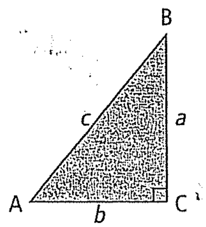
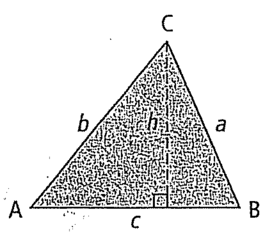
KEY

Chapter 2 Skills Organizer B

Solving a triangle means finding the measure of all unknown sides and angles. Complete the chart with all relevant formulas to solve any triangle.

Triangle	Known Info	How to Calculate Side	How to Calculate Angle	
 right triangle	$\angle C = 90°$	$a^2 =$	$\sin A = \frac{a}{c}$	$\sin B = \frac{b}{c}$
		$b^2 =$	$\cos A =$	$\cos B =$
		$c^2 = a^2 + b^2$	$\tan A =$	$\tan B =$
 oblique triangle	SSS or SAS	$a^2 = b^2 + c^2 - 2bc \cos A$	$\cos A = \frac{a^2 - b^2 - c^2}{-2bc}$	
		$b^2 =$	$\cos B =$	
		$c^2 =$	$\cos C =$	
	ASA or SSA*	$\frac{a}{\sin A} =$ ______ $=$ ______	$\frac{\sin A}{a} =$ ______ $=$ ______	

* Notes about the ambiguous case:

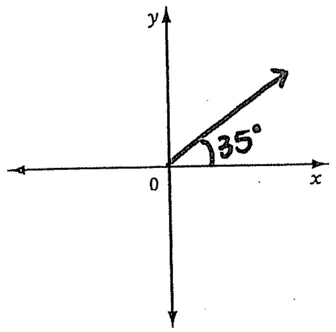
	Acute Angle	Obtuse Angle
0 triangles		
1 triangle		
2 triangles		

Chapter 2 Review

2.1 Angles in Standard Position, pages 56–67

1. Sketch each angle in standard position. State which quadrant the angle terminates in and the measure of the reference angle.

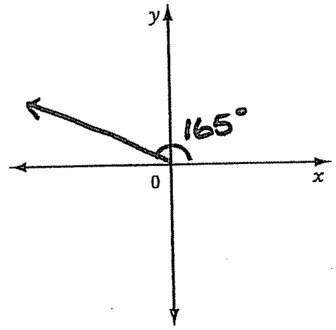
a) 35°



quadrant I

θ_R = 35°

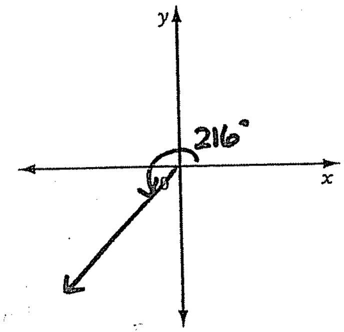
b) 165°



quadrant II

θ_R = 15°

c) 216°

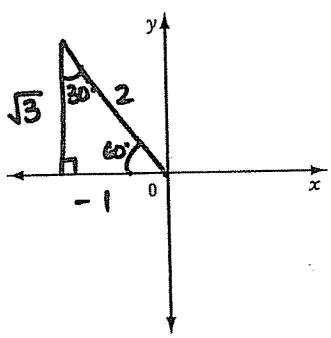


quadrant III

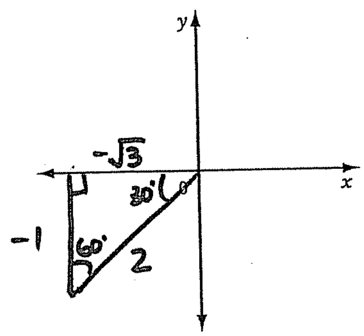
θ_R = 36°

2. Determine the exact value of the following ratios without using technology.

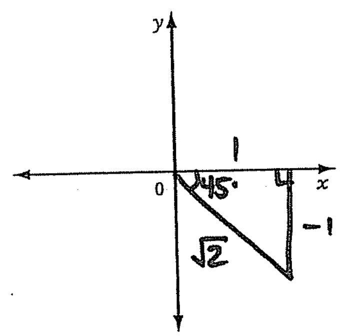
a) $\cos 120° = \frac{-1}{2}$



b) $\tan 210° = \frac{+1}{+\sqrt{3}} = \frac{\sqrt{3}}{3}$

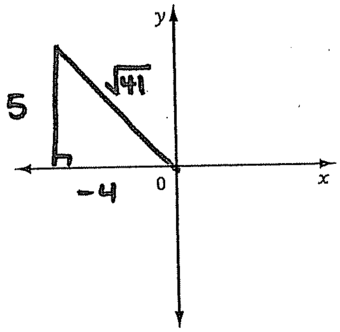


c) $\sin 315° = \frac{-1}{\sqrt{2}} = \frac{-\sqrt{2}}{2}$



2.2 Trigonometric Ratios of Any Angle, pages 68–79

3. A point P(−4, 5) lies on the terminal arm of an angle θ in standard position. Determine the exact trigonometric ratios for sin θ, cos θ, and tan θ.



$4^2 + 5^2 = r^2$

$41 = r^2$

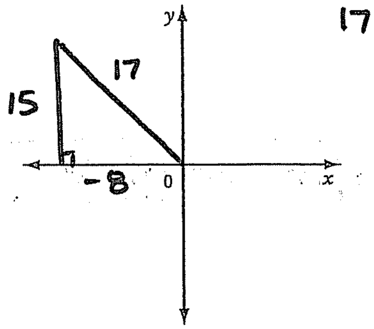
$\sqrt{41} = r$

$\sin\theta = \boxed{\frac{5}{\sqrt{41}}} = \frac{5\sqrt{41}}{41}$

$\cos\theta = \boxed{\frac{-4}{\sqrt{41}}} = \frac{-4\sqrt{41}}{41}$

$\tan\theta = \boxed{\frac{5}{-4}} = -\frac{5}{4}$

4. Suppose θ is an angle in standard position with terminal arm in quadrant II and $\sin\theta = \frac{15}{17}$. Determine the exact values of the other two primary trigonometric ratios.



$17^2 - 15^2 = a^2$

$64 = a^2$

$8 = a$

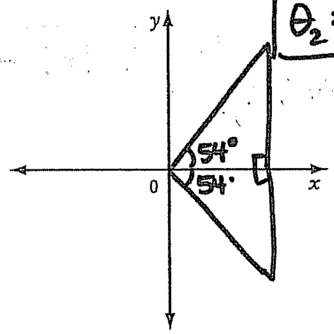
$\cos\theta = \boxed{-\frac{8}{17}}$

$\tan\theta = \boxed{-\frac{15}{8}}$

5. Solve for θ, $0° \leq \theta < 360°$.

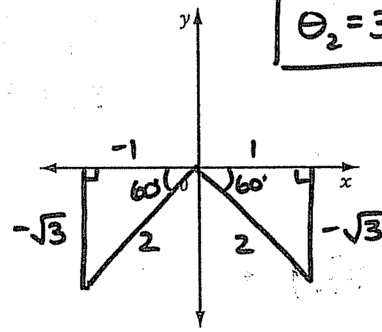
a) $\cos\theta = 0.5877$

$\boxed{\begin{matrix}\theta_1 = 54° \\ \theta_2 = 306°\end{matrix}}$



b) $\sin\theta = -\frac{\sqrt{3}}{2}$

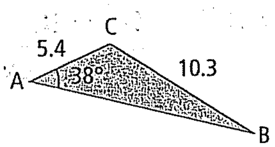
$\boxed{\begin{matrix}\theta_1 = 240° \\ \theta_2 = 300°\end{matrix}}$



2.3 The Sine Law, pages 81–93

6. Find the indicated side or angle.

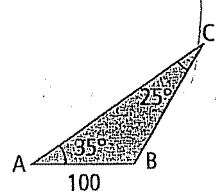
a) ∠B = 19°



$5.4 \times \frac{\sin 38°}{10.3} = \frac{\sin B}{5.4} \times 5.4$

$B = 18.8°$

b) side b = 204.9



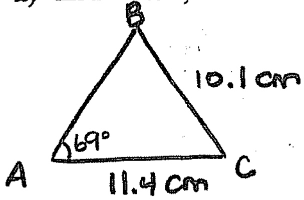
$180 - 35 - 25 = 120°$

$\sin 120° \times \frac{100}{\sin 25°} = \frac{b}{\sin 120°} \times \sin 120°$

$b = 204.92$

7. Determine how many △ABCs satisfy the following conditions.

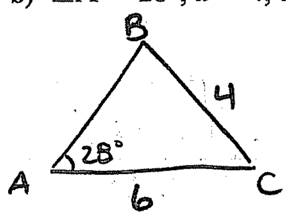
a) ∠A = 69°, a = 10.1 cm, and b = 11.4 cm



$$\frac{\sin 69^\circ}{10.1} = \frac{\sin B}{11.4}$$

B = undefined → $\boxed{\text{no triangles}}$

b) ∠A = 28°, a = 4, and b = 6



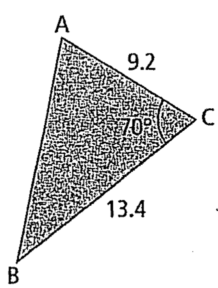
$$\frac{\sin 28^\circ}{4} = \frac{\sin B}{6}$$

$$\left.\begin{array}{l} B_1 = 44.8^\circ \\ B_2 = 180 - 44.8 = 135.2^\circ \end{array}\right\} \boxed{\text{2 triangles}}$$

2.4 The Cosine Law, pages 94–102

8. Find the indicated side or angle.

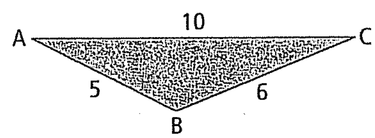
a) side c = 13.4



$c^2 = 9.2^2 + 13.4^2 - 2(9.2)(13.4)\cos 70^\circ$

$c = 13.4$

b) ∠A = 27°



$6^2 = 10^2 + 5^2 - 2(10)(5)\cos A$

$A = \cos^{-1}\left(\frac{6^2 - 10^2 - 5^2}{-2(10)(5)}\right)$

$A = 27.1$