

Pre-Calc  
4.1-4.4 Test Review

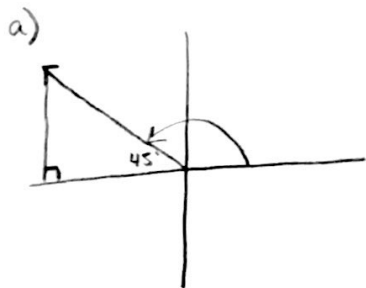
Name Key  
Date \_\_\_\_\_ Period \_\_\_\_\_

Full Block REVIEW (PRINT ANSWERS)

For each problem, answer the following:

- Draw the angle.
- Identify the quadrant.
- Identify the reference angle.
- Identify the coordinate point on the unit circle that corresponds with the given value.
- Evaluate the six trigonometric functions of the given value.

1.)  $\theta = \frac{11\pi}{4} = \frac{3\pi}{4}$



b) II

c)  $45^\circ$

d)  $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

e)  $\sin \theta = \frac{\sqrt{2}}{2}$   
 $\cos \theta = -\frac{\sqrt{2}}{2}$

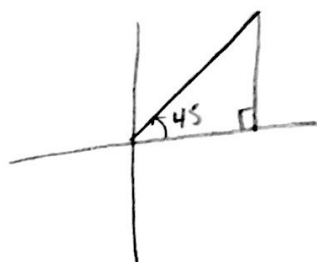
$\tan \theta = -1$

$\csc \theta = \frac{2}{\sqrt{2}} \frac{\sqrt{2}}{\sqrt{2}} = \sqrt{2}$

$\sec \theta = -\sqrt{2}$

$\cot \theta = -1$

2.)  $\theta = \frac{-23\pi}{4} = \frac{\pi}{4}$



b) I

c)  $45^\circ$

d)  $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

e)  $\sin \theta = \frac{\sqrt{2}}{2}$

$\cos \theta = \frac{\sqrt{2}}{2}$

$\tan \theta = 1$

$\csc \theta = \sqrt{2}$

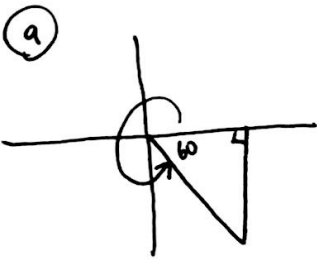
$\sec \theta = \sqrt{2}$

$\cot \theta = 1$

For each problem, answer the following:

- Draw the angle.
- Identify the quadrant.
- Identify the reference angle.
- Identify the coordinate point on the unit circle that corresponds with the given value.
- Evaluate the six trigonometric functions of the given value.

3.)  $300^\circ$



(b) IV

(c)  $60^\circ$

(d)  $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$

(e)  $\sin \theta = -\frac{\sqrt{3}}{2}$

$$\cos \theta = \frac{1}{2}$$

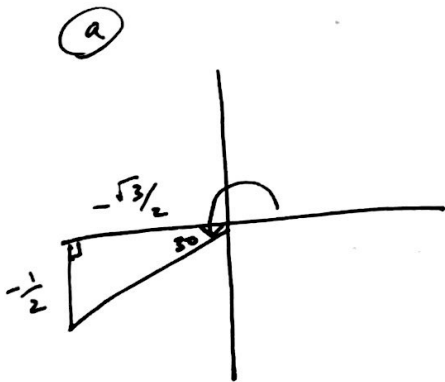
$$\tan \theta = \frac{-\sqrt{3}}{2} \cdot \frac{2}{1} = -\sqrt{3}$$

$$\sec \theta = 2$$

$$\csc \theta = \frac{2}{-\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

$$\cot \theta = \frac{1}{-\sqrt{3}} \cdot \frac{2}{2} = -\frac{\sqrt{3}}{3}$$

4.)  $\theta = \frac{7\pi}{6}$



(b) III

(c)  $30^\circ, \frac{\pi}{6}$

(d)  $(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$

(e)  $\sin \theta = -\frac{1}{2}$

$$\cos \theta = -\frac{\sqrt{3}}{2}$$

$$\tan \theta = \frac{-1}{2} \cdot \frac{2}{-\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\csc \theta = -2$$

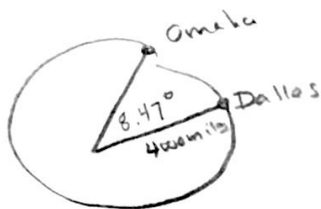
$$\sec \theta = \frac{2}{-\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

$$\cot \theta = \frac{\sqrt{3}}{2} \cdot \frac{-2}{-2} = +\sqrt{3}$$

~~cot theta~~

Use the formulas for linear and angular speeds to answer the following questions.

- 5.) Find the distance between Dallas, Texas (latitude:  $32^{\circ} 47' 39'' N$ ) and Omaha, Nebraska (latitude:  $41^{\circ} 15' 50'' N$ ). Assume that Earth is a sphere of radius 4000 miles and that the cities are the same longitude (one city is due north of the other).



Dallas  
 $32.79^{\circ}$

Omaha  
41.26

$$8.47 \left| \frac{\pi}{180} \right| = .1478$$

$$s = r\theta = .1478(4000)$$

$$s = 591.3 \text{ miles}$$

- 6.) What is the difference in latitudes assuming the radius of Earth is 4000 miles and Seattle, Washington is 686.2 miles due north of San Francisco, California?



$$\frac{s}{r} = \theta = \frac{686.2}{4000} = .17155 = \theta$$

$$.17155 \left| \frac{180}{\pi} \right| = 9.83^{\circ}$$

- 7.) A truck is moving at a rate of 90 kilometers per hour, and the diameter of its wheels is 1 meter. Find the angular speed of the wheels in radians per minute.

$$\frac{90 \text{ km}}{\text{hr}} \left| \frac{\text{hr}}{60 \text{ min}} \right| = 1.5 \text{ km/min}$$

$$\hookrightarrow 1500 \text{ m/min}$$

$$\omega = \frac{\theta}{t} = 477.5 \frac{(2\pi) \text{ rad}}{\text{min}}$$

$$= 3000 \text{ rad/min}$$

$$s = r\theta = \frac{1}{2}(2\pi) = \pi \quad \frac{1500}{\pi} = 477.5 \text{ revolutions/min}$$

Use a calculator to evaluate the trigonometric functions. Round your answers to four decimal places.

8.)  $\tan 33^{\circ}$

$$.6494$$

9.)  $\csc 11^{\circ}$

$$5.2408$$

10.)  $\sec \frac{12\pi}{4}$

$$-1$$

11.)  $\sin -\frac{\pi}{9}$

$$-.3420$$

The point is on the terminal side of an angle  $\theta$  in standard position. Determine the exact values of the six trigonometric functions of the angle  $\theta$ .

12.)  $(3, -4)$

$$\sin \theta = \frac{-4}{5}$$

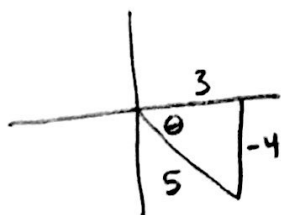
$$\csc \theta = \frac{5}{-4}$$

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

$$\sec \theta = \frac{5}{3}$$

$$\tan \theta = \frac{-4}{3}$$

$$\cot \theta = \frac{3}{-4}$$



sin	All
tan	cos

Identify the quadrant in which  $\theta$  lies.

13.)  $\tan \theta > 0$  and  $\cos < 0$  III

14.)  $\csc \theta > 0$  and  $\tan < 0$  II

15.)  $\sec \theta > 0$  and  $\tan > 0$  I

16.)  $\sec \theta < 0$  and  $\tan > 0$  III

Evaluate the trigonometric function of the quadrant angle.

17.)  $\sin \pi$

$0$

18.)  $\csc \frac{3\pi}{2}$

$-1$

19.)  $\cot \frac{\pi}{2}$

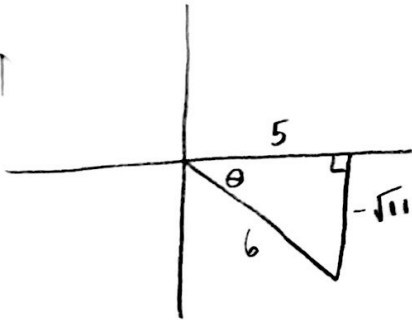
$0$

20.)  $\cos \pi$

$-1$

Find the values of the six trigonometric functions of  $\theta$  satisfying the given conditions.

21.)  $\sec \theta = \frac{6}{5}$  and  $\tan \theta < 0$



$\sin \theta = -\frac{\sqrt{11}}{6}$

$\cos \theta = \frac{5}{6}$

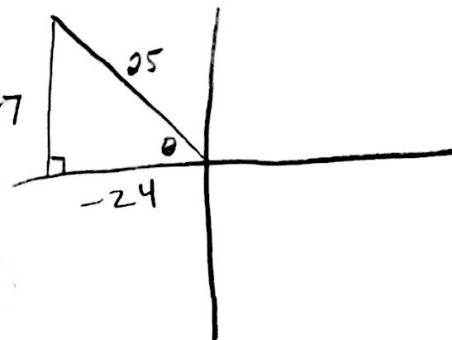
$\tan \theta = \frac{\frac{\sqrt{11}}{6}}{\frac{5}{6}} = -\frac{\sqrt{11}}{5}$

$\csc \theta = \frac{6}{-\sqrt{11}} = -\frac{6\sqrt{11}}{11}$

$\sec \theta = \frac{6}{5}$

$\cot \theta = \frac{5}{-\sqrt{11}} = -\frac{5\sqrt{11}}{11}$

22.)  $\tan \theta = -\frac{7}{24}$  and  $\sin \theta > 0$



$\sin \theta = \frac{7}{25}$

$\cos \theta = -\frac{24}{25}$

$\tan \theta = -\frac{7}{24}$

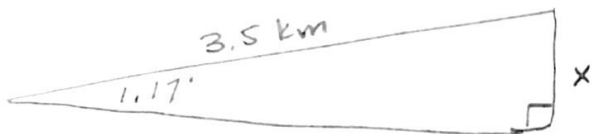
$\csc \theta = \frac{25}{7}$

$\sec \theta = -\frac{25}{24}$

$\cot \theta = -\frac{24}{7}$

Answer the following.

23.) A train travels 3.5 kilometers on a straight track with a grade of  $1^{\circ} 10'$ . What is the vertical rise of the train in that distance?

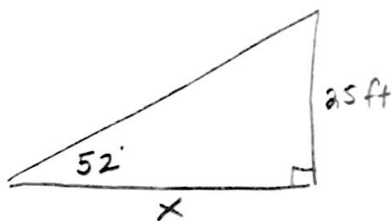


$$\sin 1.17 = \frac{x}{3.5}$$

$$x = .071 \text{ km}$$

$$x \approx 71 \text{ meters}$$

24.) A guy wire runs from the ground to the top of a 25-foot pole. The angle formed between the wire and the ground is 52 degrees. How far from the base of the pole is the wire attached to the ground?



$$\tan 52 = \frac{25}{x}$$

$$x = 19.5 \text{ ft}$$

25.) From a point 100 feet in front of the public library, the angle of elevation to the roof of the library is  $28^{\circ}$ . There is a flagpole mounted on the front of the library's roof. The angle of elevation to the top of the flagpole is  $39^{\circ} 45'$ . What is the height of the flagpole?

$$\tan 39.75 = \frac{x}{100}$$

$$83.2 - 53.2$$

$$= 30 \text{ feet}$$

$$x = 83.2 \text{ feet}$$

$$\tan 28 = \frac{x}{100}$$

$$x = 53.2 \text{ feet}$$

