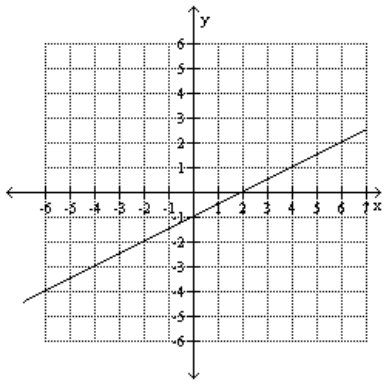
# Math 120 Final Exam Review Answers

1. $\frac{5}{4}$
2. a. Yes
   b. Approximately 28%
   c. 1975
3. a. Domain: $(-\infty, 4]$
   Range: $[0, \infty)$ Yes, it is a function.
4. a. 7 b. $2x+h+8$
5. $y-5=\left(-\frac{1}{8}\right)(x-3)$ *or* $y-6=\left(-\frac{1}{8}\right)(x+5)$
6. 

7. $y=-3440x+14{,}760$
8. $y=-8x+35$
9. $\frac{1}{3}$
10. $285 per year
11. 22
12. $f(x)=\frac{1}{x}$; $g(x)=x^2-4$
13. $f^{-1}(x)=\sqrt[3]{x}-7$ Domain: $(-\infty,\infty)$
14. 30
15. 7
16. 9
17. a. $x=3,-3$ b. 25
18. 150 units
19. 80
20. $4000 invested at 6%; $6000 invested at 11%
21. $31,000
22. Width = 30 ft.; Length = 67 ft.
23. a. $5-11i$ b. $28+20i$ c. $26-10i$ d. $80i$ e. $\frac{4}{3}+\frac{2}{3}i$ f. $21+20i$ g. $\frac{2}{3}-\frac{\sqrt{5}}{5}i$

24. a. {-4,5}; b. $\left\{-5, \frac{1}{7}\right\}$

25. $\left\{\frac{-5-\sqrt{7}}{6}, \frac{-5+\sqrt{7}}{6}\right\}$

26. $\{1-2i, 1+2i\}$

27. 8 ft.

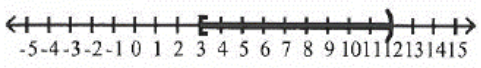
28. 18 in. by 18 in.

29. Width = 150ft, Length = 300ft, Max area = 45000ft$^2$

30. $[-1, \infty)$

31. (-4, ∞)

32. [3,12)




33. [4839, ∞)

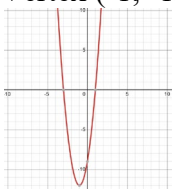
34. a. (2, 3) b. (−8, −5) c. (0, −2)

35. a. Distance is $2\sqrt{13}$ or 7.21 b. Midpoint is at (3, -1)

36. $(x-3)^2 + (y+1)^2 = 9$ Center (3, -1) and Radius = 3

37. $(x-5)^2 + (y+3)^2 = 25$

38. a. Vertex (-1, -12) b. minimum c. x = -1 d. (1, 0) and (-3, 0) e. (0, -9)

f. 

39. a. $\left(-\frac{5}{6}, -\frac{7}{6}\right)$ b. min c. $-\frac{5}{6} \pm \frac{\sqrt{7}}{6}$

40. maximum value at (-1, -8)

41. 4.5 inches

42. (0, -2) max turning points = 3

| Zero | Multiplicity | Touch or Cross at x-axis |
|---|---|---|
| -1 | 1 | Cross |
| 2 | 1 | Cross |
| 1 | 2 | Touches and turns around |

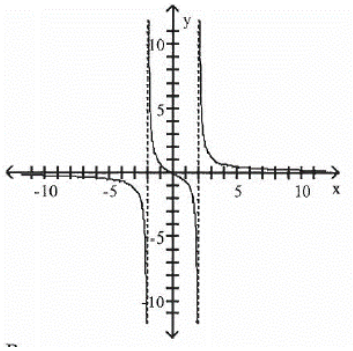
43. The leading coefficient is -1, which is negative. A negative leading coefficient with an odd degree polynomial will increase without bound on the left and decrease without bound on the right.

44. $P(x) = x^2(x-2)$

45. $(-\infty, -4) \cup (-4, 0) \cup (0, 4) \cup (4, \infty)$

46.

| Problem # | Vertical asymptotes | Horizontal asymptotes | x-intercepts | y-intercept |
|---|---|---|---|---|
| **a** | x = 0, x = -1 | y = 0 | (2,0) | DNE |
| **b** | None | y = 0 | (0,0) | (0,0) |
| **c** | $x = \frac{3}{5}$ | $y = -\frac{4}{5}$ | (3/4,0) | (0, -1) |

47. 


48. Horizontal Asymptote y = 0
The more time (hours) that goes by, the closer the drug's concentration gets to zero. The least possible concentration is approaching zero

49. y = 150

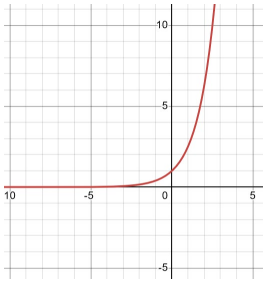
50. $I = \frac{1960}{D^2}$ ; 1.225 foot-candles

51. 19.7

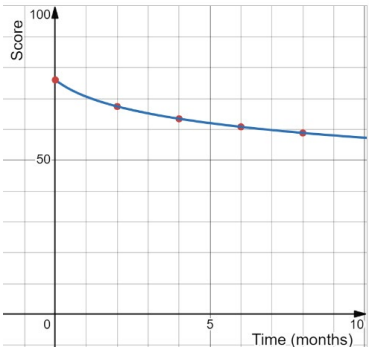
52. 4,141,309 residents

53. 160 racoons

54. Choice A: $7380.15
Choice B: $7358.31
Choice A is the better investment.

55. 


56. 4.3

57. a) 76 b) 67, 63, 61, 59 c) 

The shape of the graph indicates that the course content they remembered decreased over time.

58. 9 weeks

59. $\frac{1}{2}\log_5 7 + 3\log_5 x - 8\log_5 y$

60. $\log_b \frac{y^4\sqrt[3]{z}}{x}$

61. $e$

62. $-\frac{2}{7}$

63. $\frac{7+\ln 5}{2}$

64. $\frac{129}{64}$

65. 100 days

66. 2008

67. 10,520 years

68. a. 3,313 people  b. 36,000 people

69. a. $5,\ -6,\ 7,\ -8$  b. $\frac{1}{9},\ \frac{1}{27},\ \frac{1}{81},\ \frac{1}{243}$

70. 955

71. $a_n = 5n - 3;\ a_{20} = 97$

72. 5050

73. -0.0000149011612

74. $a_n = 5\left(-\frac{1}{5}\right)^{n-1}$; 0.00032

75. 177,148

76. 4