1. Line ℓ is mapped onto line m by a dilation centered at the origin with a scale factor of 2. The equation of line ℓ is $3x - y = 4$. Determine and state an equation for line m.

$3x - y = 4$

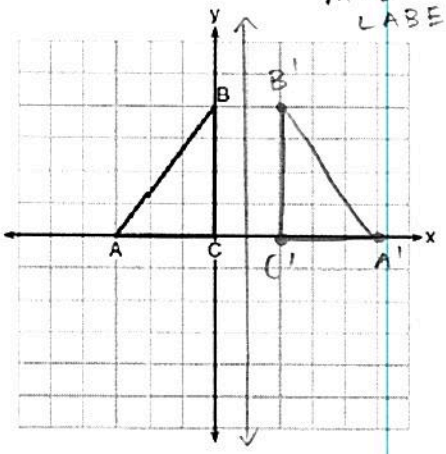
$3x = y + 4$
$-4 \quad -4$

$3x - 4 = y$

line m → $y = 3x - 8$

2. Triangle ABC is graphed on the set of axes below. Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a reflection over the line $x = 1$.

MUST LABEL!

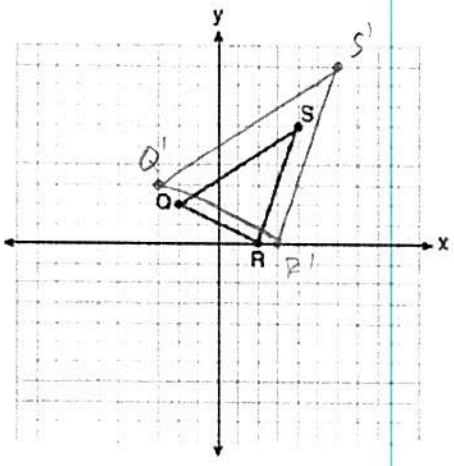


3. A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

Hexagon - 6 sides

$\frac{360}{6} = 60°$

4. Triangle QRS is graphed on the set of axes below.

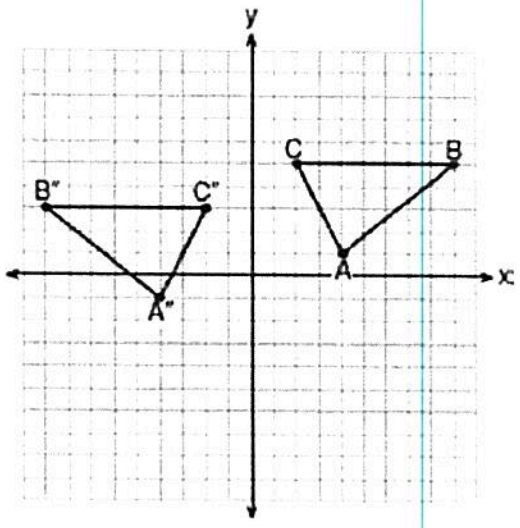


$Q\ (-2,2) \cdot \frac{3}{2} \rightarrow Q'\ (-3,3)$
$R\ (2,0) \cdot \frac{3}{2} \rightarrow R'\ (3,0)$
$S\ (4,6) \cdot \frac{3}{2} \rightarrow S'\ (6,9)$

On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

A dilation preserves slope, so the slopes of QR and $Q'R'$ are the same. Since the slopes are equal, $QR \parallel Q'R'$.

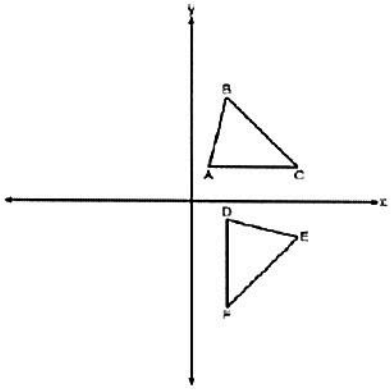
5. The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.



Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

reflection over y-axis
followed by Translation
down 2 units

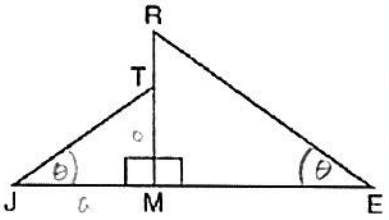
6. The image of $\triangle ABC$ after a rotation of 90° clockwise about the origin is $\triangle DEF$, as shown below.



Which statement is true?

~~1~~ $\overline{BC} \cong \overline{DE}$
~~2~~ $\overline{AB} \cong \overline{DF}$
~~3~~ $\angle C \cong \angle E$
(4) $\angle A \cong \angle D$

1. In the diagram below, $\Delta ERM \sim \Delta JTM$.



Which statement is always true?

1 $\cos J = \frac{RM}{RE}$

2 $\cos R = \frac{JM}{JT}$

3 $\tan T = \frac{RM}{EM}$

(4) $\tan E = \frac{TM}{JM}$

2. In ΔABC, where $\angle C$ is a right angle, $\cos A = \frac{\sqrt{21}}{5}$. What is $\sin B$?

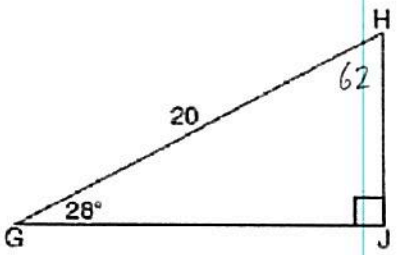
(1) $\frac{\sqrt{21}}{5}$ COFUNCTIONS

2 $\frac{\sqrt{21}}{2}$

3 $\frac{2}{5}$

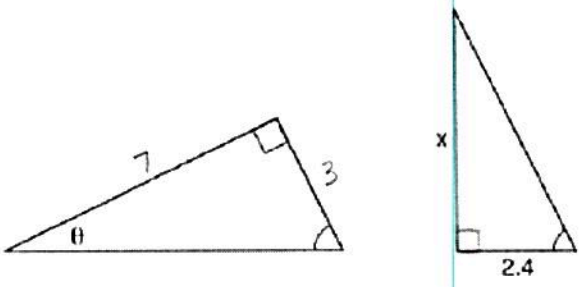
4 $\frac{5}{\sqrt{21}}$

3. When instructed to find the length of $\overline{HJ}$ in right triangle HJG, Alex wrote the equation $\sin 28° = \frac{HJ}{20}$ while Marlene wrote $\cos 62° = \frac{HJ}{20}$. Are both students' equations correct? Explain why.



Yes, both students are correct. The two non-right angles in a right Δ are complementary and the sine of one of these ∠'s is equal to the cosine of the other.

4. The diagram below shows two similar triangles.



$\frac{x}{7} = \frac{2.4}{3}$

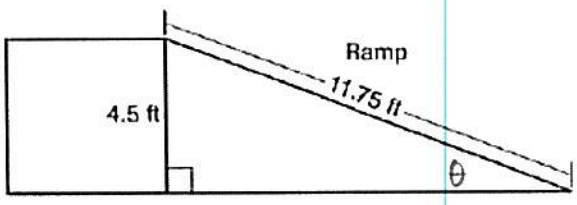
$3x = 16.8$

$x = 5.6$

If $\tan\theta = \frac{3}{7}$, what is the value of x, to the *nearest tenth*?

1 1.2
(2) 5.6
3 7.6
4 8.8

5. The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



$\tan\theta = \frac{4.5}{11.75}$

$\theta = 20.95577673$

$\theta = 21^\circ$

Determine and state, to the *nearest degree*, the angle of elevation formed by the ramp and the ground.