

Mixed Review Problems

1. Find all roots of $P(x) = 3x^3 + x^2 + 12x + 4$.

2. Determine $f^{-1}(x)$ for $f(x) = \sqrt{x-3}$.

3. Solve $\log_4(x) = 3$.

4. Express as a single logarithm.

$$3\log_b(\sqrt[3]{x}) - 2\log_b(x)$$

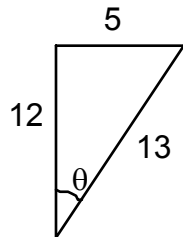
5. Solve $\sqrt{4y+9} - \sqrt{5y-4} = 1$.

6. Solve $\log_3(x+3) + \log_3(x-3) = 4$.

7. Solve $4^{x^2+4x} = \frac{1}{64}$.

8. Simplify $\frac{y - \frac{1}{y}}{y + \frac{1}{y}}$.

9. Find $\sin \theta$, $\cos \theta$, $\tan \theta$, $\csc \theta$, $\sec \theta$, and $\cot \theta$ for the triangle shown.



10. Determine the amplitude and period and sketch the graph of $y = 3\sin(3x)$.

11. Simplify $\cos x \sin x (\csc x + \sec x)$.

12. Simplify $\frac{\tan x \cos^2 x + \tan x \sin^2 x}{\sin x}$.

13. Given $\sin \theta = -\frac{4}{5}$ and $\pi < \theta < \frac{3\pi}{2}$, find $\sin 2\theta$, $\cos 2\theta$, $\tan 2\theta$, and the quadrant in which 2θ lies.

14. Evaluate $\arccos\left(-\frac{1}{2}\right)$.

15. Evaluate $\csc^{-1}\left(\frac{2\sqrt{3}}{3}\right)$.

16. Solve on $[0, 2\pi]$. $2\sin^2 x = 1$

17. Solve on $[0, 2\pi]$. $2\cos^2 x = -3\cos x - 1$

18. Solve on $[0, 2\pi]$. $\cos x = \sin 2x$

19. Evaluate the limit. $\lim_{x \rightarrow \infty} \frac{4x^2 + 5}{3x^2 - 2x}$

20. Evaluate the limit. $\lim_{x \rightarrow \infty} \frac{x^3 + 2x^2 - 5}{x^2 + 4}$