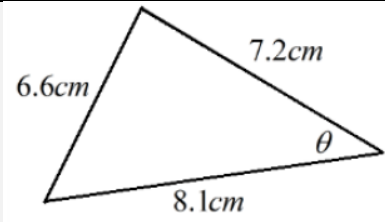


## Topic: Trigonometry

Topic/Skill	Definition/Tips	Example																								
1. Exact Values for Angles in Trigonometry	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>0°</th> <th>30°</th> <th>45°</th> <th>60°</th> <th>90°</th> </tr> </thead> <tbody> <tr> <td>sin</td> <td>0</td> <td><math>\frac{1}{2}</math></td> <td><math>\frac{\sqrt{2}}{2}</math></td> <td><math>\frac{\sqrt{3}}{2}</math></td> <td>1</td> </tr> <tr> <td>cos</td> <td>1</td> <td><math>\frac{\sqrt{3}}{2}</math></td> <td><math>\frac{\sqrt{2}}{2}</math></td> <td><math>\frac{1}{2}</math></td> <td>0</td> </tr> <tr> <td>tan</td> <td>0</td> <td><math>\frac{1}{\sqrt{3}}</math></td> <td>1</td> <td><math>\sqrt{3}</math></td> <td>----</td> </tr> </tbody> </table>		0°	30°	45°	60°	90°	sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	----	
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sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1																					
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tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	----																					
2. Sine Rule	<p>Use with <b>non right angle triangles</b>. Use when the question involves <b>2 sides and 2 angles</b>.</p> <p>For missing side:</p> $\frac{a}{\sin A} = \frac{b}{\sin B}$ <p>For missing angle:</p> $\frac{\sin A}{a} = \frac{\sin B}{b}$ <p>There is an <b>ambiguous case</b> (where there are two potential answers)</p> <div style="text-align: center;"> </div> <p>To find the two angles, use <b>sine</b> to find one, and then <b>subtract your answer from 180</b> to find the other answer.</p>	<div style="text-align: center;"> </div> $\frac{x}{\sin 85} = \frac{5.2}{\sin 46}$ $x = \frac{5.2 \times \sin 85}{\sin 46} = 3.75\text{cm}$ <div style="text-align: center;"> </div> $\frac{\sin \theta}{1.9} = \frac{\sin 85}{2.4}$ $\sin \theta = \frac{1.9 \times \sin 85}{2.4} = 0.789$ $\theta = \sin^{-1}(0.789) = 52.1^\circ$																								
3. Cosine Rule	<p>Use with <b>non right angle triangles</b>. Use when the question involves <b>3 sides and 1 angle</b>.</p> <p>For missing side:</p> $a^2 = b^2 + c^2 - 2bccosA$ <p>For missing angle:</p> $cos A = \frac{b^2 + c^2 - a^2}{2bc}$	<div style="text-align: center;"> </div> $x^2 = 9.6^2 + 7.8^2 - (2 \times 9.6 \times 7.8 \times \cos 85)$ $x = 11.8$																								



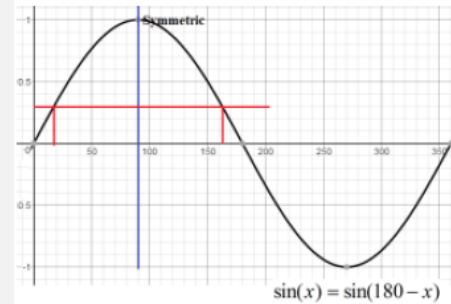
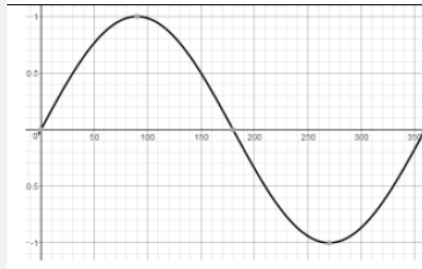
$$\cos \theta = \frac{7.2^2 + 8.1^2 - 6.6^2}{2 \times 7.2 \times 8.1}$$

$$\theta = 50.7^\circ$$

#### 4. Graphs of Trigonometric Functions

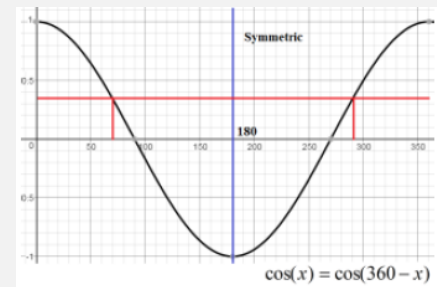
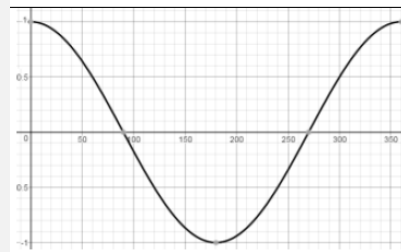
$$y = \sin(x)$$

for  $0 \leq x \leq 360^\circ$



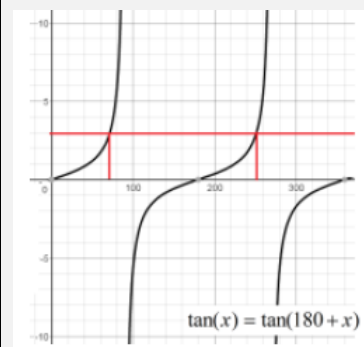
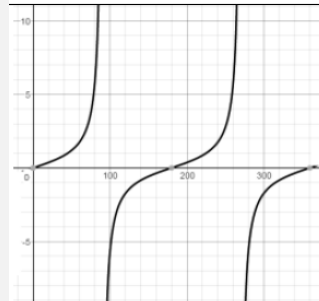
$$y = \cos(x)$$

for  $0 \leq x \leq 360^\circ$



$$y = \tan(x)$$

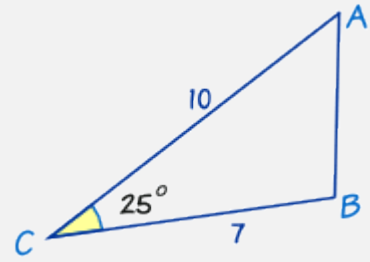
for  $0 \leq x \leq 360^\circ$



5. Area of a Triangle

Use when given the **length of two sides and the included angle.**

$$\text{Area of a Triangle} = \frac{1}{2}ab \sin C$$



$$A = \frac{1}{2}ab \sin C$$

$$A = \frac{1}{2} \times 7 \times 10 \times \sin 25$$

$$A = 14.8$$