



**CURRICULUM AND INSTRUCTIONAL SERVICES
MATHEMATICS COMMON ASSESSMENT REVIEW
PRECALCULUS—HONORS (352022)**

1. Use a sum or difference identity to find the exact value of $\sin 75^\circ$.
2. Solve $\sin \theta = 1$ for all values of θ .
3. Solve $\cos^2 x - \cos x - 2 = 0$ for $x \in [0^\circ, 360^\circ)$.
4. Verify that $\frac{\tan x \csc x}{\sec x} = 1$ is an identity.
5. If α and β are both second quadrant angles, $\tan \alpha = -\frac{2}{3}$, and $\tan \beta = -\frac{1}{2}$, find $\cos(\alpha + \beta)$.
6. Is $\frac{\sin \theta + \cos \theta}{\sin \theta} - \frac{\cos \theta - \sin \theta}{\cos \theta} = \sec \theta \csc \theta$ an identity?
7. Graph $f(x) = -3 \sin\left(\frac{x}{2} - \frac{\pi}{12}\right)$. List amplitude, period, and phase shift.
8. Graph $f(x) = 2 \cos 3x$. List amplitude, period, and phase shift.
9. Using the Law of Sines, determine the number of solutions and solve.
 $A = 12^\circ, b = 6, a = 4$
Round to two decimal places.

10. Using the Law of Sines, determine the number of solutions and solve.

$$A = 55^\circ, b = 105, a = 120$$

Round to two decimal places.

11. Using the Law of Cosines, solve the triangle and find the area.

$$a = 9, b = 10, c = 13$$

Round to two decimal places.

12. If $\sin \theta = \frac{4}{5}$ and $\theta \in \left(0, \frac{\pi}{2}\right)$, find the exact value of $\sin 2\theta$.

13. Simplify $\sec \theta \left(\frac{\sin \theta}{\tan \theta}\right)$.

14. Find the exact value of $\tan^{-1}\left(\tan \frac{5\pi}{6}\right)$.

15. Find $\cot^{-1}\left(\frac{5}{11}\right)$ to the nearest hundredth.

16. Evaluate $\sin^{-1}(\cos 210^\circ)$

17. Solve $\sin^2 x + \cos x + 1 = 0$ for $x \in [0, 2\pi)$.

18. Solve $\sqrt{3} \sec x - 2 = 0$.

19. Find the values of x for which $\cot x + 1 = 0$ is true.

20. Find the values of $x \in (-\pi, \pi)$ for which $4 \cos^2 x - 1 = 0$ is true.

21. Evaluate $\sin\left(\arctan\frac{3}{4}\right)$.

22. Evaluate $\sec\left(\arcsin\frac{3}{5}\right)$.

23. Identify the amplitude, period, and phase shift for $f(x) = -2\sin(4x + \pi)$.

24. Simplify $\frac{(n-1)!}{(n+2)!}$.

25. Evaluate $\cos^{-1}(\tan 300^\circ)$

26. Expand the binomial $(5x - 3y)^6$.

27. Write the equation of the cosine function with amplitude 5, period 120° , and phase shift 45° .

28. Write an equation of the sine function with amplitude 2, period 225° , and phase shift 20° .

29. Find P_{k+1} if $P_k = 3k - k^2$.

30. State the amplitude, period, and phase shift of $y = 5 \tan\left(2x - \frac{3\pi}{4}\right)$.

31. Find the twelfth term of the sequence $\frac{1}{32}, \frac{1}{8}, \frac{1}{2}, \dots$

32. Use the mathematical induction to prove the formula $1 + \frac{3}{2} + 2 + \frac{5}{2} + \dots + \frac{1}{2}(n+1) = \frac{n}{4}(n+3)$ for every positive integer n .

33. Find n for the sequence for which $a_n = 65$, $a_1 = 5$, and $d = 6$.
34. Evaluate $\lim_{n \rightarrow \infty} \frac{n^2 - 1}{n^3}$, or state that the limit does not exist.
35. Find the fifteenth partial sum of $\frac{2}{3}, \frac{2}{9}, \frac{2}{27} \dots$
36. Find the fiftieth term in the sequence 1, 4, 7, 10 . . .
37. Evaluate $\lim_{x \rightarrow 3} (x^4 - x)$.
38. Evaluate $\lim_{x \rightarrow 0} (x + 1)^3$.
39. Evaluate $\lim_{x \rightarrow 1} \frac{x^2 - 4x + 3}{x^2 - 1}$.
40. Evaluate $\lim_{x \rightarrow -1} f \circ g(x)$ for $f(x) = 2x + 3$ and $g(x) = x - 2$.
41. Evaluate $\lim_{x \rightarrow -1} [f(x)]^2$ for $f(x) = x^2 - 7x$.
42. Find the derivative of $f(x) = 3x^3$.
43. Find the derivative of $f(x) = \sqrt{2x}$.
44. Find the derivative of $f(x) = 3x^2 - 2x + 1$.
45. Find the slope of the function at the given point. $f(x) = 2x^2 + 1$; $(-1, 3)$
46. Write the equation of the tangent line at the given point. $f(x) = -2x^2 + x - 3$; $(1, -4)$

47. Use the limit process to find the area bounded by the function and the x-axis on the given interval. $f(x) = 3x + 2$; $(2, 4)$

48. Use the limit process to find the area bounded by the function and the x-axis on the given interval. $f(x) = 16 - x^2$; $(0, 4)$

49. Determine if the series is divergent or convergent. $\frac{3}{7} + \frac{9}{14} + \frac{27}{28} + \dots$

50. Determine if the series is divergent or convergent. $\frac{1}{3^2} + \frac{1}{5^2} + \frac{1}{7^2} + \dots$

51. Determine if the series is divergent or convergent. $\frac{1}{6} + \frac{2}{7} + \frac{3}{8} + \dots$

52. Use the ratio test to determine if the series is divergent or convergent. $3 + \frac{3^2}{1 \cdot 2} + \frac{3^3}{1 \cdot 2 \cdot 3} + \dots$