

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

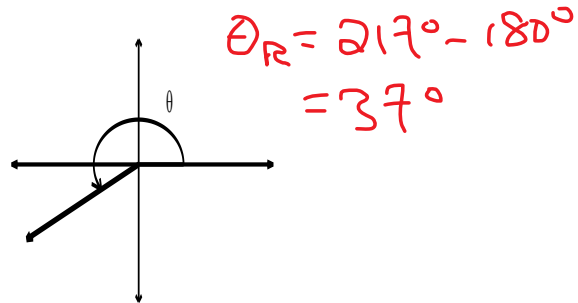
$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

8 Part I: Multiple Choice. Place the correct answer in the corresponding blank at the end of this section.

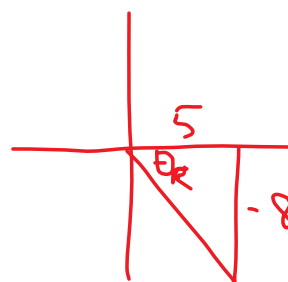
1. What is the measure of the reference angle, in degrees, for  $\theta = 217^\circ$  in the graph below?

- (A) 37°
- (B) 53°
- (C) 143°
- (D) 217°



2. If P(5, -8) is on the terminal arm of  $\theta$ , what is the measure of  $\theta$ , to the nearest degree?

- (A) 32
- (B) 58
- (C) 302
- (D) 328



Handwritten calculations for question 2:

$$\tan \theta_R = \frac{8}{5} \quad \theta = 360^\circ - 58^\circ$$

$$\theta_R = \tan^{-1}\left(\frac{8}{5}\right) \quad \theta = 302^\circ$$

$$\theta_R = 58^\circ$$

3. Solve for  $\theta$ , where  $0^\circ \leq \theta \leq 360^\circ$ :  $\cos \theta = \frac{\sqrt{3}}{2}$

- (A) 30° and 150°
- (B) 30° and 210°
- (C) 30° and 330°
- (D) 30° and 360°

Handwritten calculations for question 3:

$$\cos \theta_R = \frac{\sqrt{3}}{2}$$

$$\theta_R = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$$

$$\theta_R = 30^\circ$$

Handwritten calculations for question 3:

-	+	+	+
-	-	+	-

$$\theta_R = \theta = 30^\circ$$

$$\theta = 360^\circ - 30^\circ = 330^\circ$$

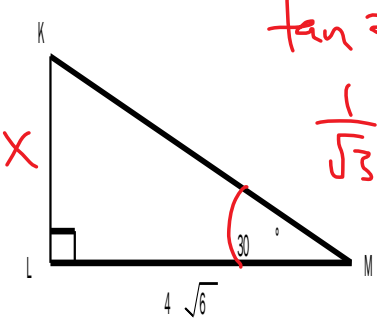
4. What is the exact value of  $\sin 210^\circ$ ?

- (A)  $-\frac{\sqrt{3}}{2}$   
 (B)  $-\frac{1}{2}$   
 (C)  $\frac{1}{2}$   
 (D)  $\frac{\sqrt{3}}{2}$
- $\theta_R = 210^\circ - 180^\circ$   
 $\theta_R = 30^\circ$   
 $\sin 210^\circ = -\frac{1}{2}$   
 $\sin 30^\circ = \frac{1}{2}$

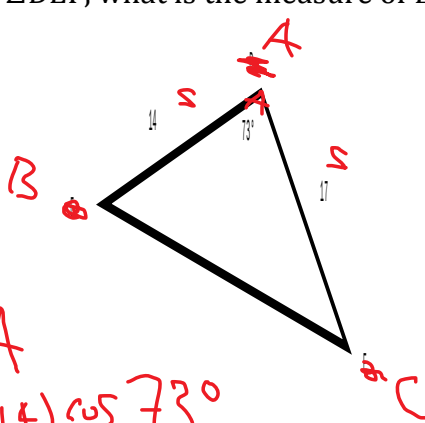
5. If  $\sin \theta = -0.3746$  and  $\tan \theta = -0.4040$ , in which quadrant is  $\theta$ ?

- (A) I  
 (B) II  
 (C) III  
 (D) IV
- S | A  
 ---  
 T | C

6. If  $\angle L = 90^\circ$ ,  $\angle M = 30^\circ$ , and  $\overline{LM} = 4\sqrt{6}$  in  $\triangle KLM$ , what is the exact length of  $\overline{KL}$ ?

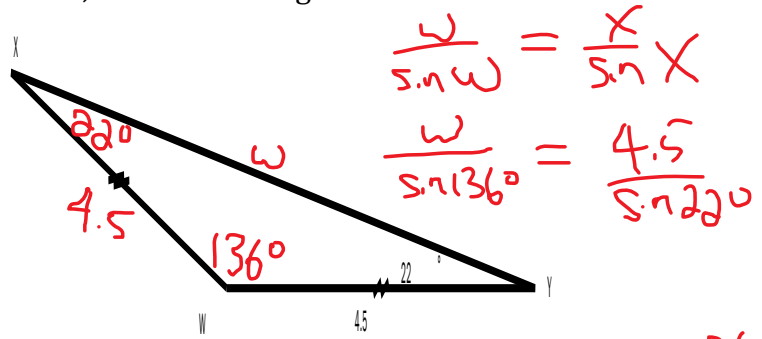
- (A)  $2\sqrt{6}$   
 (B)  $4\sqrt{2}$   
 (C)  $12\sqrt{2}$   
 (D)  $8\sqrt{6}$
- $\tan 30^\circ = \frac{x}{4\sqrt{6}}$   
 $\frac{1}{\sqrt{3}} = \frac{x}{4\sqrt{6}}$   
 $\frac{\sqrt{3}x}{\sqrt{3}} = \frac{4\sqrt{6}}{\sqrt{3}}$   
 $x = 4\sqrt{2}$
- 

7. If  $\overline{DE} = 14$ ,  $\overline{DF} = 17$  and  $\angle D = 73^\circ$  in  $\triangle DEF$ , what is the measure of  $\overline{EF}$ , to the nearest tenth?

- (A) 18.6  
 (B) 20.4  
 (C) 345.96  
 (D) 416.16
- $a^2 = b^2 + c^2 - 2bc \cos A$   
 $a^2 = 17^2 + 14^2 - 2(17)(14) \cos 73^\circ$   
 $a^2 = 345.8$   
 $\sqrt{a^2} = \sqrt{345.8} \rightarrow a = 18.6$
- 

8. If  $\angle Y = 22^\circ$ ,  $\overline{WY} = 4.5$  and  $\overline{WY} = \overline{WX}$ , what is the length of  $\overline{XY}$  in  $\triangle WXY$ ?

- (A) 2.4
- (B) 4.5
- (C) 8.3**
- (D) 11.1



$$\frac{w}{\sin w} = \frac{x}{\sin X}$$

$$\frac{w}{\sin 136^\circ} = \frac{4.5}{\sin 22^\circ}$$

$$w = \frac{4.5 \sin 136}{\sin 22}$$

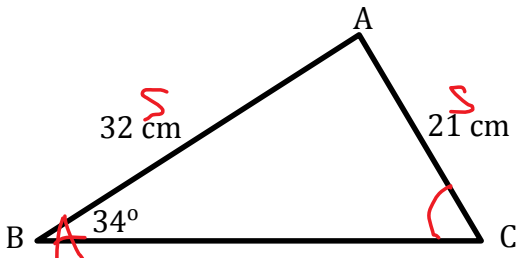
$$w = 8.3$$

Answers to multiple choice.

1. \_\_\_      2. \_\_\_      3. \_\_\_      4. \_\_\_
5. \_\_\_      6. \_\_\_      7. \_\_\_      8. \_\_\_

16 Part II: **Constructed Response.** Answer each question in the space provided. Show all workings.

9. Given  $\triangle ABC$ , solve for  $\angle C$ .



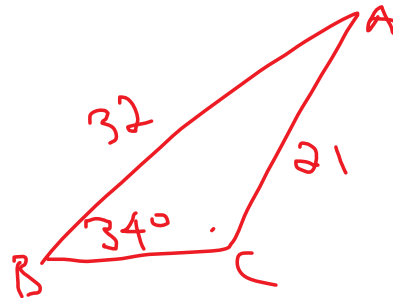
$$\frac{\sin C}{c} = \frac{\sin B}{b}$$

$$\frac{\sin C}{32} = \frac{\sin 34^\circ}{21}$$

$$\sin C = \frac{32 \sin 34^\circ}{21}$$

$$\sin C = 0.8521$$

$$C = 58^\circ$$



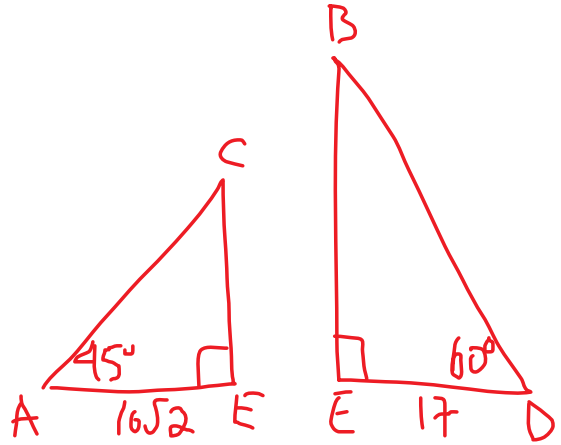
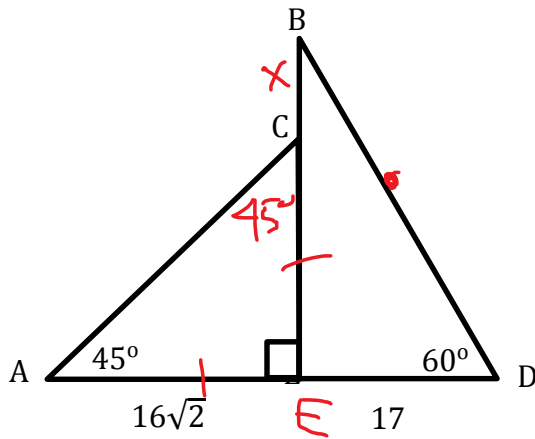
$$\text{or } \theta = 180^\circ - 58^\circ$$

$$= 122^\circ \checkmark$$

Check:

$$34^\circ + 122^\circ = 156^\circ < 180^\circ$$

4 10. Determine the exact length of  $\overline{BC}$ .



$$\tan 45^\circ = \frac{\overline{CE}}{16\sqrt{2}}$$

$$16\sqrt{2} \cdot 1 = \frac{\overline{CE}}{16\sqrt{2}} \cdot 16\sqrt{2}$$

$$\overline{CE} = 16\sqrt{2}$$

$$\tan 60^\circ = \frac{\overline{BE}}{17}$$

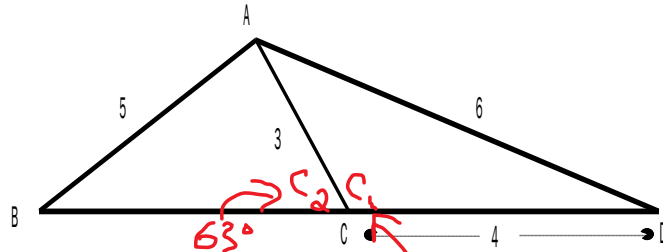
$$17 \cdot \sqrt{3} = \frac{\overline{BE}}{17} \cdot 17$$

$$\overline{BE} = 17\sqrt{3}$$

$$\overline{BC} = \overline{BE} - \overline{CE}$$

$$= 17\sqrt{3} - 16\sqrt{2} \text{ units}$$

- 4 11. Determine the measure of  $\angle B$  to the nearest degree.



$$\cos C_1 = \frac{3^2 + 4^2 - 6^2}{2(3)(4)}$$

$$\cos C_1 = -0.4583$$

$$C_1 = \cos^{-1}(-0.4583)$$

$$C_1 = 117^\circ$$

117°

$$\angle C_2 = 180^\circ - 117^\circ = 63^\circ$$

$$\frac{\sin B}{3} = \frac{\sin 63^\circ}{5}$$

$$\sin B = \frac{3 \sin 63^\circ}{5}$$

$$\sin B = 0.5346$$

$$B = \sin^{-1}(0.5346)$$

$$B = 32^\circ$$