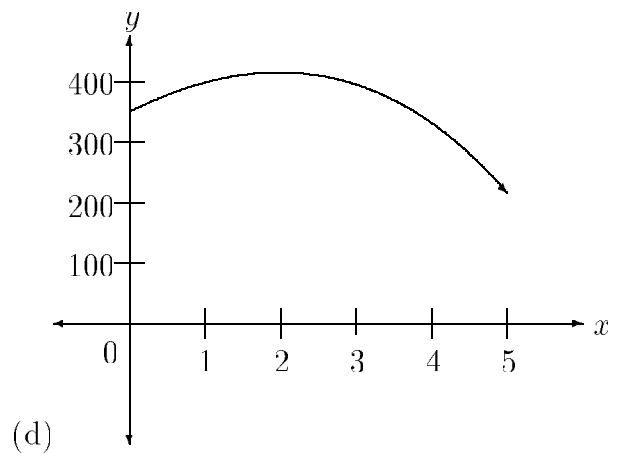
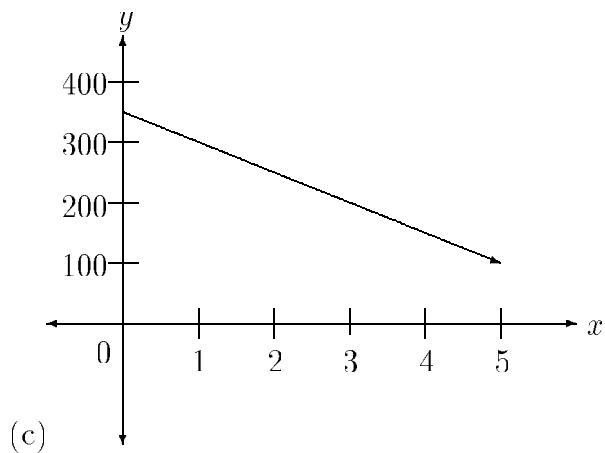
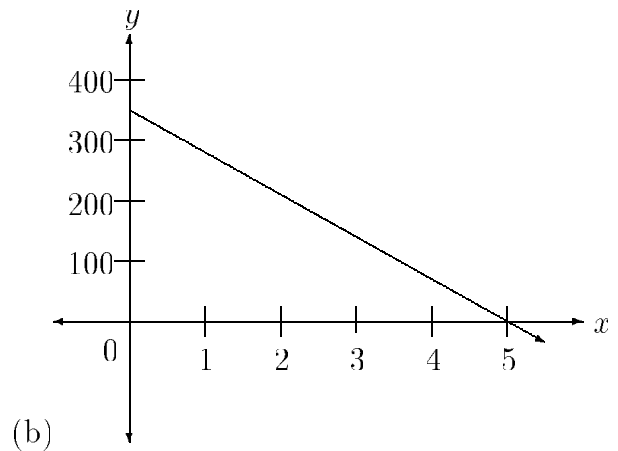
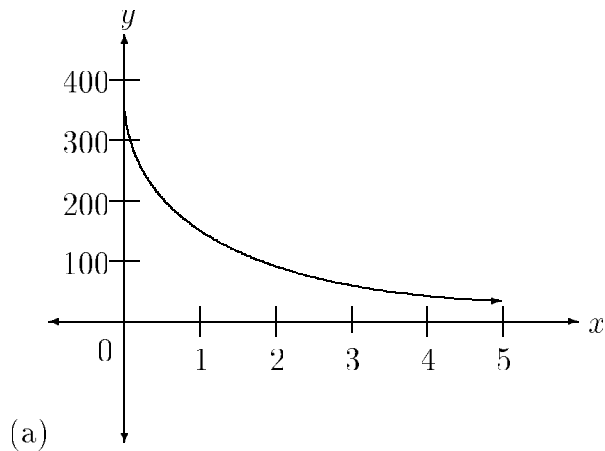


Math 151 - Final Exam Review

Select the best answer from the given choices for each question.

1. The value y of a machine after t years is determined using the equation $y = 350 - 50t$, $t \geq 0$. Which one of the following is the graph of this equation?

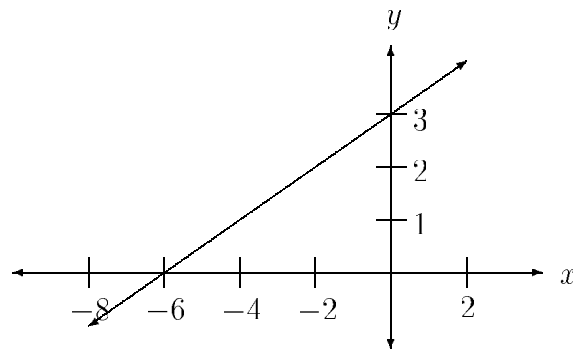


2. Which one of the following is the domain for $f(x) = \sqrt{16 - x^2}$?

- (a) $(-\infty, -4) \cup (-4, 4) \cup (4, \infty)$
- (b) $[-4, 4]$
- (c) $(-\infty, -4] \cup [4, \infty)$
- (d) $(-4, 4)$

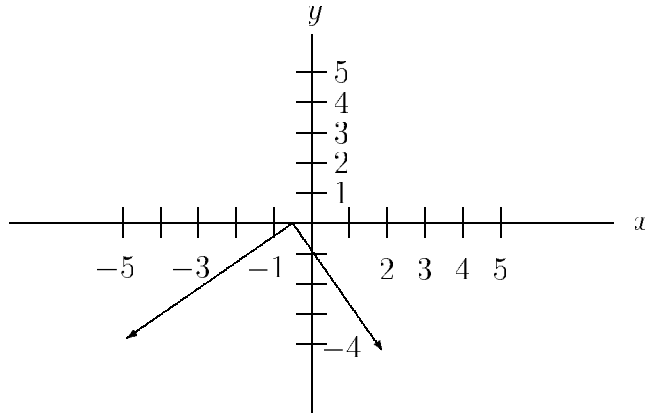
3. Which one of the following is the domain for $f(x) = \frac{1}{x^2 - 3x + 2}$?
- (a) $(-\infty, -2) \cup (-2, 1) \cup (1, \infty)$
 - (b) $(-\infty, \infty)$
 - (c) $(-\infty, 1) \cup (1, 2) \cup (2, \infty)$
 - (d) $(-\infty, 1/2) \cup (1/2, \infty)$

4. The graph of $g(x)$ is given below. Find $g(-2)$.



- (a) 2
 - (b) -2
 - (c) 3
 - (d) -6
5. The local cable television company charges a \$35 installation fee and a \$30 monthly fee. Find an equation that gives the total cost C spent on cable television service after t years.
- (a) $C = 30t + 35$
 - (b) $C = 360t + 35$
 - (c) $C = 35(30t)$
 - (d) $C = 30t$

6. Which one of the following is true for the given graph of $y = f(x)$?



- (a) The function is increasing on $(-5, 0)$.
- (b) The function is decreasing on $(0, -4)$.
- (c) The function is increasing on $(-\infty, -1/2)$.
- (d) The function is decreasing on $(-\infty, -1/2)$.

7. Find the x and y intercepts for the graph of $y = \frac{x + 7}{x - 2}$.

- (a) $(-7, 0)$ and $(0, 2)$
- (b) $(-7, 0)$ and $(0, -7/2)$
- (c) $(2, 0)$ and $(0, -7)$
- (d) $(-7/2, 0)$ and $(0, -7)$

8. Explain how the graph of $g(x) = 3 - |x|$ can be obtained from the graph of $f(x) = |x|$.

- (a) Reflect about y -axis and then shift 3 units up
- (b) Reflect about x -axis and then shift 3 units up
- (c) Reflect about x -axis and then shift 3 units right
- (d) Shift 3 units down

9. If the point $(1,2)$ is on the graph of $y = f(x)$, which point is on the graph of $y = f(x + 2) - 1$?
- (a) $(-1, 1)$
 - (b) $(-1, -1)$
 - (c) $(3, 1)$
 - (d) $(-2, 1)$
10. Find $f(g(x))$ for $f(x) = x^2 - 2x$ and $g(x) = 3 + 2x$.
- (a) $4x^2 + 8x + 3$
 - (b) $2x^2 - 4x + 3$
 - (c) $3x^2 + x$
 - (d) $2x^3 - x^2 - 6x$
11. If $f(x) = \frac{3x}{x + 4}$ find $f^{-1}(x)$.
- (a) $f^{-1}(x) = \frac{-4x}{x + 3}$
 - (b) $f^{-1}(x) = \frac{4x}{x - 3}$
 - (c) $f^{-1}(x) = \frac{4x}{x + 3}$
 - (d) $f^{-1}(x) = \frac{4x}{3 - x}$
12. Which of the following functions have inverses?
- (i) $f(x) = 3x^2$
 - (ii) $f(x) = 3x^3$
 - (iii) $f(x) = 3x$
 - (iv) $f(x) = 3/x$
- (a) All of these have inverses.
 - (b) i and ii only
 - (c) iii and iv only
 - (d) ii, iii, and iv only

13. The function $P(x) = -2x^2 + 280x - 1000$ represents the profit a company earns when it manufactures and sells x items. How many items should it manufacture and sell to maximize profit? What is the maximum profit?
- (a) 140; \$1000
 - (b) 140; \$8800
 - (c) 70; \$1000
 - (d) 70; \$8800
14. When P dollars is invested at an interest rate r , compounded annually for t years, the investment grows to A dollars where $A = P(1 + r)^t$. Find the interest rate if \$3000 grows to \$5247 in 5 years.
- (a) 9.3%
 - (b) 2.7%
 - (c) 5.4%
 - (d) 11.8%
15. Solve: $5x^2 \geq 3 - 14x$
- (a) $(-\infty, -3] \cup [1/5, \infty)$
 - (b) $[3/5, 1]$
 - (c) $(-\infty, -1] \cup [3/5, \infty)$
 - (d) $[-3, 1/5]$
16. The profit P of a certain company is given by $P(x) = -3x^2 + 630x - 6000$. Determine the nonnegative values of x for which $P(x) > 0$.
- (a) $10 < x < 200$
 - (b) $x \leq 200$
 - (c) $x \geq 200$
 - (d) $0 < x < 10$

17. Find all of the zeros of the function $f(x) = x^4 - 5x^3 + 8x^2 - 20x + 16$. The **sum** of the zeros is:

- (a) 5
- (b) -5
- (c) $5 + 4i$
- (d) $5 - 4i$

18. Which one of the following is a third degree polynomial with zeros 6 and $2i$?

- (a) $x^3 + 6x^2 + 2x + 12$
- (b) $x^3 - 6x^2 + 4x - 24$
- (c) $x^3 - 6x^2 + 2x - 12$
- (d) $x^3 + 6x^2 + 4x + 24$

19. Find the vertical and horizontal asymptotes for the graph of $y = \frac{3x - 1}{x - 4}$.

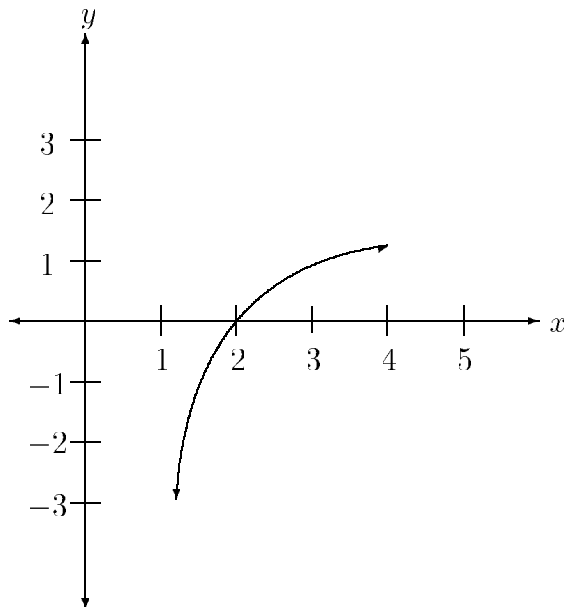
- (a) $x = 4, y = 3$
- (b) $x = 4, y = 0$
- (c) $x = -4, y = -1$
- (d) $x = -4, y = 0$

20. Which one of the following is the equation of the oblique asymptote for the graph of

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

- (a) $y = x - 3$
- (b) $y = x + 5$
- (c) $y = x - 4$
- (d) $y = x + 4$

21. Which of the following functions corresponds to the graph given below?



- (a) $f(x) = e^x$
- (b) $f(x) = e^{x-1}$
- (c) $f(x) = \ln x$
- (d) $f(x) = \ln(x - 1)$

22. Simplify: $\log_7 15$

- (a) 1.3917
- (b) 1.1761
- (c) 2.7081
- (d) 0.7186

23. Write $\log_2 \sqrt{\frac{x^2}{y}}$ as a sum and/or difference of logarithms.

- (a) $\frac{1}{2}[\log_2 x - \log_2 y]$
- (b) $\log_2 x - \frac{1}{2} \log_2 y$
- (c) $\frac{1}{2}[\log_2 x + \log_2 y]$
- (d) $\log_2 x + \frac{1}{2} \log_2 y$

24. Solve: $\log 2 + \log(x - 2) = 1$

- (a) There is no solution.
- (b) $x = 7$
- (c) $x = 3$
- (d) $x = 1$

25. Solve: $\log_5(x + 6) - \log_5(x + 2) = \log_5 x$

- (a) $x = 2$
- (b) $x = 2, x = -3$
- (c) $x = 4$
- (d) There is no solution.

26. Solve: $3^{2x} = 5^{x-1}$

- (a) $x = -0.5563$
- (b) $x = -1$
- (c) $x = -2.7381$
- (d) $x = 15.2755$

27. How much money should you invest now at 3% interest compounded quarterly in order to have \$5,000 in 10 years?

- (a) \$500
- (b) \$3708.24
- (c) \$1741.74
- (d) \$3401.35

28. A certain population P increases according to the function $P = 2000e^{kt}$. Let $t = 0$ correspond to the year 1960 and suppose the population in 1950 was 1500. Find the value of k to three decimal places, and then predict the population in 1990.

- (a) $k = 0.029; P = 4774$
- (b) $k = -0.029; P = 474$
- (c) $k = 0.029; P = 4000$
- (d) $k = 0.621; P = 4000$

29. An individual wanted to determine the relation that might exist between speed and gas mileage of an automobile. Let X be the average speed of a car on the highway measured in miles per hour and let Y represent the gas mileage of the car measured in miles per gallon. Using the following data, find the linear regression equation for the data and use it to predict the gas mileage of a car traveling 61 miles per hour. Round all of your answers to three decimal places.

X	Y
50	28
54	26
55	25
60	22
64	17
66	15

- (a) 19.213
(b) 19.828
(c) 20.297
(d) 20.851
30. Which value of r corresponds to a strong negative correlation?
(a) 0.3
(b) 0.9
(c) -0.3
(d) -0.9
31. If you were to use the inverse coefficient matrix to solve the system:

$$\begin{aligned}x + y &= 6 \\ 3x - y &= 2\end{aligned}$$

which one of the following would be matrix A ?

(a) $\begin{bmatrix} 1 & 1 & 6 \\ 3 & -1 & 2 \end{bmatrix}$ (b) $\begin{bmatrix} 6 \\ 2 \end{bmatrix}$

(c) $\begin{bmatrix} 1 & 1 \\ 3 & -1 \end{bmatrix}$ (d) $\begin{bmatrix} x \\ y \end{bmatrix}$

32. The sum of three positive numbers is 19. Find the second number if the third number is three times the first and the second number is one more than twice the first.

- (a) 7
- (b) 13
- (c) 1
- (d) 9

33. Which one of the following matrices is in reduced row-echelon form?

(a) $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 0 & 1 & 7 & 2 \\ 0 & 0 & 1 & 5 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 5 \end{bmatrix}$

(c) $\begin{bmatrix} 1 & 0 & 4 & 7 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 2 \end{bmatrix}$ (d) none of these

34. Write the solution to the system of equations associated with the following reduced matrix:

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 6 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 5 \end{array} \right]$$

- (a) (6,1,5)
- (b) (6,1,0)
- (c) $(6z - 1, z - 1, z)$
- (d) There is no solution.

Solutions

- | | |
|-------|-------|
| 1. c | 18. b |
| 2. b | 19. a |
| 3. c | 20. b |
| 4. a | 21. d |
| 5. b | 22. a |
| 6. c | 23. b |
| 7. b | 24. b |
| 8. b | 25. a |
| 9. a | 26. c |
| 10. a | 27. b |
| 11. d | 28. a |
| 12. d | 29. b |
| 13. d | 30. d |
| 14. d | 31. c |
| 15. a | 32. a |
| 16. a | 33. b |
| 17. a | 34. d |