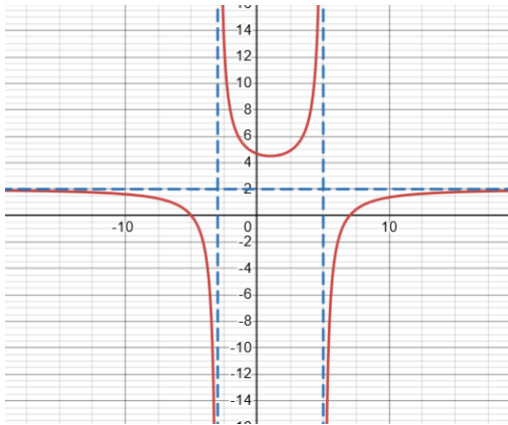


6. For the function $f(x) = \sqrt{x-1} + 3$, find the domain and range of $f^{-1}(x)$.
- a. $D: (3, \infty)$ b. $D: [3, \infty)$ c. $D: [3, \infty)$ d. $D: [1, \infty)$
 $R: (1, \infty)$ $R: [1, \infty)$ $R: (-\infty, \infty)$ $R: [3, \infty)$
7. Determine the y -intercept of the function $g(x) = x^2 - 3x + 9$
- a. $(-9, 0)$ b. $(0, 9)$ c. $(9, 0)$ d. $(0, -9)$
8. You deposit \$7550 in an account that pays 7.25% interest, compounded continuously. How long to the nearest year will it take for the money to triple?
(Hint: $A = Pe^{rt}$)
- a. 3 yrs b. 28 yrs c. 16 yrs d. 41 yrs
9. The antler spread a (in inches) and shoulder height h (in inches) of an adult male American elk are related by the model $h = 116 \log(a + 40) - 176$. Approximate the shoulder height of a male American elk with an antler spread of 55 inches.
- a. 53.4 in b. 58 in c. 1.54 in d. 405.4 in
10. A climber is on a hike. After 3 hours, his altitude is 170 feet. After 7 hours, he is at an altitude of 290 feet. What is his average rate of change during this time?
- a. 115 ft/hr b. 30 ft/hr c. 46 ft/hr d. 12 ft/hr
11. Solve the polynomial equation $2x^3 + 24x^2 + 70x = 0$.
- a. $x = 2, 0, 1$ b. $x = 0, 5, -7$ c. $x = -7, -5, 0$ d. $x = 0, 5, 7$
12. Solve the equation $(x - 1)^{1/5} = -2$.
- a. $x = -32$ b. $x = -31$ c. $x = 33$ d. $x = -33$
13. Find the equation of the line passing through $(3, 2)$ and has a slope of $-\frac{5}{6}$.
- a. $y = -\frac{5}{6}x + \frac{9}{2}$ b. $y = -\frac{5}{6}x - \frac{9}{2}$ c. $y = -\frac{6}{5}x + \frac{9}{2}$ d. $y = -\frac{5}{6}x + \frac{2}{9}$

14. Which of the following rational functions is represented by the graph?



a. $m(x) = \frac{x^2 - 2x - 35}{x^2 - 8x + 15}$

b. $g(x) = \frac{2x^2 - 4x - 70}{x^2 - 2x - 15}$

c. $f(x) = \frac{x^2 - 2x - 35}{x^2 - 2x - 15}$

d. $h(x) = \frac{2x^2 - 4x - 70}{x^2 - 8x + 15}$

15. Find the equation of a line perpendicular to $7x + 8y = 47$.

a. $y = -\frac{8}{7}x - \frac{27}{7}$

b. $y = -\frac{7}{8}x - \frac{33}{8}$

c. $y = -\frac{7}{8}x - \frac{47}{8}$

d. $y = \frac{8}{7}x - \frac{43}{7}$

16. Find the horizontal asymptote: $f(x) = \frac{3x^2 + x}{2x^2 + 1}$

a. 0

b. none

c. $y = \frac{3}{2}$

d. $x = \frac{3}{2}$

17. Which of the following functions has a slant (or oblique) asymptote?

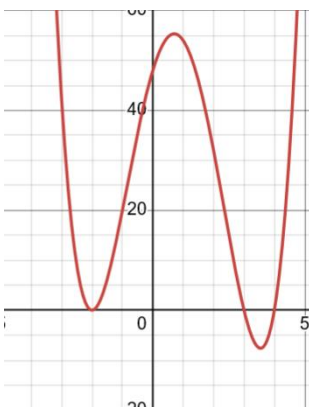
a. $f(x) = \frac{x^4 + x - 1}{x^3 + x}$

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

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

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

18. Select the polynomial function whose graph is shown below.



a. $f(x) = (x - 4)^2(x + 2)(x - 3)^2$

b. $f(x) = (x - 4)(x + 2)(x - 3)$

c. $f(x) = (x - 4)(x + 2)^2(x + 3)$

d. $f(x) = (x - 4)(x + 2)^2(x - 3)$

For problems 19 and 20, use $f(x) = x^3 - x$ and $g(x) = \sqrt[3]{x - 12}$.

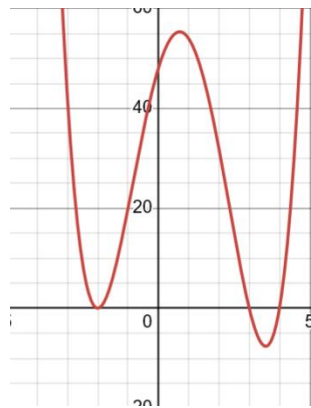
19. $(f - g)(20)$

- a. -7972 b. 7978 c. -8012 d. -7978

20. $(f \circ g)(x)$

- a. $x - 12 - \sqrt{x - 12}$ b. $\sqrt[3]{x^3 - x - 12}$
 c. 0 d. $x - 12 - \sqrt[3]{x - 12}$

21. Determine the number of local maxima/minima (aka. relative max/min) of the graph:



- a. 1 b. 2 c. 3 d. 4

Solve the following equations:

22. $|7m + 4| + 9 = 15$

- a. $\frac{2}{7}, -\frac{10}{7}$ b. $-\frac{2}{7}, \frac{10}{7}$ c. $\frac{2}{7}$ d. *No Solution*

23. $\sqrt{4x - 3} = 2x - 3$

- a. 1, 3 b. 3 c. -3 d. *No Solution*

24. $2x^2 + 6x = -3$

- a. $\frac{-3 \pm \sqrt{3}}{2}$ b. $\frac{-3 \pm \sqrt{3}}{4}$ c. $\frac{-3 \pm \sqrt{15}}{2}$ d. $\frac{-6 \pm \sqrt{3}}{2}$

25. $\frac{x}{2x+2} = \frac{-2x}{4x+4} + \frac{2x-3}{x+1}$

a. $x = \frac{3}{2}$ b. $x = 3$ c. $x = -\frac{12}{5}$ d. $x = -3$

26. $2^{(12-2x)} = 16$

a. $x = 2$ b. $x = 10$ c. $x = -6 + \frac{\log 16}{\log 2}$ d. $x = 4$

27. $\left(\frac{1}{3}\right)^x = 18$

a. $x = \ln \frac{1}{6}$ b. $x = \frac{\ln 18}{\ln 3}$

c. $x = \ln 6$ d. $x = -\frac{\ln 18}{\ln 3}$

28. $\ln 2x + \ln 9x = \ln 19$

a. $x = 1$ b. $x = \left(\frac{19}{18}\right)^{\frac{1}{2}}$

c. $x = 0$ d. $x = \frac{e^{19}}{18}$

29. Identify the vertex of the quadratic equation.

$$f(x) = x^2 + 5x + 2$$

a. $(5, 23)$ b. $(-5, 23)$ c. $\left(-\frac{5}{2}, -\frac{17}{4}\right)$ d. $\left(\frac{5}{2}, -\frac{17}{4}\right)$

30. How can the graph of $f(x) = (x - 2)^2 - 5$ be obtained from its parent function, the graph $y = x^2$?

- a. Shift the graph 2 units left and 5 units down.
- b. Shift the graph 5 units right and 2 units down.
- c. Shift the graph 2 units left and 5 units up.
- d. Shift the graph 2 units right and 5 units down.

31. Write a quadratic function with x-intercepts $(-4, 0)$ & $(2, 0)$ and opens downward.

a. $f(x) = -(x - 4)(x + 2)$ b. $f(x) = (x + 4)(x - 2)$

c. $f(x) = -(x + 4)(x - 2)$ d. $f(x) = (x - 4)(x + 2)$

32. Graph the quadratic function, $f(x) = 2x^2 - 7x + 5$ and determine the interval(s) for which $f(x) \geq 0$.

- a. $(-\infty, 1] \cup [\frac{5}{2}, \infty)$ b. $(1, \frac{5}{2})$
c. $(-\infty, 1) \cup (\frac{5}{2}, \infty)$ d. $[1, \frac{5}{2}]$

33. Given the function $f(x)$, find $f(7)$ and $f(-1)$.

$$f(x) = \begin{cases} \sqrt{x+2} & x \geq 3 \\ x^2 + 3x - 10 & -1 < x < 3 \\ x^5 + 3 & x \leq -1 \end{cases}$$

- a. $f(7) = 3$ b. $f(7) = -3$
 $f(-1) = -12$ $f(-1) = -12$
c. $f(7) = 3$ d. $f(7) = -3$
 $f(-1) = 2$ $f(-1) = 2$

34. Solve the following inequality and write the solution in interval notation:

$$x^2 + 9x + 14 \geq 0$$

- a. $(-\infty, -7] \cup [-2, \infty)$ b. $(-\infty, -7]$
c. $[-2, \infty)$ d. $[-7, -2]$

35. Which symmetry best describes that of an even function?

- a. Symmetric about the y - axis b. Symmetric about the x - axis
c. Symmetric about the origin d. No Symmetry

36. Which of the following represents an odd function?

- a. $x^2 + 3x$ b. $\ln x$ c. $x^3 - 2x$ d. e^x

37. Which of the following equations is **not** a function of y with respect to x .

- a. $2x + 3y = 6$ b. $x^2 - y = 6x - 5$
c. $x^2 + y^2 = 16$ d. $y = 4x^3 - 5x^2 + 3x - 7$

43. Divide the polynomials and state the quotient and the remainder.

$$(2x^5 - x^4 + 3x^2 - x + 5) \div (x - 1)$$

- a. $2x^4 + x^3 + 4x^2 + 3x + \frac{8}{x-1}$ b. $2x^4 + x^3 - x^2 + 2x + 1 + \frac{6}{x-1}$
c. $2x^4 - 3x^3 - x + \frac{6}{x-1}$ d. $2x^4 + x^3 + x^2 + 4x + 3 + \frac{8}{x-1}$

44. Use the rational zero test to find all the possible rational zeros of the function: $f(x) = 2x^3 + 7x^2 - 17x - 10$

- a. $\pm \frac{1}{10}, \pm \frac{1}{5}, \pm \frac{2}{5}, \pm \frac{1}{2}, \pm 1, \pm 2$ b. $\pm \frac{1}{2}, \pm 1, \pm 2, \pm \frac{5}{2}, \pm 5, \pm 10$
c. $\pm 1, \pm 2, \pm 5, \pm 10$ d. $\pm 1, \pm 2$

45. Find $f(x + h) - f(x)$ for the function $f(x) = 5x^2 - 6x + 1$.

- a. $5x^2 - 10xh + 5h^2 - 6x - 6h + 1$ b. $5x^2 - 6x + 1$
c. $5h^2 - 6h + 1$ d. $10xh + 5h^2 - 6h$

46. Write the following equation in exponential form: $\log_7 49 = 2$

- a. $49^2 = 7$ b. $2^7 = 49$ c. $7^2 = 49$ d. $\sqrt{49} = 7$

47. Evaluate the logarithm: $9 \ln \sqrt[3]{e}$

- a. $3 \ln e$ b. 1 c. 27 d. 3

48. Expand the logarithmic expression: $\log_b \frac{m^5 p^3}{n^2 b^7}$

- a. $5 \log_b m + 3 \log_b p - 5 \log_b n - 7$
b. $5 \log_b m + 3 \log_b p - 5 \log_b n + 7$
c. $5 \log_b m + 3 \log_b p - 5 \log_b n - \log_b b^7$
d. $m^5 p^3 - n^2 b^7$

49. Condense the logarithmic expression to a single quantity:

$$2 \ln(x - 4) - \frac{1}{3} \ln x^2$$

- a. $\ln(\sqrt[3]{x^2}(x^2 - 8x + 16))$ b. $\ln\left(\frac{x^2 - 8x + 16}{\sqrt[3]{x^2}}\right)$
- c. $\ln\left(\frac{x^2 - 8x + 16}{\sqrt[2]{x^3}}\right)$ d. $-\ln\left(\frac{2x - 8}{\frac{1}{3}x^2}\right)$

50. Determine the zeros and the multiplicity of each zero for the given function:

$$f(x) = x^5 - 2x^4 - 20x^3 + 8x^2 + 128x + 128$$

- a. $x = 4$ multiplicity: 3 b. $x = -4$ multiplicity: 3
 $x = 2$ multiplicity: 2 $x = -2$ multiplicity: 2
- c. $x = 4$ multiplicity: 2 d. $x = -4$ multiplicity: 2
 $x = -2$ multiplicity: 3 $x = 2$ multiplicity: 3

Answer Key

- | | | | |
|-----|---|-----|---|
| 1. | A | 26. | D |
| 2. | C | 27. | D |
| 3. | B | 28. | B |
| 4. | C | 29. | C |
| 5. | D | 30. | D |
| 6. | B | 31. | C |
| 7. | B | 32. | A |
| 8. | C | 33. | C |
| 9. | A | 34. | A |
| 10. | B | 35. | A |
| 11. | C | 36. | C |
| 12. | B | 37. | C |
| 13. | A | 38. | D |
| 14. | B | 39. | B |
| 15. | D | 40. | A |
| 16. | C | 41. | A |
| 17. | A | 42. | D |
| 18. | D | 43. | D |
| 19. | B | 44. | D |
| 20. | D | 45. | D |
| 21. | C | 46. | C |
| 22. | A | 47. | D |
| 23. | B | 48. | A |
| 24. | A | 49. | B |
| 25. | B | 50. | C |