

Unit 9 Advanced Algebra

#1

Assignment #19 Chapter 9 Review

Draw triangles, label them and then use either law of sines or cosines to find the missing sides and angles.

You need to have a triangle on your paper labeled.

1) In Triangle ABC, $A=105^\circ$ $c=15$ and $b=21$

2) In Triangle ABC $A=33^\circ$ $C=82^\circ$ and $b=18$

3) In Triangle ABC $b=12$ $a=11$ and $c=13$

4) In Triangle ABC $A=52^\circ$ $B=48$ and $c=14$

5) In Triangle ABC $A=60^\circ$ $c=6$ and $a=7$

6) In Triangle ABC $A=63^\circ$ $B=49^\circ$ and $b=18$

Basic Trig:

1) Draw an angle of 152° and mark the reference angle

2) draw an angle of 320° and mark the reference angle.

3) Show by making two triangles in two different quadrants that the following are True or False

$\sin 160 = \sin 20$

$\cos 60 = \cos 120$

$\tan 30 = \tan 210$

Draw the angle in the correct quadrant and state the exact trig value. No decimals.

$\cos 225$

$\tan 135$

$\sin 330$

$\cos 240$

Draw a the proper picture for the angle that has a terminal side as the given point. You then need to list the sin, cos, and tan. Also State what the big angle would be.

$(3,4)$

$(-8,-6)$

$(15,-10)$

Applications:

1) A ball rolls off the end of a table with a horizontal velocity of 2 feet/second. The height of the table is 4 feet.

How long was the ball in the air?

How far did it land from the base of the desk.

2) Beth hits a baseball so that it travels at an initial speed of 120 feet/second at an angle of 30 degrees. If the bat contacts the ball 3 feet above the ground...

a) Draw the labeled right triangle.

b) What are the sine and cosine equation that come from the triangle.

c) Remembering that the gravity constant is $-16t^2$, write the y equation that models time vs height

d) Use the quadratic formula to solve for the roots

e) Hence, how long was the ball in the air?

f) How long did it take to get the max height?

g) What was the maximum height

h) How far did it go horizontally?

3) A ship is moving at a speed of 18 miles per hour. It is on bearing of 73 degrees. It needs to go a total of 750 miles.

What was the x distance that it traveled during that time?

What was the y distance that it traveled during that time?

4) An airplane takes off at an angle of 18 degrees. The speed of the airplane is 205 feet per second.

a) Draw the right triangle

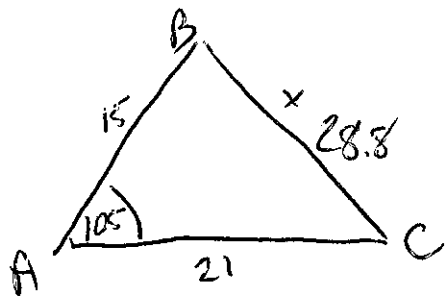
b) What are the sine and cosine equations

c) What is the height of the plane after 30 seconds

d) What is the horizontal distance after 30 seconds.

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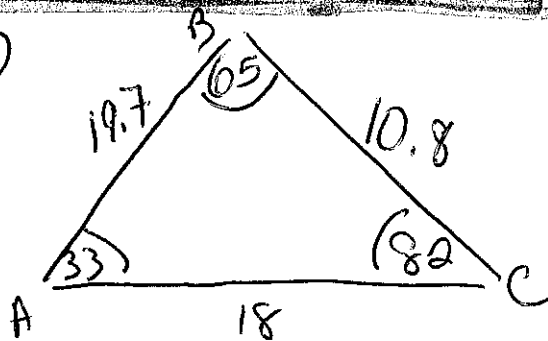
①



$$x^2 = 15^2 + 21^2 - 2(15)(21)\cos 105^\circ$$

$$\boxed{x = 28.8}$$

②



$$180 - (33 + 82) = 65$$

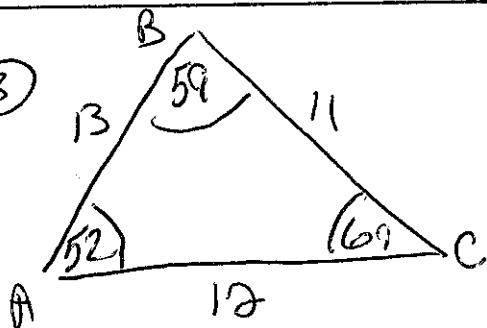
$$\frac{\sin 65}{18} = \frac{\sin 82}{x}$$

$$\boxed{x = 19.7}$$

$$\frac{\sin 33}{x} = \frac{\sin 82}{19.7}$$

$$x = 10.8$$

③



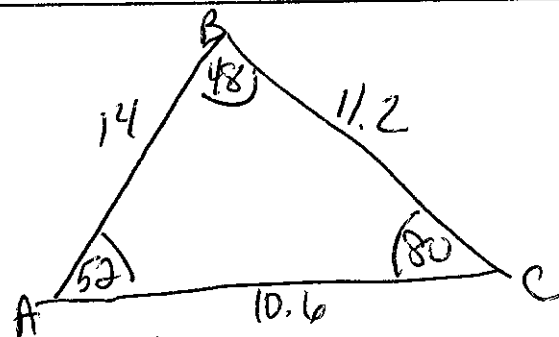
$$11^2 = 13^2 + 12^2 - 2(13)(12)\cos A$$

$$A = 52^\circ$$

$$\frac{\sin B}{12} = \frac{\sin 52}{11}$$

$$B = 59^\circ$$

④



$$180 - (52 + 48) = 80$$

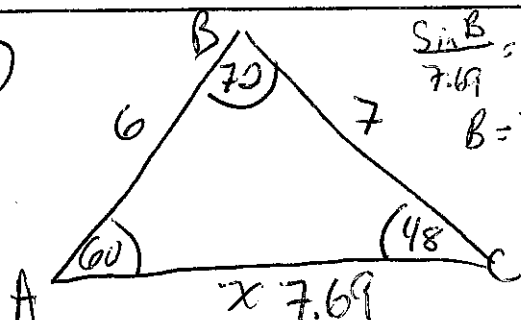
$$\frac{\sin 80}{14} = \frac{\sin 52}{x}$$

$$x = 11.2$$

$$\frac{\sin 48}{x} = \frac{\sin 52}{11.2}$$

$$\boxed{x = 10.6}$$

⑤



$$\frac{\sin B}{7.69} = \frac{\sin 60}{7}$$

$$B = 72^\circ$$

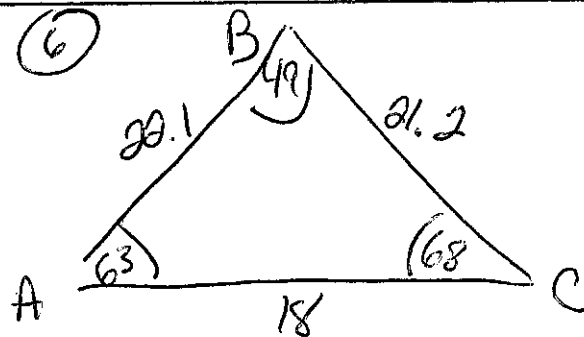
$$7^2 = 6^2 + x^2 - 2(6)(x)\cos 60$$

$$13 = x^2 - 6x$$

$$0 = x^2 - 6x - 13$$

$$\text{Use QF } \leftarrow -1.69$$

⑥



$$180 - (63 + 49) = 68$$

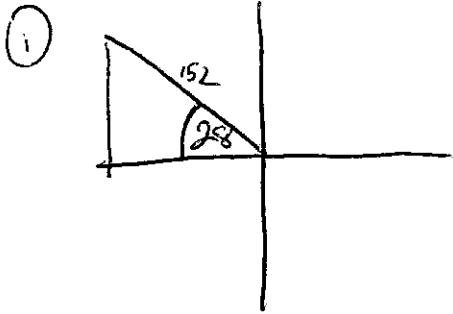
$$\frac{\sin 68}{c} = \frac{\sin 49}{18}$$

$$c = 22.1$$

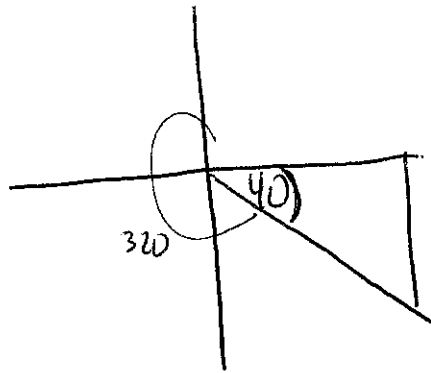
$$\frac{\sin 63}{a} = \frac{\sin 68}{22.1}$$

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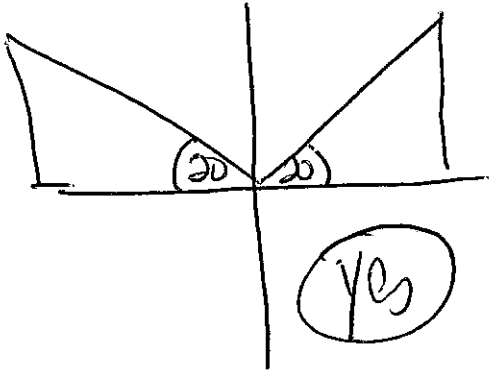
BASIC Trig: 152°



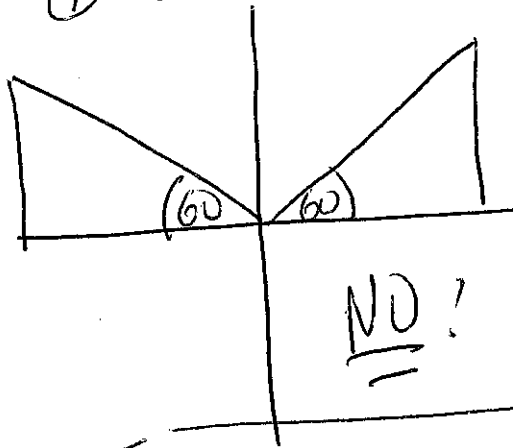
②



③ Is $\sin 160 = \sin 20$

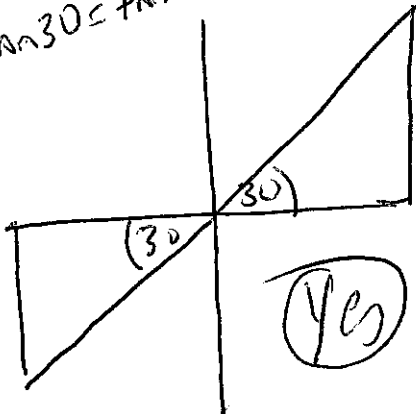


④ $\cos 60 = \cos 120$



But $-\cos 60 = \cos 120$

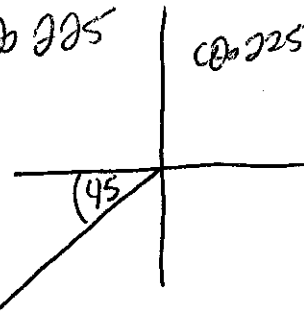
⑤ $\tan 30 = \tan 210$



Draw the angle in the correct quadrant and state the exact trig value.

$\cos 225$

$\cos 225 = -\frac{\sqrt{2}}{2}$

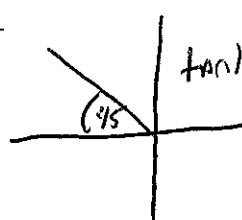


$\sin 330 = \frac{1}{2}$

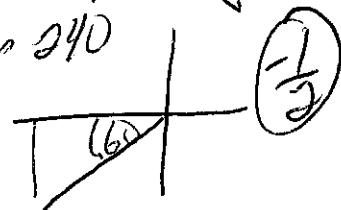


$\tan 135$

$\tan 135 = -1$

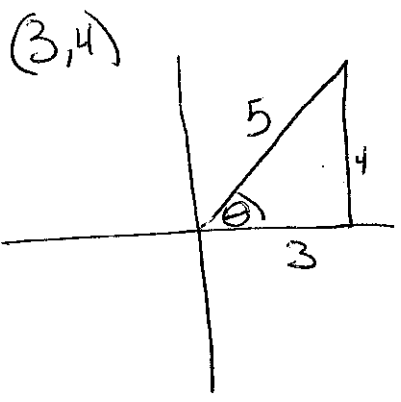


$\cos 240$



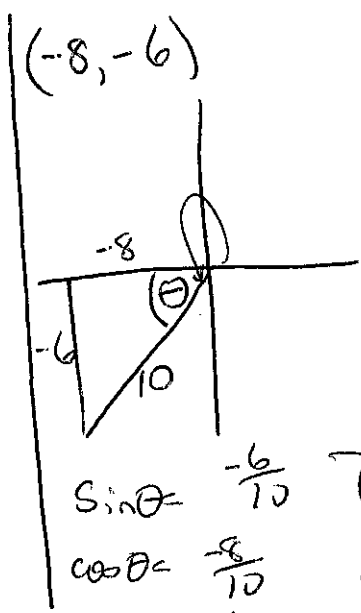
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Draw the proper picture for the angle. List sin cos tan and Big Angle.



$$\sin \theta = \frac{4}{5} \quad \tan \theta = \frac{4}{3}$$

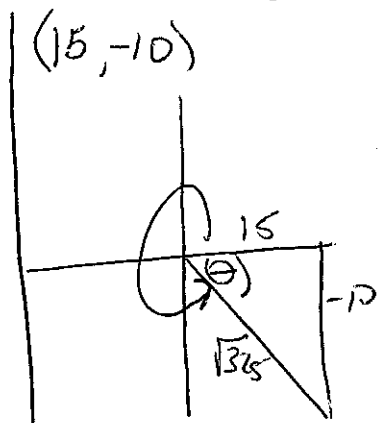
$$\cos \theta = \frac{3}{5} \quad \theta = 53.1$$



$$\sin \theta = \frac{-6}{10} \quad \theta = 36.9$$

$$\cos \theta = \frac{-8}{10} \quad \phi = 216.9$$

$$\tan \theta = \frac{6}{8}$$



$$\sin \theta = \frac{-10}{17.5} \quad \tan \theta = \frac{-10}{15}$$

$$\cos \theta = \frac{15}{17.5}$$

$$\theta = 33.7$$

$$\phi = 326.3$$

Applications

①

$y = -16t^2 + 4$
 $0 = -16t^2 + 4$
 $t = .5 \text{ sec}$

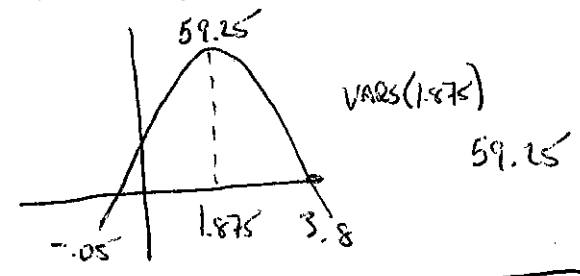
$x = 2t$
 $x = 2(\frac{1}{2})$
 $x = 1 \text{ foot}$

②

$$y = -16t^2 + 120t \sin 30 + 3$$

$$x = 120t \cos 30$$

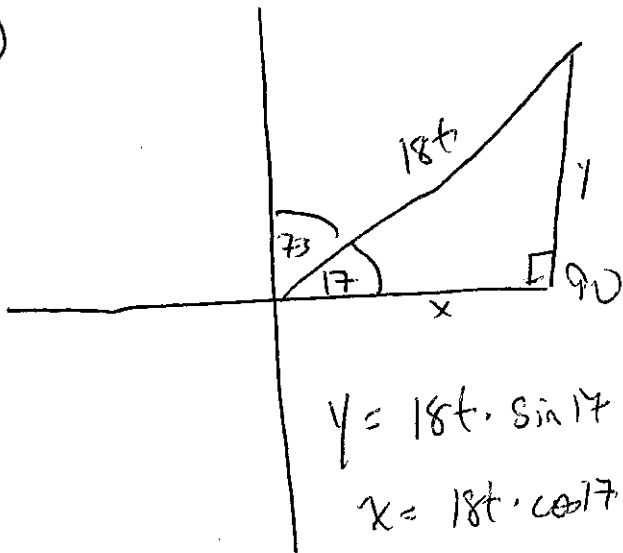
Use QF $-.05$ and 3.8



$$x = 120(3.8) \cos 30 \quad \boxed{394.91}$$

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3



$$y = 18t \cdot \sin 17$$

$$x = 18t \cdot \cos 17$$

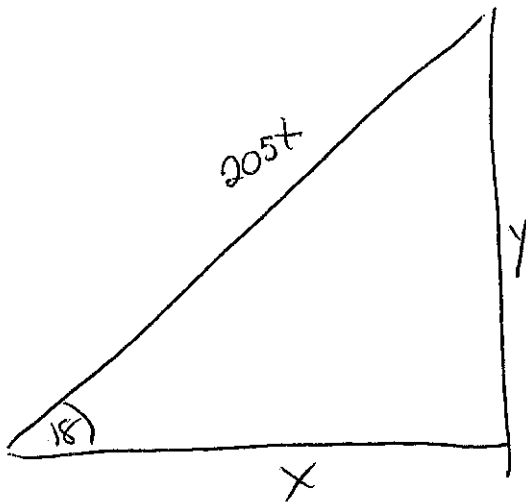
$$18t = 750$$

$$t = 41.7$$

$$y = 18(41.7) \sin 17 \quad 219.5 \text{ miles}$$

$$x = 18(41.7) \cos 17 \quad 717.8 \text{ m.l.}$$

4



$$y = 205t \cdot \sin 18$$

$$x = 205t \cdot \cos 18$$

$$y = 205(30) \sin 18$$

$$x = 205(30) \cos 18$$

$$y = 1900$$

$$x = 5848. \quad 5849$$