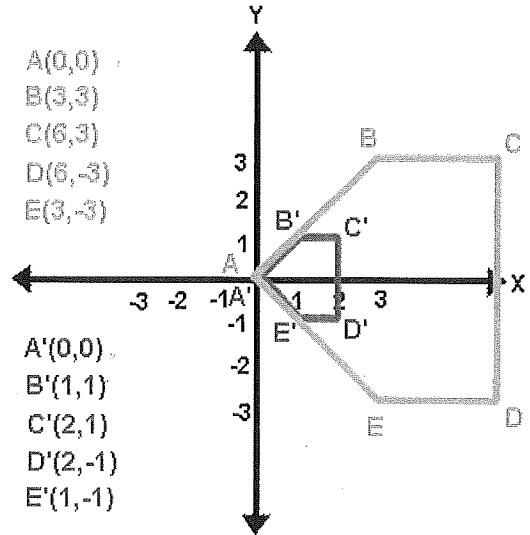


42) What type of dilation occurs with a scale factor of $\frac{4}{5}$?

$$\frac{4}{5} = 0.8 < 1 \leftarrow \text{Reduction}$$

43) If pentagon A'B'C'D'E' is the image of pentagon ABCDE, what is the scale factor of the dilation?

$$\div 3 \rightarrow \boxed{\frac{1}{3}}$$



44) Sort the types of transformations into whether the image is congruent to or similar to the preimage.

Translation Rotation Dilation Reflection

Congruent	Similar
Translations Rotations Reflections	Dilation

