1. Find the slope of the line through the points \((-10, 1)\) and \((-3, -4)\).

2. Give an equation for a line parallel to \(y = 15x - 2\) through the point \((-1, 2)\).

3. Give an equation for a line perpendicular to \(y = 15x - 2\) through the point \((0, 1)\).

4. Find the domain of \(f(x) = \frac{(2x^7 - 13x^3 + 5)}{\sqrt{1 - 3x}}\)

5. Using \(g(x) = \frac{\sqrt{x}}{1-x^2}\), find \(\frac{g(x+h) - g(x)}{h}\)

6. If \(g(2) = 5,\) \(g(3) = 5,\) \(g(4) = 5,\) is \(g(x)\) a function?

7. Given \(p(x) = x^2 - 4x + 1\) and \(q(x) = \frac{\sqrt{x}}{x^2 - 2}\), find \((q \circ p)(x)\)

8. Find the limit (if it exists) \(\lim_{x \to 5} x^2 - 3x^2 + 9\)

9. Find the limit (if it exists) \(\lim_{x \to -3} \frac{x^3 + 3}{x^2 - 9}\)

10. Sketch a curve where \(\lim_{x \to 2} f(x) = 3,\) \(\lim_{x \to 2^-} f(x) = 1\) and \(f(3) = 2\)

11. Find any vertical asymptotes of \(g(x) = \frac{x^2 - 36}{(x-6)^2}\)

12. Find any horizontal asymptotes of \(g(x) = \frac{x^2 - 4}{2x^2 + 8}\)

13. Determine where the following function is continuous

\[
f(x) = \begin{cases} 
4x + 4 & x < -2 \\
x^3 + 4 & x \geq -2 
\end{cases}
\]

14. Use the limit definition of derivative to find \(\frac{d}{dx} \left[ \frac{1}{1-x} \right]\)

15. Given \(f(x) = 6x^6 + \frac{1}{x^{1/2}} - \cos(x),\) find \(f'(-1)\)

16. Given \(g(t) = (x^5 - 3x^2 + 2x - 5)(x^4 + 20x - 6)\) find \(g'(t)\)

17. Find \(\frac{dy}{dx}\) if \(y = \frac{x^2 - 2x}{\cos(x)}\)

18. If \(f(x) = x^5 - 2x^3 + 10x^2\) then find \(f^{(4)}(x)\)

19. If a ball is thrown off of a cliff on some other planet has a height function of \(h(t) = -3t^2 + 9t + 1000\) meters after \(t\) seconds, then find its velocity and acceleration after 1 second.

20. Find \(f'(x)\) if \(f(x) = \sin^3(2x)\)

21. find \(\frac{dy}{dx}\) given \(2y^3 - 3xy^2 = 7x^2\)

22. As a spherical balloon inflates, its radius increases at a rate of 1 centimeter per second. Find the rate that the volume increases when the balloon has a radius of 6 centimeters. (note volume \(V = \frac{4}{3} \pi r^3\)
23. On which intervals is $f(x) = x^3 - 3x^2$ increasing and decreasing?

24. Find the absolute (global) extrema of $g(x) = -2x^2 - 8x + 4$ on $[-3, 0]$. 