

1. Solve $\frac{x}{x+2} - \frac{1}{x} = \frac{10}{3}$. [10 pts]
2. Solve $10 - |1 - 3x| \geq 3$. Give your solution in interval notation. [10 pts]
3. Let $f(x) = \sqrt{x-2}$ and $g(x) = x^4 + 2$. Find $(f \circ g)(x)$ and $(f \circ f)(x)$. Simplify. [10 pts]
4. Solve $\frac{x-4}{x^2+3x} \geq 0$. Give your solution in interval notation. [10 pts]
5. Evaluate the following:
 - (a) $\log_4\left(\frac{1}{8}\right)$ [5 pts]
 - (b) $9^{\log_3 5}$ [5 pts]
6. Solve the equation $\frac{2}{3-2x} = 5$. [10 pts]
7. Sketch the graph of $g(x) = -2x^2 + 16x - 24$. Give the domain and range. Mark the vertex and all intercepts with their coordinates. [20 pts]
8. Suppose the function $y = |x|$ is shifted right 2, reflected in the y -axis, then shifted down 3. Give the resulting function and sketch the graph. Mark two points with their coordinates. Give the domain and range. [15 pts]
9. Write the function $f(x) = 6 \cos x + 2\sqrt{3} \sin x$ in the form $f(x) = a \cos k(x \pm b)$. [10 pts]
10. Sketch the graph of $f(x) = -\frac{3}{2} \sin\left(\frac{1}{2}x + \frac{\pi}{8}\right)$. Mark the intercepts with their coordinates. Make sure the phase shift and amplitude are clear on your graph. [20 pts]
11. If $\sec t = \frac{3}{2}$ and the TP for t lies in QIV, find $\cos t$, $\sin t$ and $\cos\left(2t - \frac{\pi}{4}\right)$. [15 pts]
12. Suppose a triangle has sides $a = \frac{7}{\sqrt{3}}$, $b = \frac{2}{\sqrt{3}}$ and $c = 5$. Find the angle A . [10 pts]
13. Find all solutions to $3 \sin x = \sin x \tan^2 x$. [15 pts]
14. Sketch the graph of $f(x) = 3e^{x-1} - 4$. Mark both intercepts with their coordinates and the asymptote with its equation. Give the domain and range. [20 pts]
15. Find the length a shown. Make sure your calculations are clear and explained. [15 pts]

