

Name _____

Date _____

Advanced Algebra Assignment #8

~~Chapter 8~~ *Chapter 9*

Trigonometry

Section 8.4

Draw a picture with the coordinate axis and show the reference angle and the correct triangle.

- a) 147 degrees b) 204 degrees c) 314 degrees

1) An object is moving at a speed of 10 units per second, at a bearing of 60 degrees

- a) Draw a right triangle to represent this problem.
- b) What is the parametric equation for the horizontal motion.
- c) What is the parametric equation for the vertical motion.

2) Without a calculator, decide whether the equation is true or false. (Find the reference angle)

- a) $\sin 174 = \sin 6$ b) $\cos 200 = \cos 20$

3) $\tan 220 = \tan 40$

b) $\cos 300 = \cos 60$

4) A pilot heads a plane due west from Memphis, Tennessee, toward Albuquerque, New Mexico. The cities are 1000 miles apart, and the pilot sets the plane's controls to fly at 250 miles per hour. However there is a constant 20 mile per hour wind blowing from the north. Where does the plane end up after 4 hours?

a) Draw a right triangle to represent this problem.

b) Write the parametric equation for the plane's motion. (Horizontal) $x = 250t$

c) Write the parametric equation for the wind. (vertical displacement) $y = 20t$

d) Where does the plane end up after 4 hours

e) What was his bearing?

5) What angle and bearing to the nearest hundredth of a degree should the pilot in the previous problem set so that the plane actually lands in Albuquerque?

6) A pilot wants to fly from Toledo, Ohio, to Chicago, Illinois, which lies 280 miles directly west. Her plane can fly at 120 miles per hour. She ignores the wind and heads directly west. However, there is 25 miles per hour wind blowing from the south.

a) Write the equation that describes the effect of the wind.

b) Write the equation that describes the plane's contribution to the motion.

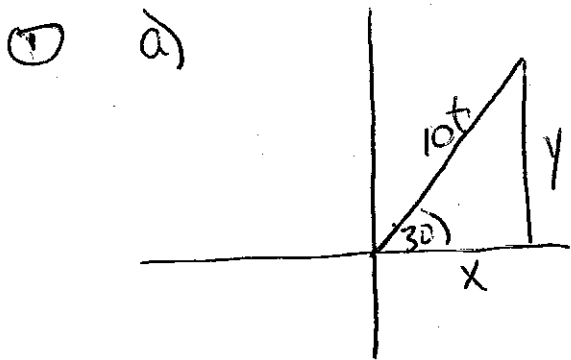
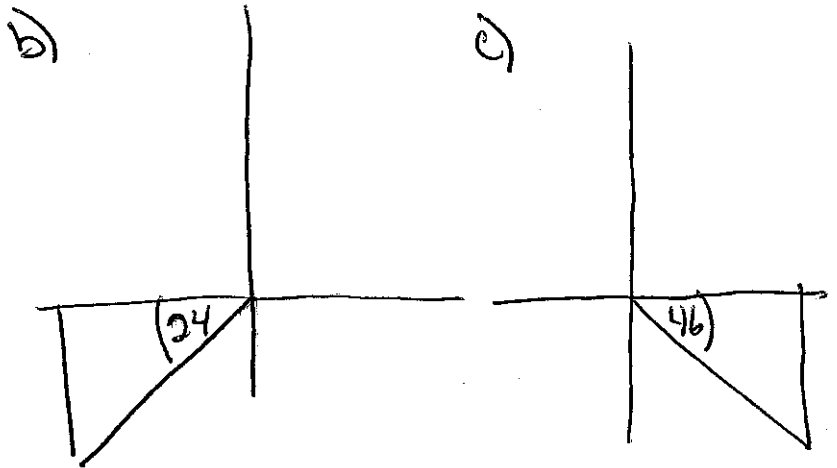
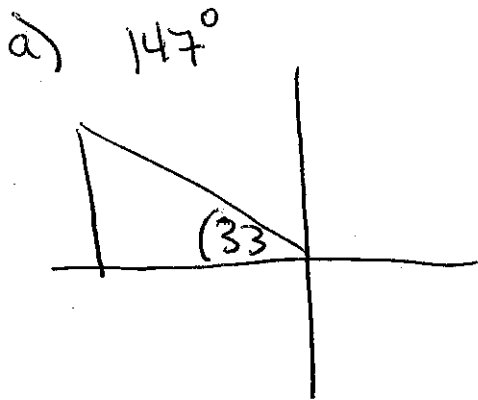
c) Draw the right triangle with these parametric equations.

d) How far off course is the plane after traveling 280 miles west?

e) How far has the plane actually traveled?

f) What was the plane's ground speed?

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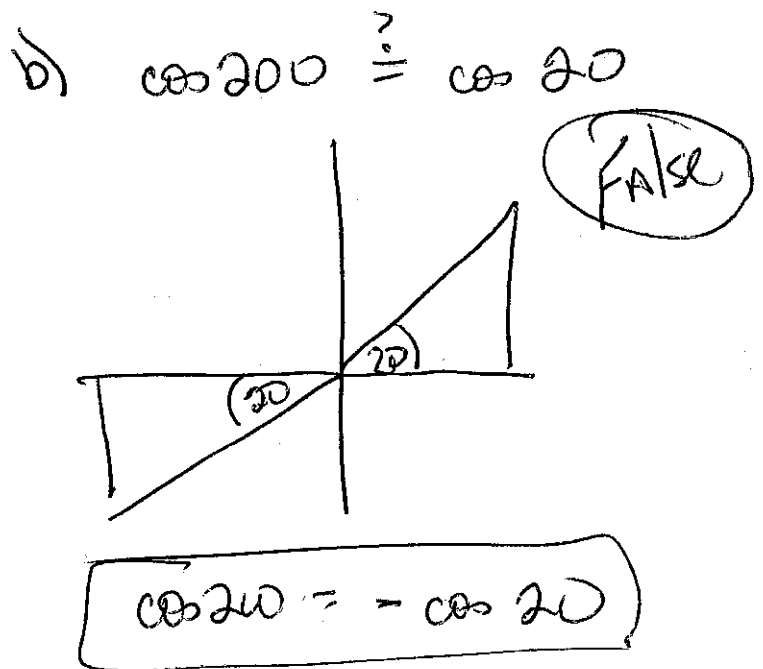
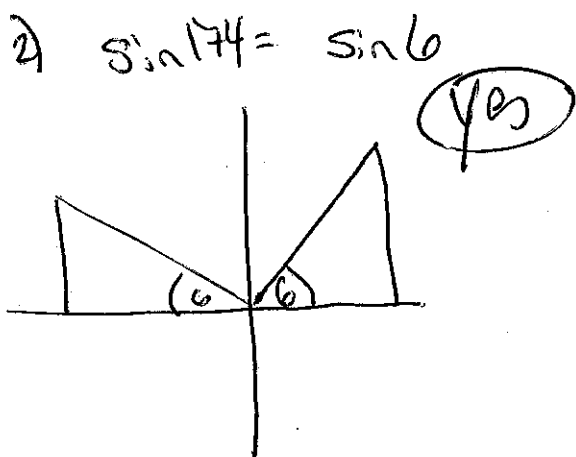


b) $\cos 30 = \frac{x}{10t}$

$x = 10t \cdot \cos 30$

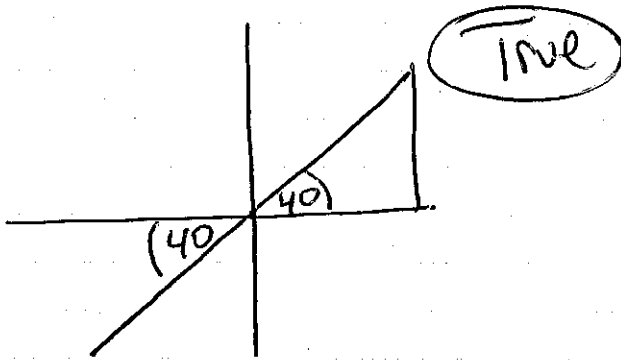
c)

$y = 10t \cdot \sin 30$

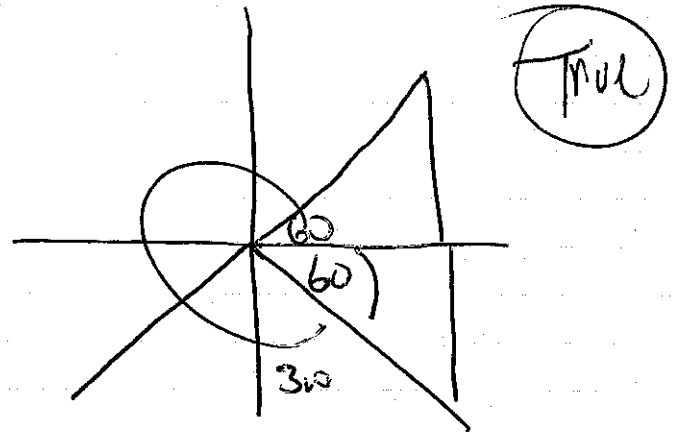


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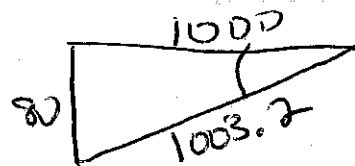
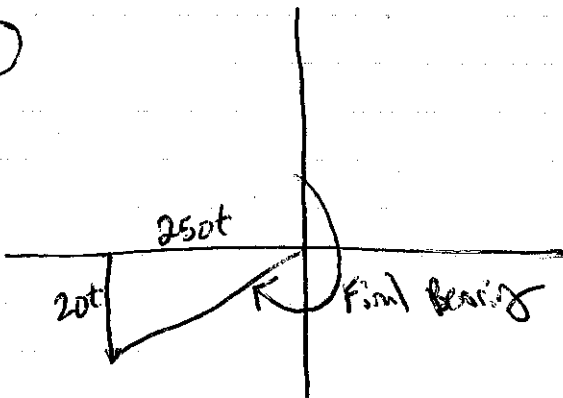
③ $\tan 220 = \tan 40$



b) $\cos 30 = \cos 60$



④



$$\frac{\sqrt{1000^2 + 80^2}}{1003.2}$$

He went 1003.2 miles

$$\tan^{-1}\left(\frac{80}{1000}\right) 4.57^\circ$$

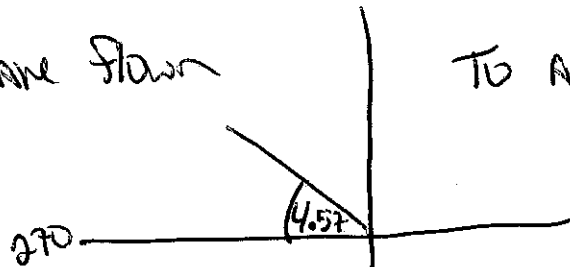
Bearing $180 + (90 - 4.57)$

265.43°

⑤

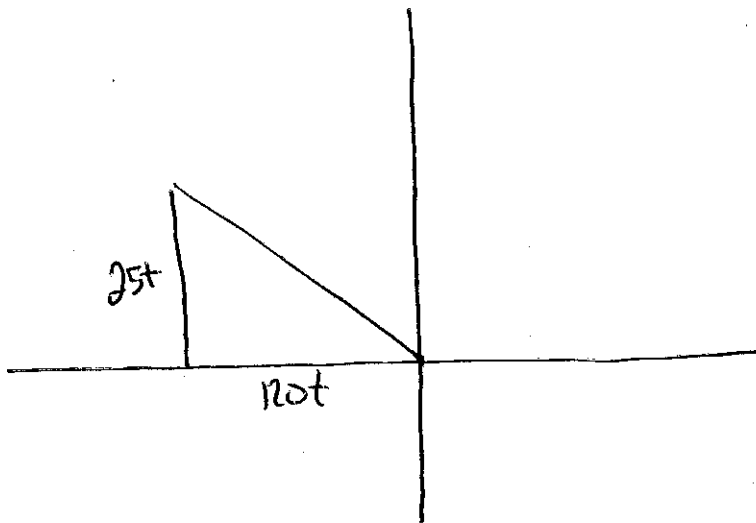
pilot should have flown

To adjust for wind



274.57 Bearing to land in Albuquerque

6

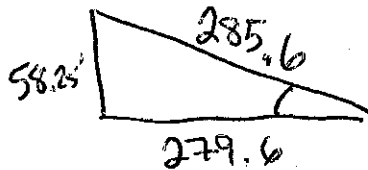


a) $y = 25t$

b) $x = 120t$

c) See above

d)



$\tan^{-1}\left(\frac{58.25}{279.6}\right) = 11.77^\circ \text{ off course}$

$\frac{280}{120} = 2.33 \text{ hours}$

e) 285.6

f) $D = r t$

$285.6 = 2.33 r$

$r = 122.57 \text{ m/h}$