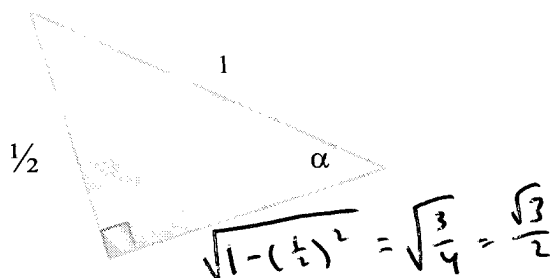


1) (8 points) For the right triangle below, find the exact value of the six trigonometric functions for the angle α . Simplify as needed:



$$\sin \alpha = \frac{1}{2} \quad \csc \alpha = 2$$

$$\cos \alpha = \frac{\sqrt{3}}{2} \quad \sec \alpha = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$\tan \alpha = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} \quad \cot \alpha = \sqrt{3}$$

2) (2 points) What is the measurement of the angle α from number 1? I

3) (1 point each) Fill in the blank:

a) The sine function is the like to cosine but the big of cosecant.

b) The cosine function is the hamburger to sine but the and of secant.

c) The tangent function is the I and the cannot of cotangent.

4) (1 point) If $\sin p = 0.2367$ where p is acute, then the value of $\cos(90^\circ - p)$ is like.

5) (3 points each) Given that $\cos \theta = 0.2935$, find the value of θ rounded to two decimal places if...

a) θ is in Quadrant I

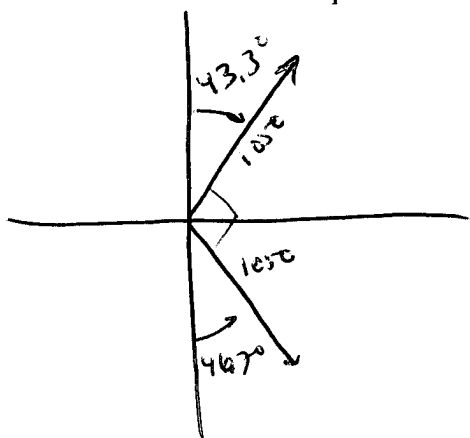
$$\boxed{72.93^\circ}$$

$\cos^{-1} 0.2935$

b) θ is in Quadrant IV

$$360 - 72.93^\circ = \boxed{287.07^\circ}$$

6) (6 points) Two planes leave an airport going in different directions. The first plane travels at 350 miles per hour at a bearing of $N43.3^\circ E$. The second plane travels at 350 miles per hour at a bearing of $S46.7^\circ E$. How far apart are the planes after 3 hours? Draw a picture and round answer to 2 decimal places:

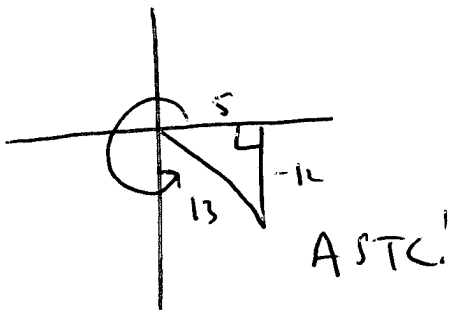


$$\sqrt{1050^2 + 1050^2}$$

$$= 1050\sqrt{2} = \boxed{1484.92 \text{ mi}}$$

29

7) (6 points) For the angle θ in Quadrant IV where $\cos \theta = \frac{5}{13}$, find the 5 other trig functions:



$$\sin \alpha = -\frac{12}{13} \quad \csc \alpha = -\frac{13}{12}$$

$$\cos \alpha = \frac{5}{13} \quad \sec \alpha = \frac{13}{5}$$

$$\tan \alpha = -\frac{12}{5} \quad \cot \alpha = -\frac{5}{12}$$

8) (3 points each) Convert as directed. Round **only** part a to 4 decimal places:

a) $7^{\circ}35'20''$ to Degrees

b) $\frac{7\pi}{6}$ to Degrees

c) 18° to Radians

$$7^{\circ} + \frac{35^{\circ}}{60} + \frac{20''}{3600}$$

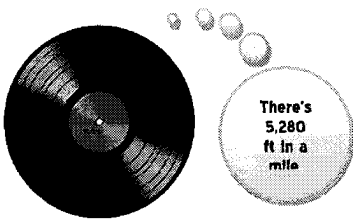
$$\approx 7.5889$$

$$\frac{7\pi}{6} \cdot \frac{180^{\circ}}{\pi}$$

$$\approx 210^{\circ}$$

$$18^{\circ} \cdot \frac{\pi}{180^{\circ}} = \frac{\pi}{10}$$

9) (8 points) A 12-inch diameter LP makes $33\frac{1}{3}$ revolutions per minute. Determine the linear speed of a point on the tip of the record in miles per hour. Round to two decimal places:



$$v = r \cdot \omega$$

$$r = \frac{6 \text{ in}}{1 \text{ rev}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} = \frac{1 \text{ mi}}{10560 \text{ rev}}$$

$$\omega = \frac{33\frac{1}{3} \text{ rev}}{1 \text{ min}} \cdot \frac{2\pi \text{ rad}}{1 \text{ rev}} = \frac{60 \text{ min}}{1 \text{ hr}} = \frac{4000\pi \text{ rad}}{1 \text{ hr}}$$

$$v = \frac{1 \text{ mi}}{10560 \text{ rev}} \cdot \frac{4000\pi \text{ rad}}{1 \text{ hr}} \approx 1.19 \text{ mph}$$

10) (1 points each) Fill in the blank with the words "even" or "odd" to describe the type of function and then the correct values for the period:

	Type of Function	Period
Sine	Yuna	Tidur
Cosine	Lightning	Anca
Tangent	Lulu	Chocolo

	Type of Function	Period
Cosecant	Aerit	Cluel
Secant	Balthier	Fran
Cotangent	Mogk	WAKKA

35

11) (2 points) Concerning the graph of $\cot \theta = \frac{\cos \theta}{\sin \theta}$, when $\sin \theta = 0$, the graph of $\cot \theta$ had Shoes and when $\cos \theta = 0$, the graph of $\cot \theta$ had hips.

12) (3 points each) Given the point $\left(\frac{\pi}{4}, \frac{\sqrt{2}}{2}\right)$ on the graph of $y = \cos \theta$, find the **exact value** of the coordinates of the point under the transformation below:

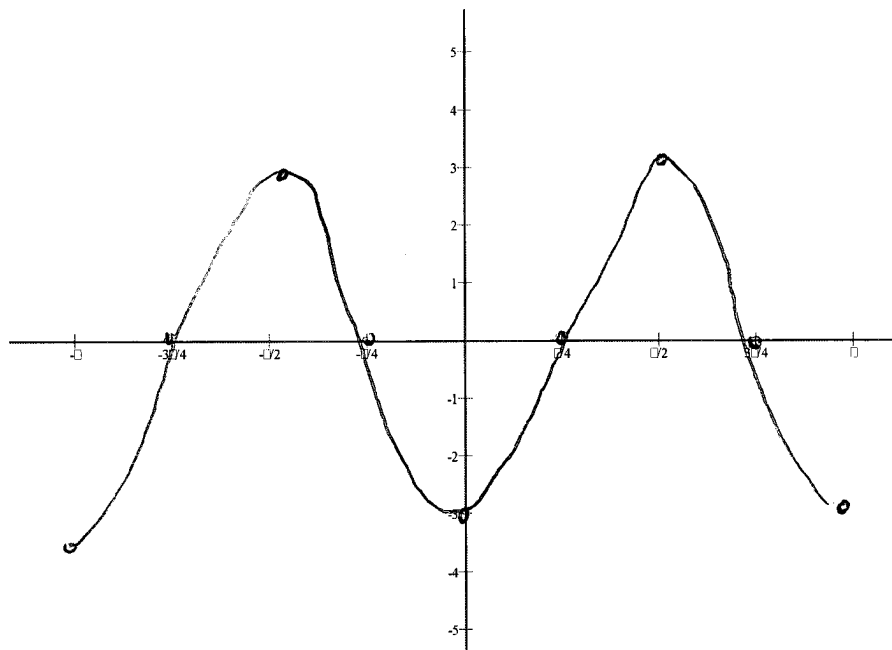
- a) $y = -2 \cos \theta$ b) $y = \cos\left(\theta - \frac{\pi}{4}\right)$ c) $y = \cos(3\theta)$ d) $y = \cos \theta + 3$
- $\left(\frac{\pi}{4}, -\sqrt{2}\right)$ $\left(\frac{\pi}{2}, \frac{\sqrt{2}}{2}\right)$ $\left(\frac{\pi}{12}, \frac{\sqrt{2}}{2}\right)$ $\left(\frac{\pi}{4}, \frac{\sqrt{2}}{2} + 3\right)$
 $\hookrightarrow \text{or } \frac{\sqrt{2}+6}{2}$

13) For the function $y = 3 \sin\left(2\theta - \frac{\pi}{2}\right) = 3 \sin(2(\theta - \pi/4))$

a) (3 points) Write the steps needed to graph the transformation:

- 1) Horizontally compress by a factor of 2
- 2) shift $\pi/4$ to the right
- 3) Vertically stretch by 3

b) (9 points) Sketch a graph of the function below. Fill in the whole axis from $[-\pi, \pi]$:



\leftarrow Gr. π
 no print.
 Angles $\pi/4$!

c) (2 points each) Determine the following:

- i) Domain ii) Range iii) Amplitude iv) Phase Shift v) Period

\mathbb{R}

$[-3, 3]$

3

$\pi/4$ right

$\frac{2\pi}{2} = \boxed{\pi}$

\leftarrow 3/4