

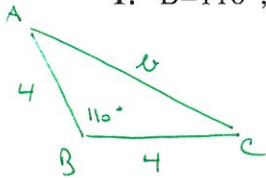
Key

Pre-Calculus

Chapter 6 Review – Day 1

Solve each triangle.

1. $B=110^\circ, a=4, c=4$



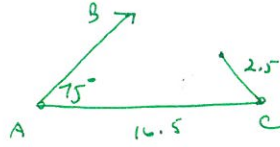
$$b^2 = 4^2 + 4^2 - 2 \cdot 4 \cdot 4 \cdot \cos 110^\circ$$

$$b = 6.6$$

Isosceles \rightarrow

$A = 35^\circ$	$a = 4$
$B = 110^\circ$	$b = 6.6$
$C = 35^\circ$	$c = 4$

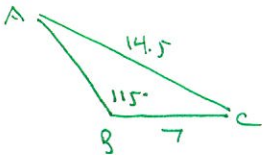
2. $A=75^\circ, a=2.5, b=16.5$



$$\frac{\sin 75^\circ}{2.5} = \frac{\sin B}{16.5}$$

NOT A TRIANGLE

3. $B=115^\circ, a=7, b=14.5$



$$\frac{\sin 115^\circ}{14.5} = \frac{\sin A}{7}$$

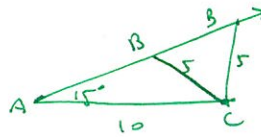
$$A = 26^\circ$$

$$\frac{\sin 39^\circ}{c} = \frac{\sin 115^\circ}{14.5}$$

$$c = 10.1$$

$A = 26^\circ$	$a = 7$
$B = 115^\circ$	$b = 14.5$
$C = 39^\circ$	$c = 10.1$

4. $A=15^\circ, a=5, b=10$



$$\frac{\sin 15^\circ}{5} = \frac{\sin B}{10}$$

$$B = 31^\circ \text{ or } B' = 149^\circ$$

<u>1st Δ</u>	<u>2nd Δ</u>
$A = 15^\circ$	$A = 15^\circ$
$B = 31^\circ$	$B' = 149^\circ$
$C = 134^\circ$	$C' = 16^\circ$
$a = 5$	$a = 5$
$b = 10$	$b = 10$
$c = 13.9$	$c' = 5.4$

Find the area of each triangle.

5. $a=4, b=5, c=7$

$$A = \sqrt{8(8-4)(8-5)(8-7)}$$

$$= \boxed{9.8 \text{ u}^2}$$

6. $A=27^\circ, b=5, c=8$

$$A = \frac{1}{2} \cdot 5 \cdot 8 \cdot \sin 27^\circ$$

$$= \boxed{9.1 \text{ u}^2}$$

7. Find a vector in the direction of \overrightarrow{PQ} with a magnitude of 4. $P=(7,-4), Q=(-3,2)$.

$$\overrightarrow{PQ} = \langle -10, 6 \rangle$$

$$4 \langle \cos 149^\circ, \sin 149^\circ \rangle$$

$$\tan \theta = \frac{6}{-10} \quad \theta = -31^\circ \text{ or } 229^\circ \rightarrow \theta = 149^\circ$$

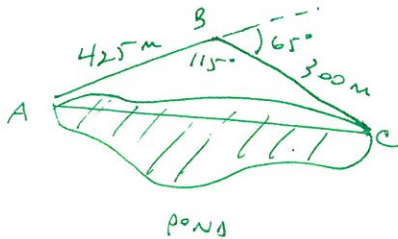
$$= \boxed{\langle -3.4, 2.1 \rangle}$$

8. Find the angle between vectors \mathbf{u} and \mathbf{v} , where $\mathbf{u} = \langle -6, -3 \rangle$ and $\mathbf{v} = \langle 4, 2 \rangle$.

$$\cos \theta = \frac{-24 - 6}{\sqrt{45} \cdot \sqrt{20}} = -1$$

$$\theta = \pi \text{ or } 180^\circ$$

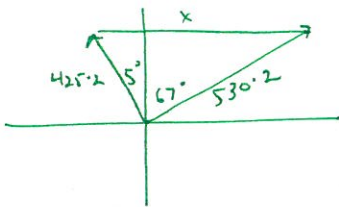
9. A surveyor walks 425 meters from A to B, then turns 65° and walks 300 meters to C. How far across is the pond (from A to C)?



$$b^2 = 300^2 + 425^2 - 2 \cdot 300 \cdot 425 \cdot \cos 115^\circ$$

$$b = 615.1 \text{ m}$$

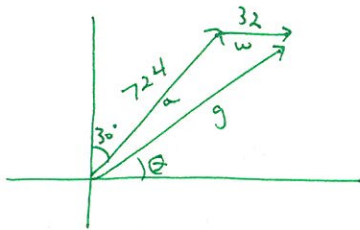
10. Two planes leave an airport at the same time. One is flying 425 mph at a bearing of $N 5^\circ W$ and the other is flying 530 mph at a bearing of $N 67^\circ E$. Find the distance between the planes after they have flown for two hours.



$$x^2 = 850^2 + 1060^2 - 2 \cdot 850 \cdot 1060 \cdot \cos 72^\circ$$

$$x = 1135.5 \text{ mi}$$

11. An airplane has an airspeed of 724 km/h at a bearing of $N 30^\circ E$. If the wind velocity is 32 km/h from the west, find the ground speed (true speed) and bearing of the plane.



$$\vec{a} + \vec{w} = \vec{g}$$

$$\langle 724 \cos 60^\circ, 724 \sin 60^\circ \rangle + \langle 32 \cos 0^\circ, 32 \sin 0^\circ \rangle = \vec{g}$$

$$\langle 394, 627 \rangle = \vec{g}$$

$$\|\vec{g}\| = 740.5 \text{ mph}$$

$$\tan \theta = \frac{627}{394}$$

$$\theta = 58^\circ$$

$$N 32^\circ E$$