

Show all your work for full credit. Please show your work on this paper. Attach additional work if space does not permit it here.

1. Write the equation of the line perpendicular to $y = \frac{3}{4}x - 21$ and through $(4, -2)$.

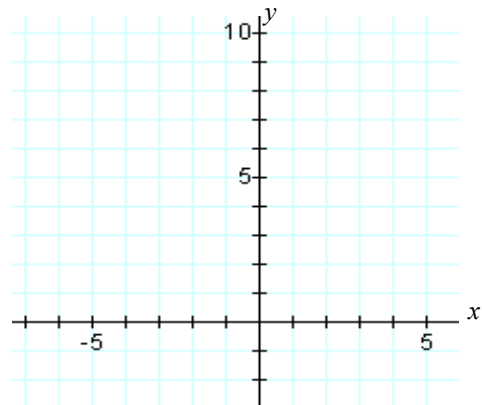
2. Let $f(x) = x^2 - 3x$ and $g(x) = \frac{2}{x+1}$. Find the following and simplify fully:

a. $g(f(x))$

b. $\frac{f(x+h) - f(x)}{h}$

3. Sketch the graph of

$$f(x) = \begin{cases} -1 & x < -4 \\ 2x + 7 & -4 \leq x \leq 1 \\ -x^2 + 10 & x > 1 \end{cases}$$



4. Let $f(x) = 2x^2\sqrt{9-x^2}$

a. Find the domain for f .

b. Find the x -intercepts for f .

5. Given that $f(x) = 3x - 7$, find $f^{-1}(x)$.

6. $\log_3 81 =$

7. $\sin(\pi/3) =$

8. $\sec(3\pi/4) =$

9. If $\theta = \sin^{-1}(5/13)$, find $\cos(\theta)$.

10. Given that $f(x) = x^3$ $g(x) = \ln x$ $h(x) = e^x$ $j(x) = \sin x$ sketch each of the following pairs of functions (1 graph per pair):

a. $f(x)$ and $f(x) - 3$

b. $g(x)$ and $2g(x+3)$

c. $h(x)$ and $-h(2x)$

d. $j(x)$ and $j(2x)+1$

11. Graph and analyze (identify end behavior, asymptotes, roots, and holes) the function

$$f(x) = \frac{(x+4)(x-2)}{x-1}.$$

12. Solve for x:

a. $x^2 - 3x - 10 = 0$

b. $2\sin^2 x - \sin x = 0$ for $0 \leq x < 2\pi$

c. $2 \bullet 3^x - 54 = 0$

d. $\sqrt{\log_3(x-3)} - 2 = 0$

13. Simplify $\frac{\frac{x}{y} + \frac{z}{2}}{\frac{z}{2} + \frac{z}{y}}$
