

Geometry CC - Unit 8  
Lesson 11: Law of Sines  
M2 L32

**HW Answers 8.9**

6) A roller coaster travels 80 ft of track from the loading zone before reaching it horizontal distance between the loading zone and the base of the peak is 50 ft.  
a. Model the situation using a right triangle.

Practice:  
Find the measure of angles  $\alpha$  through  $d$  to the nearest degree.

$\cos \alpha = \frac{13}{20}$   
 $\alpha = \cos^{-1}(\frac{13}{20})$   
 $\alpha \approx 49.45$   
 $\alpha \approx 49^\circ$

$\sin b = \frac{40}{42}$   
 $b = \sin^{-1}(\frac{40}{42})$   
 $b \approx 72.24$   
 $b \approx 72^\circ$

b. At what angle is the roller coaster rising according to the model?

$\cos x = \frac{50}{80}$   
 $x = \cos^{-1}(\frac{50}{80})$   
 $x \approx 51.31$   
 $x \approx 51^\circ$

$\tan c = \frac{14}{29}$   
 $c = \tan^{-1}(\frac{14}{29})$   
 $c \approx 25.769$   
 $c \approx 26^\circ$

$\sin d = \frac{48}{85}$   
 $d = \sin^{-1}(\frac{48}{85})$   
 $d \approx 53^\circ$

$\cos d = \frac{51}{85}$   
 $d = \cos^{-1}(\frac{51}{85})$   
 $d \approx 53^\circ$

$\tan d = \frac{48}{51}$   
 $d = \tan^{-1}(\frac{48}{51})$   
 $d \approx 53^\circ$

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Main ideas/Questions	Notes
<p><b>Law of Sines</b></p>	<p>We have practiced using trigonometric ratios to find side lengths and angle measurements in right triangles.</p> <p>The <b>Law of Sines</b> shows the proportional relationship between angles and their opposite sides. It can be used to find side lengths and angle measurements for <b>any triangle</b>.</p> $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ <p>Given <math>\triangle ABC</math>:</p>
<p><b>Finding Missing Sides &amp; Angles:</b> Use the Law of Sines to set up a proportion and solve for <math>x</math>.</p>	
<p>1)</p>	<p>2)</p>
$\frac{12}{\sin 35} = \frac{x}{\sin 71}$ $12 \sin 71 = x \sin 35$ $x \approx 19.8$	$\frac{5}{\sin 18} = \frac{x}{\sin 114}$ $5 \sin 114 = x \sin 18$ $x \approx 14.8$

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5)

6)

$$\frac{15}{\sin 29} = \frac{x}{\sin 103}$$

$29 + 103 + y = 180$   
 $132 + y = 180$   
 $y = 48$

$$\frac{15 \sin 103}{\sin 29} = \frac{x \sin 29}{\sin 29}$$
  
 $x \approx 23$

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7)

8)

$117 + 23 = 140$   
 $180 - 140 = 40$

$$\frac{x}{\sin 23} = \frac{29}{\sin 40}$$

$$\frac{x \sin 40}{\sin 40} = \frac{29 \sin 23}{\sin 40}$$
  
 $x \approx 17.6$

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9)

10)

$$\frac{14}{\sin 77} = \frac{9}{\sin x}$$

$$\frac{9 \sin 77}{14} = \frac{14 \sin x}{14}$$

$$\sin^{-1}\left(\frac{9 \sin 77}{14}\right) \approx 38.8^\circ$$

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11)

12)

$$\frac{24}{\sin 61} = \frac{x}{\sin 24}$$

$$\frac{21 \sin 61}{24} = \frac{24 \sin x}{24}$$

$$\sin^{-1}\left(\frac{21 \sin 61}{24}\right) \approx 49.9^\circ$$

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