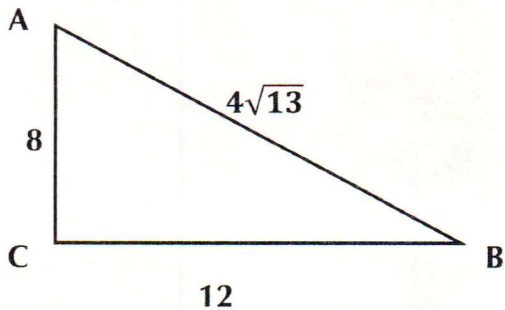


Unit 6 Review – Unit Circle

1. Write a ratio for all six trig functions. Write in exact, fully simplified form. $\angle C = 90^\circ$.



a. $\sin A = \frac{12}{4\sqrt{3}} = \frac{3}{\sqrt{3}} = \sqrt{3}$

b. $\cos A = \frac{8}{4\sqrt{3}} = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

c. $\cot A = \frac{2}{3}$

d. $\csc B = \frac{\sqrt{3}}{3}$

e. $\sec B = \frac{\sqrt{3}}{2}$

f. $\tan B = \frac{12}{8} = \frac{3}{2}$

Using a Unit Circle, find the exact value of the following.

2. $\tan 510^\circ = \tan 150^\circ = -\frac{\sqrt{3}}{3}$

3. $\sec -330^\circ = \sec 30^\circ = \frac{2\sqrt{3}}{3}$

4. $\sin 405^\circ = \sin 45^\circ = \frac{\sqrt{2}}{2}$

5. $\cos -360^\circ = \cos 0^\circ = 1$

6. $\cot 660^\circ = \cot 300^\circ = -\frac{\sqrt{3}}{3}$

7. $\csc 315^\circ = -\sqrt{2}$

8. $\cos \frac{-7\pi}{4} = \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$

9. $\cot \frac{11\pi}{6} = -\frac{\sqrt{3}}{3}$

10. $\csc \frac{4\pi}{3} = -\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$

11. $\tan \frac{5\pi}{6} = -\frac{\sqrt{3}}{3}$

12. $\sin \frac{-3\pi}{4} = \sin \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$

13. $\sec 540^\circ = \sec 180^\circ = -1$

14. $\tan \frac{7\pi}{6} = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

15. $\sec \frac{-\pi}{2} = \sec \frac{3\pi}{2} = \text{undefined}$

Evaluate the given expression, leaving the answer in simple radical form.

16. $\cos 120^\circ + \sin 150^\circ =$
 $\left(-\frac{1}{2}\right) + \left(\frac{1}{2}\right) = \boxed{0}$

17. $\cos 30^\circ \sin 240^\circ =$
 $\left(\frac{\sqrt{3}}{2}\right)\left(-\frac{\sqrt{3}}{2}\right) = \boxed{-\frac{3}{4}}$

18. $\csc 300^\circ \sec 30^\circ =$
 $\left(-\frac{2}{\sqrt{3}}\right)\left(\frac{2}{\sqrt{3}}\right) = \boxed{-\frac{4}{3}}$

19. $\tan^2 45^\circ + \sin 30^\circ =$
 $(1)^2 + \frac{1}{2} = \boxed{\frac{3}{2}}$

20. $12 \sin 120^\circ \cos 210^\circ =$
 $12\left(\frac{\sqrt{3}}{2}\right)\left(-\frac{\sqrt{3}}{2}\right) = \boxed{-9}$

21. $\cos^2 45^\circ + \sin^2 315^\circ + \cos^2 150^\circ + \sin^2 150^\circ =$
 $\left(\frac{\sqrt{2}}{2}\right)^2 + \left(-\frac{\sqrt{2}}{2}\right)^2 + \left(-\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = \frac{1}{2} + \frac{1}{2} + \frac{3}{4} + \frac{1}{4} = \boxed{2}$

22. $\tan 120^\circ \cot 120^\circ + \tan 150^\circ \cot 150^\circ =$
 $(-\sqrt{3})\left(-\frac{\sqrt{3}}{3}\right) + \left(-\frac{\sqrt{3}}{3}\right)(-\sqrt{3}) = 1 + 1 = \boxed{2}$

23. $4 \sin 270^\circ \sin 315^\circ \cos 315^\circ =$
 $4(-1)\left(-\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \boxed{2}$

Determine all values of θ from 0° through 360° for which:

24. $\sin \theta = 0$
 $0^\circ, 180^\circ, 360^\circ$

25. $\csc \theta = -1$
 270°

26. $\tan \theta = \frac{\sqrt{3}}{3}$
 $30^\circ, 210^\circ$

27. $\sec \theta = \text{undefined}$
 $90^\circ, 270^\circ$

Graph the circle given by the following equation.

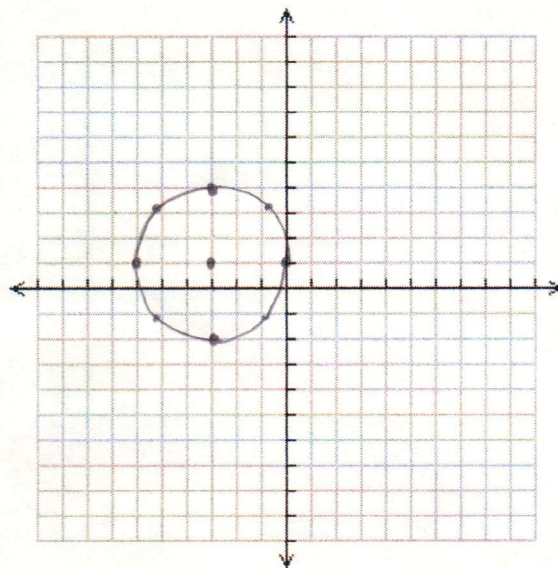
[8 points on circle]

28. $(x + 3)^2 + (y - 1)^2 = 9$

Center: $(-3, 1)$

Radius: 3

$$\frac{\sqrt{2}}{2} \cdot 3 \approx 2.12$$



Identify the center and radius for each.

29. $x^2 + (y + 4)^2 = 20$

Center: $(0, -4)$

Radius: $\sqrt{20} \approx 4.47$

30. $(x - 7)^2 + (y - 12)^2 = 121$

Center: $(7, 12)$

Radius: 11

Write an equation given the center and radius.

31. Center: $(-2, 0)$

Radius: $5\sqrt{3}$

$$(x + 2)^2 + y^2 = 75$$

32. Center: $(5, -8)$

Radius: 7

$$(x - 5)^2 + (y + 8)^2 = 49$$

33. Center: $(1, \sqrt{3})$

Radius: $\frac{2}{5}$

$$(x - 1)^2 + (y - \sqrt{3})^2 = \frac{4}{25}$$

34. Center: $(\frac{1}{4}, 3)$

Radius: 4.7

$$(x - \frac{1}{4})^2 + (y - 3)^2 = 22.09$$