Turn in Test #1 Practice Problems

1. Find the exact value of the following.

   a. $\cot\frac{\pi}{3}$

   b. $\sin\frac{\pi}{4}$

   c. $\csc\frac{\pi}{2}$

   d. $\cos 30°$

   e. $\sec 60°$

2. Find the exact value of the following.

   a. $\cos 225°$

   b. $\tan(-240°)$

   c. $\sec 540°$

   d. $\sin(-150°)$

   e. $\csc 135°$

3. a. Find the exact value of $\csc\left(-\frac{\pi}{2}\right)$.

   b. Find the exact value of $\cot\frac{5\pi}{4}$.

   c. Find the exact value of $\csc\frac{11\pi}{6}$.

   d. Find the exact value of $\csc\left(-\frac{\pi}{2}\right)\cot\frac{5\pi}{4} - \csc\frac{11\pi}{6}$.

4. Given that $\tan\theta = -\frac{12}{5}$ and θ is in Quadrant IV, find the other 5 trig functions of θ.

   a. $\sin\theta =$

   b. $\cos\theta =$

   c. $\sec\theta =$

   d. $\csc\theta =$

   e. $\cot\theta =$

5. Given that the terminal side of an angle β passes through the point $(-2, 4)$,

   a. Draw a picture depicting the reference triangle with accurately labeled sides.

   b. Find the length of the hypotenuse. (simplify all radicals)

   c. Evaluate $\cot\beta$.

   d. Evaluate $\csc\beta$.

   e. Evaluate $\cos\beta$.

6. Given $\theta = \frac{23\pi}{6}$,

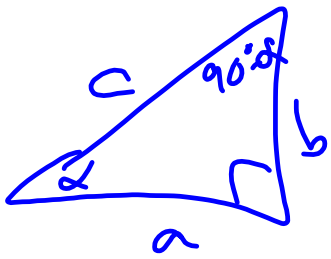
a. Convert θ to degrees.

b. In which quadrant does the terminal side of θ lie?

c. What is the degree measure of its reference angle?

d. Draw a picture depicting the reference triangle with accurately labeled sides.

e. Find the exact value of $\cos\theta$.

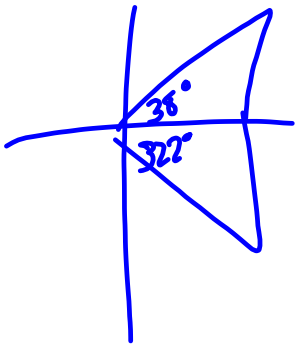


7. Write the following in terms of $\sin 38°$ and $\cos 38°$.

a. $\csc 322° = -\csc 38° = \frac{-1}{\sin 38°}$

b. $\tan 52° = \cot(90° - 52°) = \cot 38° = \frac{\cos 38°}{\sin 38°}$

360° − 322° = 38°



8. The angle of depression from the top of a cliff to an object on the ground is 30°. If the object is 250 feet from the base of the cliff, how tall is the cliff? Give an exact answer in feet.

9. A child rides his tricycle at a rate of 20 miles per hour. If the diameter of the front wheel is 8 inches, find the angular speed of the wheel in revolutions per minute. Give an exact answer, in terms of π if necessary.

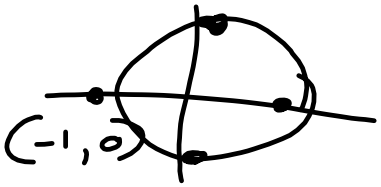
$v = 20\ mi/h$; $r = 4\ in$; $\omega = ?\ rev/min$

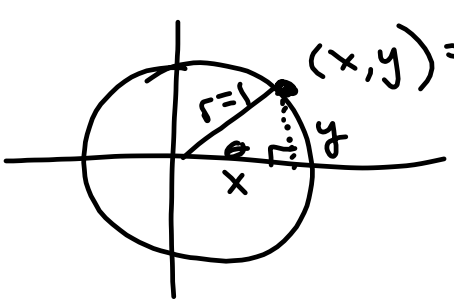
$\frac{v}{r} = \frac{r\omega}{r}$ $\omega = \frac{v}{1} \cdot \frac{1}{r}$

$\omega = \frac{20\ mi}{h} \cdot \frac{1}{4\ in} \cdot \frac{1\ h}{60\ min} \cdot \frac{12\ in}{1\ ft} \cdot \frac{5280\ ft}{1\ mi} \cdot \frac{1\ rev}{2\pi}$

$= \frac{2640}{\pi}\ rev/min$

$\csc(-9\pi) = \boxed{\text{undefined}}$





$f(x)$ is even if $f(-x) = f(x)$

odd if $f(-x) = -f(x)$

$$f(x) = \sin x - \frac{\cos x}{x}$$

$$f(-x) = \sin(-x) - \frac{\cos(-x)}{-x}$$

$$= -\sin x + \frac{\cos x}{+x} = -1\left(\sin x - \frac{\cos x}{x}\right)$$

$$= -f(x)$$

$\Rightarrow$ f is odd

$$f(x) = \sin x + \cos x$$

$$f(-x) = \sin(-x) + \cos(-x)$$

$$= -\sin x + \cos x$$

10. Find the exact measure in inches of the radius of a circle with a central angle of 72° that subtends an arc of length 8 feet.

$r = ?$ in, $\theta = 72°$, $s = 8$ ft $\qquad s = r\theta$

$$r = \frac{s}{\theta} = \frac{8 \text{ ft}}{72^\circ} \cdot \frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{30}{\pi} = \frac{240}{\pi} \text{ in}$$

9. A wheel with a 24 inch diameter rotates at a rate of 5 revolutions per minute. What is the linear speed of a point on its rim in feet per second?

$r = 12$ in, $\omega = 5$ rev/min, $V = ?$ ft/s

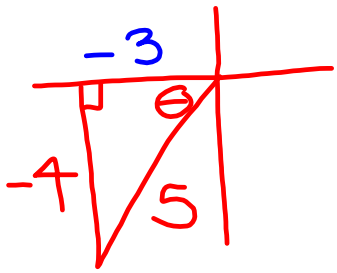
$$V = r\omega = 12 \text{ in} \cdot \frac{5 \text{ rev}}{\text{min}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ min}}{60 \text{ s}} \cdot \frac{2\pi}{1 \text{ rev}} =$$

$$= \frac{\pi}{6} \text{ ft/s}$$

Given that $\csc\theta = -\frac{5}{4}$ and θ is in quadrant III, evaluate

15. $\sin\theta$ $-4/5$

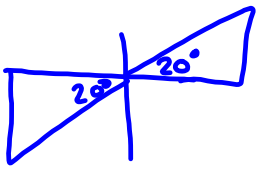
16. $\tan\theta$ $4/3$



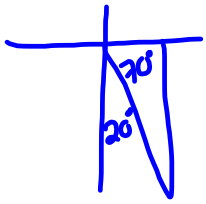
Write in terms of $\sin 20°$ and/or $\cos 20°$.

19. $\csc 20°$ $\frac{1}{\sin 20°}$

20. $\sin 70°$ $\cos 20°$



21. $\cos 200° = -\cos 20°$



22. $\sec 290° = \sec 70°$

$= \csc 20°$

$= \frac{1}{\sin 20°}$

24. A motorcyclist dangerously rides his bike at a rate of 120 miles per hour. If the diameter of the front wheel is 24 inches, find the angular speed of the wheel in revolutions per minute.

$V = 120\ mi/h$, $r = 12\ in$, $\omega = ?\ rev/min$

$\frac{V}{r} = \frac{r\omega}{r}$ $\omega = \frac{V}{1} \cdot \frac{1}{r}$

$$\omega = \frac{120\ mi}{h} \cdot \frac{1}{12\ in} \cdot \frac{5280\ ft}{1\ mi} \cdot \frac{12\ in}{1\ ft} \cdot \frac{1\ h}{60\ min} \cdot \frac{1\ rev}{2\pi}$$

$$= \frac{5280}{\pi}\ rev/min$$

Homework for Test #1:

HW #1 - Submitted 8/15:

- 5.1 #1, 2, 7-18 all, 31-48 all, 55-74 all
- 4 angular speed problems on handout

HW #2 - Submitted 8/22:

- 5.2 #1-75odd
- 5.3 #1-35odd; 37-48all; 61-68all
- 5.4 #1-22 all;
- 5.4 #33-67odd; 71-97odd

Submitted Monday 8/25:

- Test #1 Practice Problems (handout)

Test #1 - Wednesday, 8/27