

Chapter 4 Review

Name Key

Determine the quadrant of the terminal side of the angle in standard position. Convert degree measures to radians and radian measures to degrees.

1. $\frac{5\pi}{2} = 450^\circ$

2. $-135^\circ = -\frac{3\pi}{4}$

3. $78^\circ = \frac{13\pi}{30}$

4. $\frac{\pi}{12} = 15^\circ$



Q I

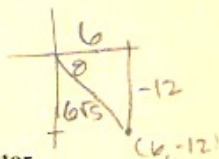
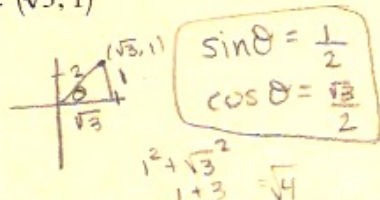
Q I

The point is on the terminal side of an angle, θ , in standard position. Evaluate $\sin \theta$ and $\cos \theta$.

5. $(\sqrt{3}, 1)$

6. $(6, -12)$

$\sin \theta = \frac{-12}{6\sqrt{5}} = -\frac{2}{\sqrt{5}}$ $\cos \theta = \frac{6}{6\sqrt{5}} = \frac{1}{\sqrt{5}}$



$6^2 + 12^2 = r^2 \Rightarrow 36 + 144 = 180 = r^2$
 $\sqrt{180} = \sqrt{36 \cdot 5} = 6\sqrt{5}$

Evaluate the expression exactly without a calculator.

7. $\sin 30^\circ = \frac{1}{2}$

8. $\tan(-135^\circ) = +1$

9. $\sin \frac{5\pi}{6} = +\frac{1}{2}$

10. $\sec\left(-\frac{\pi}{3}\right) = 2$

11. $\csc 270^\circ = -1$

12. $\cot(-90^\circ) = 0$

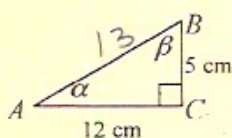
$\cos -\frac{\pi}{3} = +\frac{1}{2}$

$\sin 270^\circ = -1$



Evaluate exactly all six trigonometric functions of the angle. Use reference triangles and not your calculator.

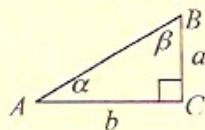
13. Find all six trigonometric functions of α in $\triangle ABC$



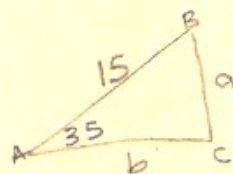
$\sin \alpha = \frac{5}{13}$ $\csc \alpha = \frac{13}{5}$
 $\cos \alpha = \frac{12}{13}$ $\sec \alpha = \frac{13}{12}$
 $\tan \alpha = \frac{5}{12}$ $\cot \alpha = \frac{12}{5}$

Solve the right $\triangle ABC$

14. $\alpha = 35^\circ, c = 15$



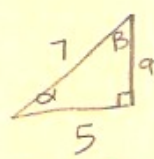
15. $b = 5, c = 7$



$\sin 35 = \frac{a}{15}$ $\cos 35 = \frac{b}{15}$

$a = 8.6$ $b = 12.3$

$\beta = 55^\circ$



$\cos \alpha = \frac{5}{7}$

$\alpha = \cos^{-1}\left(\frac{5}{7}\right) = 44.4^\circ = \alpha$

$a^2 + 5^2 = 7^2$
 $a = \sqrt{24} \approx 4.9$ $2\sqrt{6} = a$

16. Arc Length: Find the length of the arc intercepted by a central angle of $\frac{2\pi}{3}$ rad in a circle with radius 2.

$s = r\theta$

$\frac{2\pi}{3} \times 2 = \frac{4\pi}{3} \approx 4.2$

OR

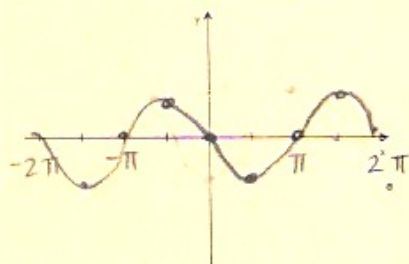
$\frac{2\pi}{3} = 120^\circ$

$C = d\pi$

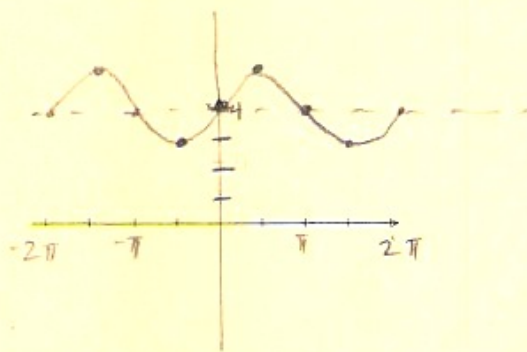
$4\pi \times \frac{120}{360} \approx 4.2$

Use transformations to describe how the graph of the function is related to a basic trigonometric graph. Graph one period.

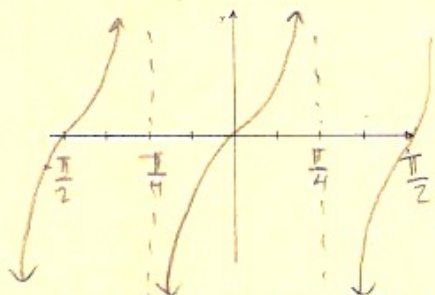
17. $y = \sin(x + \pi)$



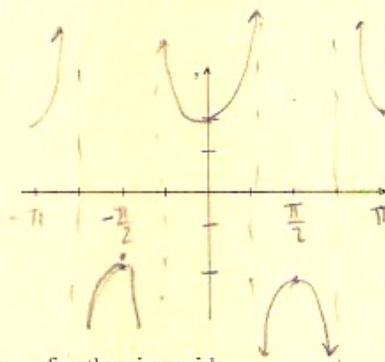
18. $y = -\cos(x + \pi/2) + 4$



19. $y = \tan 2x$



20. $y = -2 \sec \frac{x}{2}$



State the amplitude, period, phase shift, domain, and range for the sinusoid.

21. $f(x) = 2 \sin 3x$

amp = 2 no phase shift
 per = $\frac{2\pi}{3}$ $D = (-\infty, \infty)$
 $R = [-2, 2]$

22. $g(x) = 3 \cos 4x$

amp = 3 $D = (-\infty, \infty)$
 per = $\pi/2$ $R = [-3, 3]$
 no phase shift

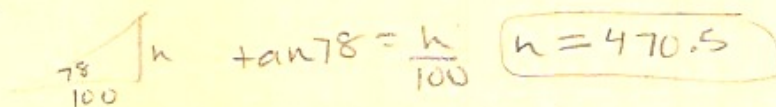
Evaluate the expression without a calculator.

23. $\tan^{-1}(1) = 45^\circ$
 or $\frac{\pi}{4}$

24. $\sin^{-1}\left(-\frac{1}{2}\right) = -30^\circ$
 or $-\frac{\pi}{6}$

25. $\cos^{-1}(0) = \frac{\pi}{2} = 90^\circ$ 26. $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) = 135^\circ$ or $\frac{3\pi}{4}$

27. **Height of Building:** The angle of elevation of the top of a building from a point 100 m away from the building on level ground is 78° . Find the height of the building.



28. **Height of Tree:** A tree casts a shadow 51 ft long when the angle of elevation of the sun (measured with the horizon) is 25° . How tall is the tree?

