Name: **Key** Period:_____ Date: _____

Measurement, Transformations, and Angles Practice

When solving area and volume problems, write the formula and show how you substituted in before solving. All answers should be rounded to the tenths place. Use the π button on your calculator instead of 3.14. **Make sure to show all work.**

1. A circle has an area = 201.1 in², what is the diameter?

$$A = \pi r^2$$
$$\frac{201.1}{\pi} = \frac{\pi r^2}{\pi}$$
$$64 = r^2$$
$$8 = r$$

Diameter = 2r
$$= 2(8)$$
$$= 16 \text{ in}$$

16 in.

2. The area of a trapezoid is 42cm² and the lengths of the bases are 6 cm and 8 cm. What is the height of the trapezoid?
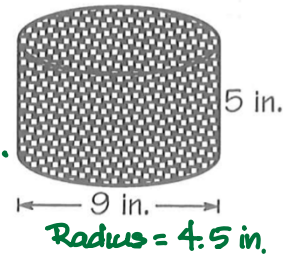
$$A = \tfrac{1}{2}(b_1 + b_2)h$$
$$42 = \tfrac{1}{2}(6+8)h$$
$$\frac{42}{7} = \frac{7h}{7}$$
$$6 = h$$

Height = 6 cm

3. Mr. Butterworth baked a cake in the shape of a cylinder. The cake had a diameter of 9 in. and a height of 5 in. He spread chocolate frosting over the entire cake except the bottom. How many square inches of the cake did he cover in frosting?

5 in.

9 in.

Radius = 4.5 in.

Find the surface area of a cylinder with only 1 closed end.

$$SA = \pi r^2 + 2\pi r h$$
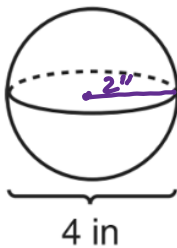
Area of top of cake   Area around the sides of the cake.

$$= \pi(4.5)^2 + 2\pi(4.5)(5)$$
$$= 204.99$$

The frosting covers
205.0 in²

4. For the solids below, calculate the volumes and list the solids in order from smallest to largest volume.
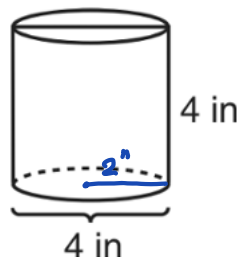
A.

4 in   2"

$$V = \tfrac{4}{3}\pi r^3$$
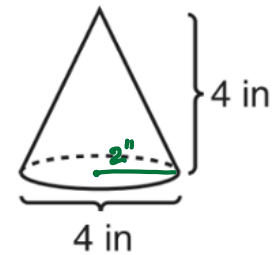$$= \tfrac{4}{3}\pi(2^3)$$
$$= 33.5 \text{ in}^3$$

B.

4 in   2"   4 in

$$V = \pi r^2 h$$
$$= \pi(2^2)(4)$$
$$= 50.3 \text{ in}^3$$

C.

4 in   2"   4 in

$$V = \tfrac{1}{3}\pi r^2 h$$
$$= \tfrac{1}{3}\pi(2^2)4$$
$$= 16.8 \text{ in}^3$$

smallest   **CONE, SPHERE, CYLINDER**   **largest**

5. A packing carton is in the shape of a triangular prism. What is the volume of the packing carton?

$V = Bh$

↓

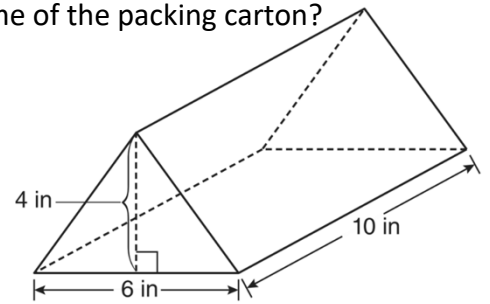Area of triangular base

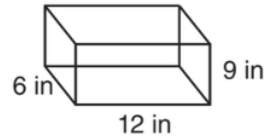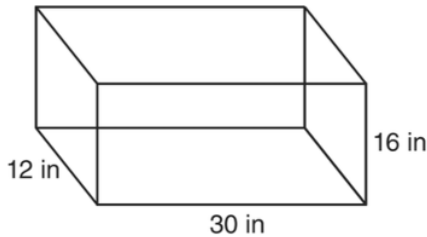$B = \frac{1}{2}bh$
$= \frac{1}{2}(6)(4)$
$= 12$

$V = Bh$
$= 12(10)$
$= 120\ in^3$

Volume = 120 in³

4 in

10 in

6 in

6. The diagram below represents Joe's two fish tanks.

16 in

12 in

30 in

6 in

9 in

12 in

Joe's larger tank is completely filled with water. He takes water from it to completely fill the smaller tank. How many cubic inches of water will remain in the larger tank?

Large Tank:

$V = Bh$
$= 12 \cdot 30 \cdot 16$
$= 5760\ in^3$

Small Tank:

$V = Bh$
$= 6 \cdot 12 \cdot 9$
$= 648\ in^3$

Water remaining in large tank:

$5760 - 648 = 5112$

5112 in³

7. Find the values of the labeled angles in each figure below.

a.

60°

y 45°   x z

$45 + 60 + x = 180$
$105 + x = 180$
$-105 \quad -105$
$\boxed{x = 75°}$

$y + 45 = 180$
$-45 \quad -45$
$\boxed{y = 135°}$

$x + z = 180$
$75 + z = 180$
$-75 \quad -75$
$\boxed{z = 105°}$

b.

w
z
x   30°   80°
y

$w + 70 = 180$
$-70 \quad -70$
$\boxed{w = 110°}$

$30 + 80 + z = 180$
$110 + z = 180$
$-110 \quad -110$
$\boxed{z = 70°}$

$x + 30 = 180$
$-30 \quad -30$
$\boxed{x = 150°}$

$80 + y = 180$
$-80 \quad -80$
$\boxed{y = 100°}$

8. Both problems below are pictures of parallel lines cut by a transversal. What is the value of x in each figure?

a.

$(3x + 10)°$ j

$(5x - 10)°$ k

$\boxed{x = 10}$

$3x + 10 = 5x - 10$
$+10 \qquad +10$
$3x + 20 = 5x$
$-3x \qquad -3x$
$\dfrac{20}{2} = \dfrac{2x}{2}$
$10 = x$

b.

$(3x + 21)°$ l

$(6x + 15)°$ m

$(6x + 15) + (3x + 21) = 180°$
$9x + 36 = 180°$
$-36 \quad -36$
$\dfrac{9x}{9} = \dfrac{144}{9}$
$x = 16$

$\boxed{X = 16}$
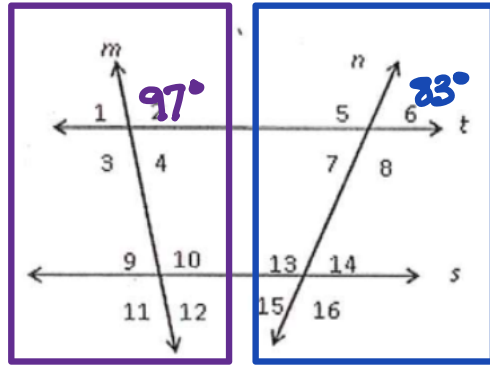
9. Find the angle measures asked for given the measures of angles 2 and 6.

$m\angle 2 = 97°$ $m\angle 6 = 83°$

$m\angle 3 = \underline{97°}$ $m\angle 5 = \underline{97°}$

$m\angle 10 = \underline{97°}$ $m\angle 7 = \underline{83°}$
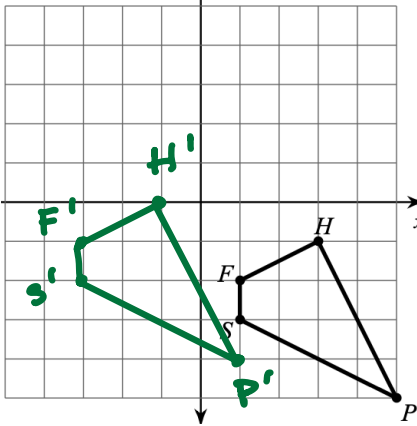
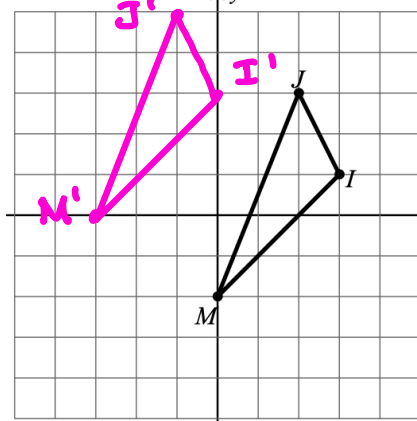$m\angle 9 = \underline{83°}$ $m\angle 16 = \underline{97°}$

Remember, 2 separate problems.

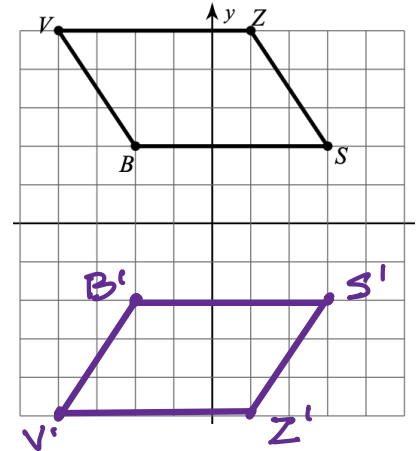10. Perform the following transformations. Don't forget to label the vertices of your new figure.
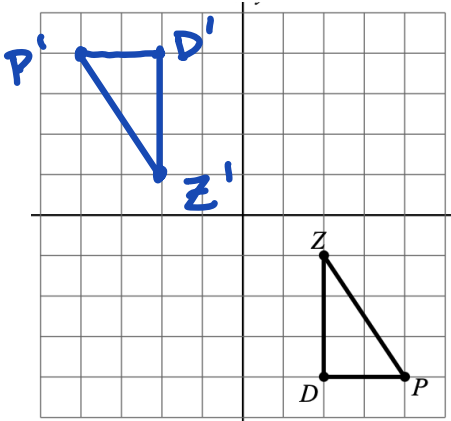
a. Translate 4 units left, 1 unit up
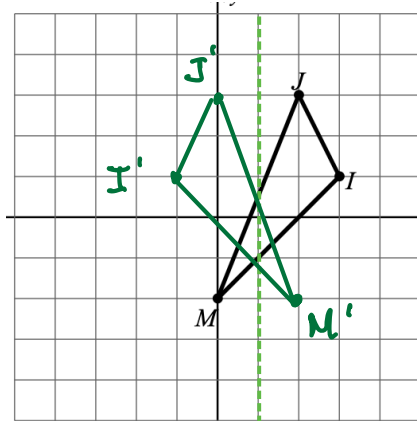

b. $(x, y) \rightarrow (x-3, y+2)$

c. Reflect across the x-axis
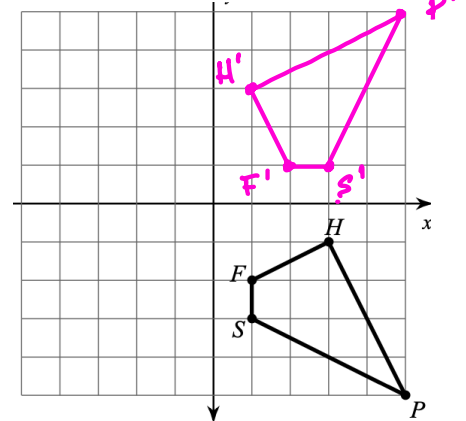

d. Rotate 180° clockwise

e. Reflect across the line x=1.

f. Rotate 90° counterclockwise

11. Triangle ABC is reflected over the y-axis and then translated 3 units down. How do the angle measures and lengths of the image compare to those of the preimage?

Reflections and Translations result in congruent images.
The angle measures and lengths of the image will be the same as the corresponding measures of the preimage.
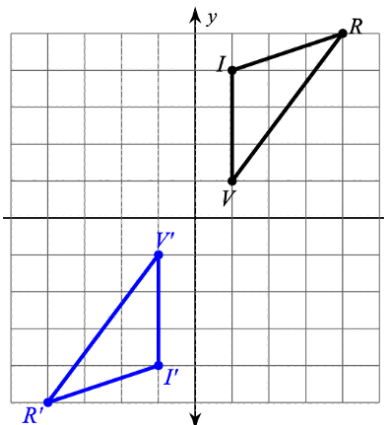
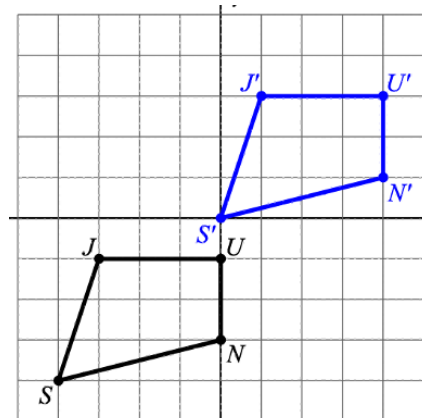12. What transformation was performed in each of the graphs below?
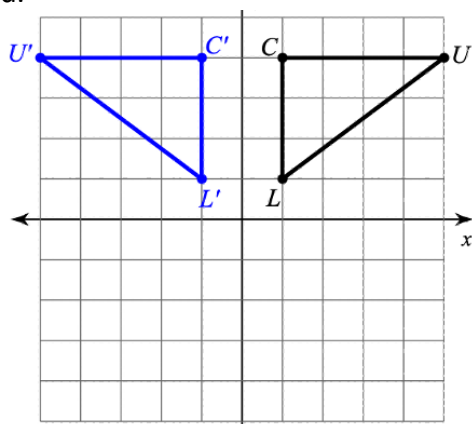
a.
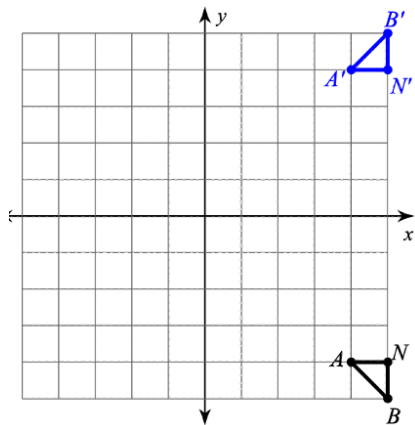
Reflection across the x-axis
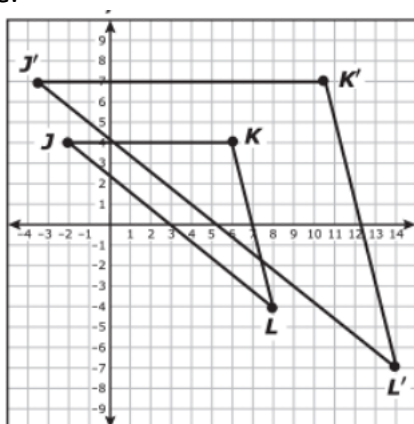
b.

Rotation 180° around the origin.

c.

$(x,y) \rightarrow (x+4, y+1)$
OR
The figure moved 4 units right, 1 unit up

d.

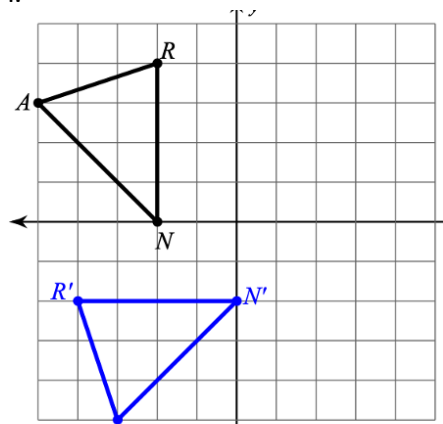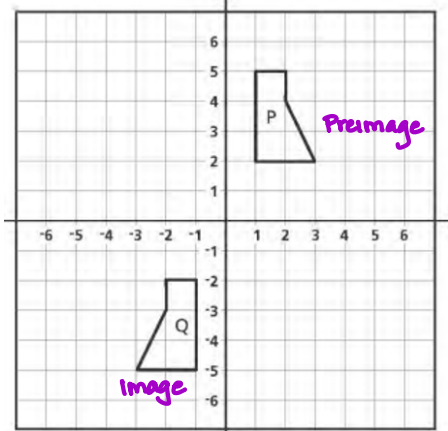

Reflection across the y-axis

e.

Dilation from the origin with scale factor = $\frac{3}{4}$
$(x,y) \rightarrow (\frac{3}{4}x, \frac{3}{4}y)$

f.

Rotation counterclockwise 90° around $(0,0)$

13. What sequence of 2 transformations will transform Figure P to Figure Q?

Preimage P

Image Q

1. Reflection across the y-axis.
2. $(x,y) \rightarrow (x, y-7)$

OR

1. $(x,y) \rightarrow (x, y-7)$
2. Reflection across y-axis

14. Triangle ABC is dilated by a factor of 3 to Triangle A'B'C'. How do the following aspects of the image compare to the pre-image?

- Angle measures   Angle measures of the Image are equal to the angle measures of the preimage.

- Side lengths   Side lengths of the Image are 3 times as long as side lengths of the preimage.

- Area   Area of the Image is 9 times the area of the preimage.