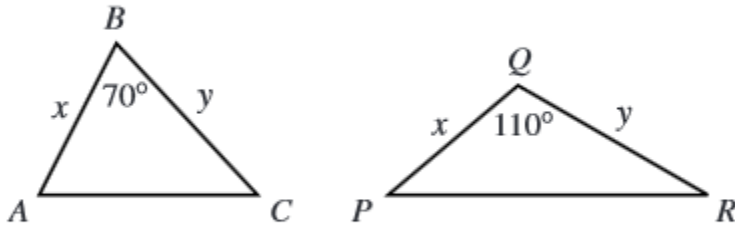


**Titan Learning Center**  
**Mathematics ACT Prep**  
**Set B-Week 10**

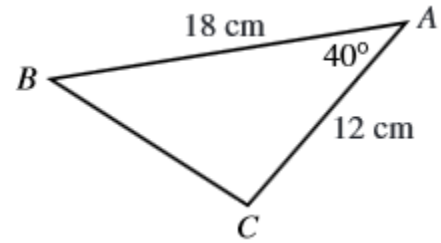
Solve each problem, circling the correct answers. Remember that figures are not necessarily drawn to scale.

1. Triangles  $\triangle ABC$  and  $\triangle PQR$  are shown below. The given side lengths are in centimeters. The area of  $\triangle ABC$  is 30 square centimeters. What is the area of  $\triangle PQR$ , in square centimeters?



- F. 15  
G. 19  
H. 25  
J. 30  
K. 33
2. If  $x$  and  $y$  are real numbers such that  $x > 1$  and  $y < -1$ , then which of the following inequalities *must* be true?
- A.  $\frac{x}{y} > 1$   
B.  $|x|^2 > |y|$   
C.  $\frac{x}{3} - 5 > \frac{y}{3} - 5$   
D.  $x^2 + 1 > y^2 + 1$   
E.  $x^{-2} > y^{-2}$
3. In the equation  $x^2 + mx + n = 0$ ,  $m$  and  $n$  are integers. The *only* possible value for  $x$  is  $-3$ . What is the value of  $m$ ?
- A. 3  
B.  $-3$   
C. 6  
D.  $-6$   
E. 9

4. Triangle  $\triangle ABC$  is shown in the figure below. The measure of  $\angle A$  is  $40^\circ$ ,  $AB = 18$  cm, and  $AC = 12$  cm. Which of the following is the length, in centimeters, of  $\overline{BC}$  ?



(Note: For a triangle with sides of length  $a$ ,  $b$ , and  $c$  opposite angles  $\angle A$ ,  $\angle B$ , and  $\angle C$ , respectively, the law of sines states  $\frac{\sin \angle A}{a} = \frac{\sin \angle B}{b} = \frac{\sin \angle C}{c}$  and the law of cosines states  $c^2 = a^2 + b^2 - 2ab \cos \angle C$ .)

- A.  $12 \sin 40^\circ$   
B.  $18 \sin 40^\circ$   
C.  $\sqrt{18^2 - 12^2}$   
D.  $\sqrt{12^2 + 18^2}$   
E.  $\sqrt{12^2 + 18^2 - 2(12)(18) \cos 40^\circ}$
5. The *determinant* of a matrix  $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$  equals  $ad - cb$ .

What must be the value of  $x$  for the matrix  $\begin{bmatrix} x & 8 \\ x & x \end{bmatrix}$  to

have a determinant of  $-16$  ?

- A.  $-4$   
B.  $-2$   
C.  $-\frac{8}{5}$   
D.  $\frac{8}{3}$   
E.  $4$

**TLC Stamp**

