

1. Simplify the difference quotient, $\frac{f(x+h) - f(x)}{h}$, for $f(x) = -3 + 6x + 2x^2$

(a) $6 + 4x + 2h$

(b) $\frac{-3 + 6x + 2x^2 + h}{h}$

(c) $6 + 4x - 4h$

(d) $12 - 2x + 6h$

2. Find the inverse of the function: $f(x) = 8x - 1$

(a) $f^{-1}(x) = \frac{1}{8x-1}$

(b) $f^{-1}(x) = \frac{1}{8}x + \frac{1}{8}$

(c) $f^{-1}(x) = 8x - \frac{1}{8}$

(d) $f^{-1}(x) = -\frac{1}{8}x + 1$

3. Which of the following is not an asymptote of any kind for the function

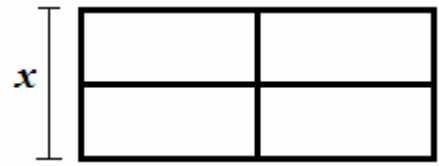
$$f(x) = \frac{2x+1}{x+3}.$$

(a) $y = 0$

(b) $y = 2$

(c) $x = -3$

4. The rectangular region at the right is built using a total of 2100 feet of fencing for the four sides and the dividers in the middle. Determine a function which models the area of the enclosed region shown here as a function of the dimension labeled x .



a) $A = 2100x - 3x^2$

b) $A = 700x - x^2$

c) $A = 2100x - \frac{2}{3}x^2$

d) $A = \frac{3}{2}x - 700x^2$

5. What is the equation of the circle centered at the point $(-3,0)$ and the circle passes through the point $(0,4)$?

a) $x^2 + (y-4)^2 = 16$

b) $(x+3)^2 + (y-4)^2 = 100$

c) $(x-3)^2 + (y+4)^2 = 25$

d) $(x+3)^2 + y^2 = 25$

6. Perform the indicated operation: $\frac{5+2i}{3i}$

(a) $-\frac{2}{3} + \frac{5}{3}i$

(b) $\frac{2}{3} - \frac{5}{3}i$

(c) $-\frac{5}{3} + \frac{2}{3}i$

(d) $\frac{5}{3} - \frac{2}{3}i$

7. Find the domain of this function: $f(x) = \sqrt{5x+15}$.

- (a) All reals except $x = -3$
- (b) All reals less than $x = -3$
- (c) All reals less than or equal to $x = -3$
- (d) All reals greater than or equal to $x = -3$

8. Solve the equation $5\log_4(3x+1) - 21 = 4$

- (a) $x = \frac{5}{2\log_4} - \frac{1}{2}$ (b) $x = 4^{\log_{20} 25}$ (c) $x = 341$ (d) No solution

9. Solve the following inequality for x: $\frac{2x-3}{4-x} \leq 0$

(a) $(-\infty, 1.5] \cup (4, \infty)$

(b) $[1.5, 4)$

(c) $(-\infty, 1.5) \cup [4, \infty)$

(d) $(-\infty, \infty)$

10. Determine the equation of the line through the point $(0, 4)$ which is perpendicular to the line $x - 4y = 0$.

- a) $y = -\frac{1}{4}x + 4$ b) $y = 4x$ c) $y = \frac{1}{4}x + 4$ d) $y = -4x + 4$

11. Solve the equation $4e^{x+3} - 7 = 13$

(a) $x = \frac{e^{20}}{4} - 3$

(b) $x = \ln(5) - 3$

(c) $x = \frac{\ln(5)}{3}$

(d) $x = \frac{e^{20} - e^4}{3}$

12. How long would it take an investment of \$12000 to grow to \$20000 if it was invested at 6.5% interest compounded continuously? Use the formula $A = Pe^{rt}$
- (a) 5.4 years (b) 6.3 years (c) 7.9 years (d) 9.2 years

13. Determine the range of the function $f(x) = -2x^2 + 8x - 10$

a) $[-2, \infty)$

b) $(-\infty, -2]$

c) $(-\infty, 2]$

d) $(-\infty, \infty)$

14. Condense the expression $7\ln a - 4\ln b + 2\ln c - 8\ln d$ into a single logarithm

(a) $\ln(a^7 - b^4 + c^2 - d^8)$

(b) $\ln\left(\frac{a^7 c^2}{b^4 d^8}\right)$

(c) $\frac{7\ln(ac)}{16\ln(bd)}$

(d) $\ln\left(\frac{a^7 + c^2}{b^4 - d^8}\right)$

15. Given that $x = -3$ is one zero for the polynomial equation $x^3 + 7x^2 + 11x - 3 = 0$, find the other zeros.

a) $x = -2 \pm \sqrt{5}$

b) $x = 4 \pm \sqrt{2}$

c) $x = -3 \pm i\sqrt{5}$

d) $x = 5 \pm \sqrt{2}$