

- What is the domain of the function defined by the equation $y = \frac{x^2 - 2x}{x^2 + 5x + 6}$?
 - $[0, \infty)$
 - $(-\infty, 0) \cup (0, 2) \cup (2, \infty)$
 - $(-\infty, 2) \cup (2, 3) \cup (3, \infty)$
 - $(-\infty, -3) \cup (-3, -2) \cup (-2, \infty)$
 - $(-\infty, 1]$
- If b and c are real numbers so that the polynomial $x^2 + bx + c$ has $3 + 4i$ as a zero, find c .
 - 3
 - 4
 - 5
 - 5
 - 25
 - none of these
- Let $R(x) = \frac{3x^3 - x^2 + 3x + 3}{x^2 + 1}$. Find all asymptotes for $R(x)$ if any.
 - $y = 3x - 1$
 - $y = 3x + 1$
 - $y = -3x - 1$
 - $y = -3x + 1$
 - $y = 3x$
 - $y = -3x$
- Solve the inequality: $\frac{2 - x}{2 + x} \geq 0$
 - $(-2, 2)$
 - $[-2, 2)$
 - $(-2, 2]$
 - $[-2, 2]$
 - $(-\infty, -2) \cup [2, \infty)$
- Solve the inequality: $\frac{x - 6}{x - 3} \geq 2$.
 - $(-\infty, 0] \cup (3, \infty)$
 - $[0, 3)$
 - $(0, 3)$
 - $(-\infty, 0] \cup [3, \infty)$
 - $[0, 3]$
- If $x^{100} + 2x^{99} + x^2 - 4$ is divided by $x + 2$, then the remainder is:
 - 4
 - 0
 - 4
 - greater than 4
 - less than -4
- How many of the zeros of the polynomial $f(x) = 4x^4 + 8x^3 + 3x^2 - 2x - 1$ are positive?
 - 0
 - 1
 - 2
 - 3
 - 4

8. Given $x = 1 + 2i$ is a solution to $x^4 - 4x^3 + 4x^2 - 25 = 0$. The real solutions to this equation are $x = 1 \pm \sqrt{b}$ where $b =$

- (a) 2 (b) 3 (c) 5 (d) 6 (e) 7 (f) 8

9. Find the domain of the function $f(x) = \ln\left(\frac{2-x}{2+x}\right)$.

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

10. Consider the function $f(x) = \frac{3-2x}{x-2}$. If g is the inverse function to f , then $g(x) =$

- (a) $\frac{3-2x}{x+2}$ (b) $\frac{3-2x}{x-2}$ (c) $\frac{5+2x}{x-2}$ (d) $\frac{2x+3}{x+2}$ (e) $\frac{2x-3}{x+2}$ (f) $\frac{2x+3}{x-2}$

11. If $9^{1-x} = 27^{1+x}$, then $x =$

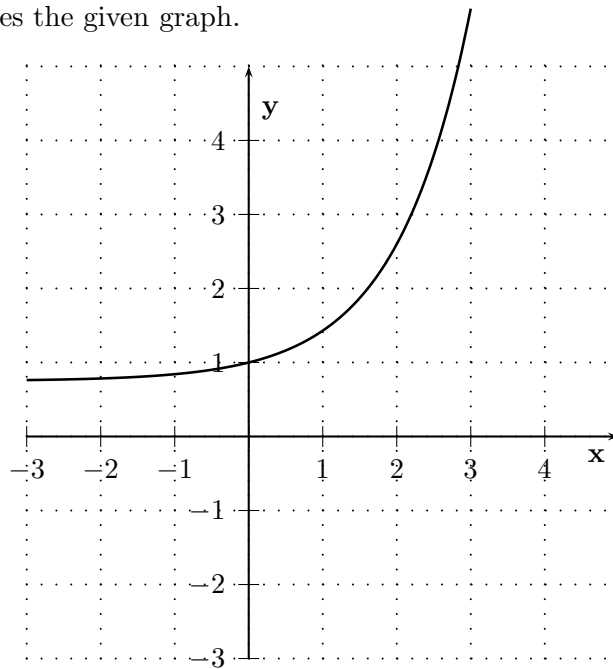
- (a) $\frac{1}{5}$ (b) $\frac{2}{5}$ (c) $\frac{3}{5}$ (d) $-\frac{1}{5}$ (e) $-\frac{2}{5}$ (f) $-\frac{3}{5}$

12. Find $\log_5(10\sqrt{5}) - \log_5(2)$.

- (a) $1/2$ (b) $3/2$ (c) $5/2$ (d) $7/2$ (e) $9/2$ (f) $11/2$

13. Select the function that best describes the given graph.

- (a) $f(x) = e^x$
 (b) $f(x) = e^{\frac{x}{4}}$
 (c) $f(x) = \frac{e^x + 1}{4}$
 (d) $f(x) = \frac{e^x + 3}{4}$
 (e) $f(x) = \frac{\ln(x+1)}{10}$



14. $\log_{10} 700$ is between

- (a) 0 and 1 (b) 1 and 2 (c) 2 and 3 (d) 3 and 4 (e) 4 and 5

15. Use properties of logarithms to find the exact value of the expression

$$\log_2 3 \cdot \log_3 2 \cdot \log_5 7 \cdot \log_7 5$$

- (a) 1 (b) 2 (c) 4 (d) 8 (e) 16 (f) 32

16. Recall that “log” means logarithm base 10. If $a = \log 2$ and $b = \log 3$ write $\log(\frac{3}{5})$ in terms of a and b .

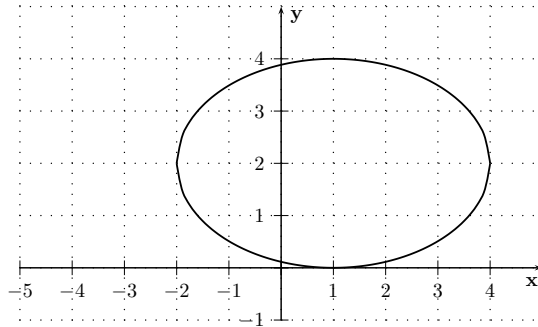
- (a) $a + b$ (b) $a + b + 1$ (c) $a + b - 1$ (d) $a + 2b$ (e) $2a + b$ (f) ab

17. Use natural logarithms to solve the equation $2^x = \sqrt{e}$. Then x equals

- (a) $\frac{1}{\ln 2}$ (b) $\frac{2}{\ln 2}$ (c) $\frac{1}{2 \ln 2}$ (d) $\frac{1}{3 \ln 2}$ (e) $\sqrt{\ln 2}$ (f) $\frac{\ln 3}{5}$

18. Choose the equation for the ellipse.

- (a) $\frac{(x+1)^2}{9} + \frac{(y+2)^2}{4} = 1$
(b) $\frac{(x+1)^2}{9} + \frac{(y-2)^2}{4} = 1$
(c) $\frac{(x-1)^2}{9} + \frac{(y+2)^2}{4} = 1$
(d) $\frac{(x-1)^2}{9} + \frac{(y-2)^2}{4} = 1$



19. Which of the following conics is represented by the equation $x^2 - y^2 + 2x - 2y + 1 = 0$?

- (a) Circle (b) Ellipse (c) Parablola (d) Hyperbola (e) None of these

20. Find the foci of the ellipse $\frac{(x+1)^2}{9} + \frac{y^2}{25} = 1$.

- (a) $(-1, \pm 4)$ (b) $(1, \pm 4)$ (c) $(-1 \pm 4, 0)$ (d) $(1 \pm 4, 0)$ (e) $(-1, \pm 5)$ (f) $(1, \pm 5)$

21. Solve the system of equations for z .

$$\begin{aligned} x + y + z &= 6 \\ x - y + 2z &= 5 \\ x + 2y - z &= 2 \end{aligned}$$

- (a) $z = 1$ (b) $z = 2$ (c) $z = 3$ (d) $z = 4$ (e) $z = 5$

22. If $\frac{3x-4}{x^2-4} = \frac{A}{x+2} + \frac{B}{(x-2)}$, then
- (a) $A - B = 0$ (b) $A - B = 2$ (c) $A - B = -2$ (d) $A - B = 3$ (e) $A - B = -3$
23. Find the infinite geometric sum $3 - \frac{3}{2} + \frac{3}{4} - \frac{3}{8} + \dots$.
- (a) 2 (b) 3 (c) 4 (d) 5 (e) 6
24. Find the arithmetic sum $4 + 10 + \dots + 1,198$.
- (a) 119,800 (b) 119,900 (c) 120,000 (d) 120,100 (e) 120,200
25. Find the coefficient of x in $(x-1)^{100}$.
- (a) 1 (b) -1 (c) 100 (d) -100 (e) 4950 (f) -4950
26. Find the constant term in the expansion of $\left(x^2 - \frac{1}{x^2}\right)^6$.
- (a) 6 (b) -6 (c) 15 (d) -15 (e) 20 (f) -20
27. A coed soccer team has 7 girls and 9 boys. How many ways can you choose a team of 5 girls and 6 boys?
- (a) less than 500
 (b) between 500 and 1,000
 (c) between 1,000 and 5,000
 (d) between 5,000 and 10,000
 (e) over 10,000
28. The number of different 8-letter passwords can be made 3 A 's, 3 B 's, and 2 C 's is between
- (a) 10,000 and 20,000 (b) 5,000 and 10,000 (c) 3,000 and 5,000 (d) 1,000 and 3,000 (e) under 1,000
29. Determine the probability of tossing 2 heads and 3 tails with five tosses of a fair coin.
- (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{3}{8}$ (d) $\frac{5}{16}$ (e) $\frac{7}{16}$
30. Four people randomly choose one of seven flavors of ice cream. The probability that they all choose a different flavor is:
- (a) $\frac{120}{343}$ (b) $\frac{122}{343}$ (c) $\frac{18}{49}$ (d) $\frac{2}{7}$ (e) $\frac{3}{7}$

1. d
2. e
3. a
4. c
5. b
6. b
7. b
8. d
9. a
10. d
11. d
12. b
13. d
14. c
15. a
16. c
17. c
18. d
19. d
20. a
21. c
22. b
23. a
24. e
25. d
26. f
27. c
28. e
29. d
30. a