Unit 1 Trig Functions – Review

Find two coterminal angles, one positive and one negative for each of the following.

1. 225°

585°, -135°

2. 750°

390°, 30°, -330°

3. -60°

-420°, 300°

4. -π

-3π, π

5. π/4

$\frac{9\pi}{4}$, $-\frac{7\pi}{4}$

6. 5π/6

$\frac{17\pi}{6}$, $-\frac{7\pi}{6}$

II. Evaluate the following trigonometric expressions.

7. sin(225°)

$-\frac{\sqrt{2}}{2}$

8. csc(750°) = csc(30°)

2

9. cot(-60°) = cot(300°)

$\frac{-1}{\sqrt{3}} = \boxed{\frac{-\sqrt{3}}{3}}$

10. tan(π/2)

Und

11. cos(7π/4)

$\frac{\sqrt{2}}{2}$

12. sec(-π/6)

$\frac{2}{\sqrt{3}} = \boxed{\frac{2\sqrt{3}}{3}}$

III. Solve the following trigonometric equations. List answers in both degrees and radians. $0^\circ \le \theta < 360^\circ$ *and* $0 \le \theta < 2\pi$.

13. tan(θ) = 1

θ = 45°, 225°

$\theta = \frac{\pi}{4}, \frac{5\pi}{4}$

14. sin(θ) = $\frac{-1}{2}$

θ = 210°, 330°

$\theta = \frac{7\pi}{6}, \frac{11\pi}{6}$

15. cos(θ) = $\frac{1}{2}$

θ = 60°, 300°

$\theta = \frac{\pi}{3}, \frac{5\pi}{3}$

16. cot(θ) = $-\sqrt{3}$

θ = 150°, 330°

$\theta = \frac{5\pi}{6}, \frac{11\pi}{6}$

17. sec(θ) = $\frac{2\sqrt{3}}{3}$ → $\cos\theta = \frac{3}{2\sqrt{3}} = \frac{\sqrt{3}}{2}$

θ = 30°, 330°

$\theta = \frac{\pi}{6}, \frac{11\pi}{6}$

18. csc(θ) = -2 → $\sin\theta = \frac{-1}{2}$

θ = 210°, 330°

$\theta = \frac{7\pi}{6}, \frac{11\pi}{6}$

IV. Using a calculator, solve for the angle, θ, where $0^\circ \le \theta < 360^\circ$. Round answers to the nearest hundredth.

19. sin θ = 0.3907

θ = 23°

θ = 157°

20. cos θ = -0.3746

θ = 112°

θ = 248°

21. tan θ = 0.3640

θ = 20°

θ = 200°

22. sec θ = 1.0154

$\cos\theta = \frac{1}{1.0154}$

θ = 10°

θ = 350°

23. csc θ = 4.1336

θ = 14°

θ = 166°

24. cot θ = -0.1405

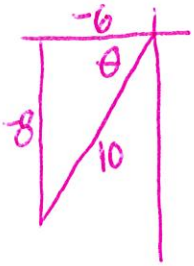
→ $\tan\theta = \frac{1}{-0.1405}$ → θ = -82°

θ = 278°

θ = 98°

V. Solve for all six trig functions of Θ with the given characteristics.

19. An endpoint on the terminal side is (-6, -8).

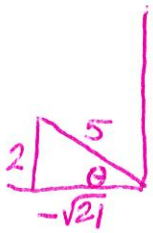


$\sin\theta = \frac{-4}{5}$ $\csc\theta = \frac{-5}{4}$

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

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

20. Θ is in Quadrant II and $\sin\theta = \frac{2}{5}$.



$\sin\theta = \frac{2}{5}$ $\csc\theta = \frac{5}{2}$

$\cos\theta = \frac{-\sqrt{21}}{5}$ $\sec\theta = \frac{-5\sqrt{21}}{21}$

$\tan\theta = \frac{-2\sqrt{21}}{21}$ $\cot\theta = \frac{-\sqrt{21}}{2}$

VI. Free Response Questions.

21. Define a reference angle.

Acute angle that is shortest distance to x-axis.

22. Identify the angles on the unit circle with the same reference angles.

- $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$
- $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$
- $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

23. Identify which trig functions are positive in each quadrant.

Q_1 all Q_2 sine Q_3 tangent Q_4 cosine

24. List the domains and ranges:

	Sine	Cosine	Arcsine	Arccosine	Arctangent
Domain	$\mathbb{R}$	$\mathbb{R}$	$[-1, 1]$	$[-1, 1]$	$\mathbb{R}$
Range	$[-1, 1]$	$[-1, 1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$	$[0, \pi]$	$(-\frac{\pi}{2}, \frac{\pi}{2})$

VII. Simplify the following inverse trig expressions.

25. arcsin1

$\sin\theta = 1$

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

26. arcsin 4

$\sin\theta = 4$

Not possible!

27. $\arccos\frac{\sqrt{2}}{2}$

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

$\theta = \frac{\pi}{4}$

28. $\arccos\left(-\frac{\sqrt{3}}{2}\right)$

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

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

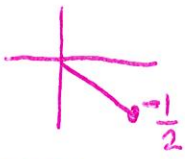
29. $\cos\left[\arccos\left(-\frac{1}{3}\right)\right]$

$\cos\theta = \frac{-1}{3}$

$\cos\theta = \boxed{\frac{-1}{3}}$

30. $\arcsin\left[\sin\frac{7\pi}{6}\right]$

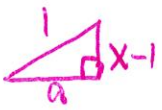
$\frac{-1}{2}$



$\arcsin\frac{-1}{2} = \boxed{\frac{-\pi}{6}}$

31. $\sec\left[\arcsin(x-1)\right]$

$\sin\theta = \frac{x-1}{1} = \frac{o}{h}$



$a^2 + (x-1)^2 = 1$

$a^2 = 1 - x^2 + 2x - 1$

$a = \sqrt{2x - x^2}$

$\sec\theta = \frac{h}{a}$

$= \boxed{\frac{1}{\sqrt{2x-x^2}}} = \boxed{\frac{\sqrt{2x-x^2}}{2x-x^2}}$