

Start date: 12/15/14 Altered
Final Deadline: 12/19/14.

Instructors: All

1. What is the vertex of the parabola whose equation is $8y = x^2 - 2x - 7$.

- a. (1,-7) b. (1,-8) c. (1,-1) d. (0,-7) e. (-1, -0.5)

2. Find the focus of the parabola whose equation is $8y = x^2 - 2x - 7$.

- a. (1,1) b. (1,-3) c. (3,-1) d. (-1,-1) e. (-1, 1)

3. Let $R(x) = \frac{x^2 - 3x + 1}{x + 2}$. Find the oblique asymptote if one exists.

- (a) $-5x + 1$ (b) $x + 2$ (c) x (d) 1
(e) $x - 5$ (f) $x - 3$ (g) $x - 3/2$ (h) $-3x + 1$
(i) No oblique asymptote.

4. Solve the inequality: $\frac{(x + 4)(3 - x)}{(x - 2)^2} < 0$.

- a. $(-4, 2)$ or $(2, 3)$
b. $(-4, 2)$ or $(2, \infty)$
c. $(-\infty, -4)$ or $(2, 3)$
d. $(-\infty, -4)$ or $(3, \infty)$

5. Solve the inequality: $\frac{3x + 1}{x + 1} \leq 2$.

- a. $(-1, 1]$
b. $[-1, 1)$
c. $(-\infty, -1)$ or $[1, \infty)$
d. $(-\infty, -1]$ or $(1, \infty)$

6. If $2x^2 + 3x - 1$ is divided by $x + 2$, then the remainder is

- (a) -4 (b) -3 (c) -2 (d) -1 (e) 0
(f) 1 (g) 2 (h) 3 (i) 4 (j) 5

7. The polynomial $2x^3 + x^2 - 2x - 1$ has three rational zeros. Find the three zeros and compute their sum.

- a. -1 b. $-\frac{1}{2}$ c. 0
d. $\frac{1}{2}$ e. 1 f. $\frac{1}{6}$

8. Form a polynomial with real coefficients of degree two so that $2 + i$ is a zero.

- a. $x^2 + 4x + 5$
- b. $x^2 - 4x + 5$
- c. $x^2 + 4x - 5$
- d. $x^2 - 4x - 5$
- e. $x^2 + 2x - 5$

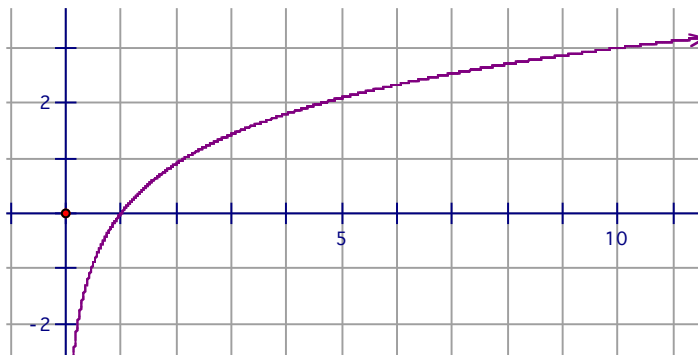
9. Find all solutions to $x^3 - x^2 + x - 1 = 0$

- a. $1, 1 + i, 1 - i$
- b. $1, -1 + i, -1 - i$
- c. $1, i, -i$
- d. $-1, 1 + i, 1 - i$
- e. $-1, -1 + i, -1 - i$
- f. $-1, i, -i$

10. The equation $e^{x^2} = \frac{e^x}{e^6}$ has two solutions. Find the sum of the two solutions.

- a. -2
- b. -1
- c. 0
- d. 1
- e. 2
- f. 3

11. Select the function that best represents the given graph.



- a. $f(x) = 10^x$
- b. $f(x) = \log x$
- c. $f(x) = \log x^2$
- d. $f(x) = \log x^2$
- e. $f(x) = \log x^2$
- f. $f(x) = \log(x - 1)^3$

12. Solve the equation $e^{5x} = 2$ for x .

- a. $\ln 5$
- b. $\ln 2$
- c. $\ln 5 - \ln 2$
- d. $\ln 2 - \ln 5$
- e. $\frac{\ln 2}{5}$
- f. $\frac{\ln 5}{2}$

13. Use properties of logarithms to find the exact value of the expression $\log_5 2 \cdot \log_2 125$.

- a. -2
- b. -1
- c. 0
- d. 1
- e. 2
- f. 3

14. Write the expression as a single logarithm $2\log_5 4 + 3\log_5 2 + \log_5 8 - \log_5 16$.

- a. $\log_5 2$
- b. $\log_5 4$
- c. $\log_5 8$
- d. $\log_5 16$
- e. $\log_5 32$
- f. $\log_5 64$

15. How many years would it take an amount of money to double if it is invested at 10% compounded continuously?

- a. $\ln(2)$
- b. $2\ln(2)$
- c. $5\ln(2)$
- d. $10\ln(2)$
- e. $20\ln(2)$
- f. $25\ln(2)$

16. Find the foci of the ellipse $\frac{(x-1)^2}{7} + \frac{(y+2)^2}{16} = 1$.

- a. (4,-2) and (-2,-2) c. (6,-2) and (-4,-2)
b. (1,2) and (1,-6) d. (1,1) and (1,-5)

17. Solve the system of equations. Find the sum $x + y + z$.

$$\begin{cases} x - y = -1 \\ 2x - 3z = -6 \\ 2y + z = 4 \end{cases}$$

- a. 2 b. 3 c. 4 d. 5 e. 6

18. Solve the system of equations. Find the sum $x + y$.

$$\begin{cases} \frac{2}{x} + \frac{3}{y} = 2 \\ \frac{8}{x} - \frac{9}{y} = 1 \end{cases}$$

- a. 2 b. 3 c. 4 d. 5 e. 6

19. How many solutions does the following system of equations have?

$$\begin{cases} x^2 + y^2 = 4 \\ y = x^2 \end{cases}$$

- a. 0 b. 1 c. 2 d. 3 e. 4

20. Find the 101st term of the arithmetic sequence $-5, 3, 11, \dots$.

- a. 795 b. 803 c. 811 d. 819 e. 827

21. Find the arithmetic sum $3 + 6 + 9 + \dots + 6,000$.

- a. 6,003,000 b. 12,006,000 c. 9,999,999 d. 202,605 e. 1,000,005

22. Find the geometric sum $1 + 2 + 2^2 + 2^3 + \dots + 2^{64}$.

- a. 2^{65} b. $2^{65} - 1$ c. $\frac{2^{101} - 1}{2}$ d. $\frac{2^{101} - 3}{2}$ e. $\frac{2^{100} - 1}{2}$

23. Find the infinite geometric sum $1 + \frac{1}{5} + \frac{1}{25} \dots$.

- a. $\frac{5}{3}$ b. $\frac{5}{4}$ c. 1 d. $\frac{5}{6}$ e. $\frac{5}{7}$

24. Let $A = \{1,2,3,4,8\}$, $B = \{1,2,4,5\}$, and $C = \{0,2,6,7,8,9\}$. Find $(A \cup B) \cap C$.

- a. $\{2,8\}$ b. $\{0,2,6,7,8,9\}$ c. $\{0,1,2,4,6,7,8,9\}$ d. $\{1,2,4\}$

25. Find the coefficient of x^2 in $\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^8$.

- a. 1 b. 8 c. 28 d. 56 e. 70

26. Find the coefficient of x^{97} in $(x-1)^{100}$.

- a. 161,700 b. -161,700 c. 4,950 d. -4,950 e. 3,921,225

27. How many distinct 4-letter passwords can be formed using the letters A, B, C, D, E, F, G , if no letter can be used more than once?

- (a) 105 (b) 35 (c) 28 (d) 22 (e) 840 (f) 5040 (g) 24

28. How many different four-person committees can be formed from a group of 12 people?

- a. 990 b. 495 c. 220 d. 210 e. 56

29. What is the probability of rolling either a five or a six with a pair of fair dice?

- a. $\frac{1}{2}$ b. $\frac{1}{3}$ c. $\frac{1}{4}$ d. $\frac{1}{5}$ e. $\frac{1}{6}$

30. Five people randomly choose integers between 1 and 10, inclusive. What is the probability that at least two of them chose the same number to the nearest tenth?

- a. 0.3 b. 0.4 c. 0.5 d. 0.6 e. 0.7 f. 0.8

Answers

1. C
2. A
3. E
4. D
5. A
6. C
7. B
8. B
9. C
10. D
11. D
12. E
13. F
14. F
15. D
16. D
17. B
18. D
19. C
20. A
21. A
22. B
23. B
24. A
25. C
26. B
27. E
28. B
29. C
30. E