Alg 2 Midterm Review key

1. D: $[-3, \infty)$
2. R: $[-4.649, \infty)$
3. $(-1.423, 3.369)$
4. $(1.757, -4.649)$
5. Decreasing
6. $T(14) = 89°F$
7. $T(14)$ means the temperature at 14 hours after midnight (2:00 PM)
8. The highest temp. is 90°F b/c it is the y-value of the maximum of the graph.
9. $[16, 20]$
10. number answer: 10.9
    Meaning: with 3 days of rain, the height of the flower is 10.9 inches
11. $3(x-5) = 4x + 2x + 6$

    $3x - 15 = 6x + 6$

    $-21 = 3x$

    $\boxed{x = -7}$

12. $-2(x+5)+3x = 3(-2x+8)$

$-2x-10+3x = -6x+24$

$7x = 34$

$\boxed{x = 34/7}$

13. $5(4-x) = -(x+2)+3$

$20-5x = -x+2+3$

$15 = 4x$

$\boxed{x = 15/4}$

14. Rate of change: \$3/125 mins

linear model fits best b/c rate of change is constant.

15. 1 km/9 min $\Rightarrow$ Cheryl travels 1 km every 9 mins.

16. a. $\frac{182-303}{11-3} = \frac{-121}{8}$

b. $\frac{303-350}{3-0} = -\frac{47}{3}$

$\frac{135-268}{17-6} = -133/11$

17. a. \$100, \$50

b. $C = 100+50(6)$

$\boxed{C = \$400}$

c. $750 = 100+50(n)$

$650 = 50(n)$

$n = 13$

$\boxed{\text{13 months}}$

18. a: \$ 350

b: $a_n = 1100 - 125n$

c: $100 = 1100 - 125n$

$-1000 = -125n$

$8 = n \rightarrow$ 8 months.

19. a: n, a_n

b: $a_1 = 6$

$a_n = a_{n-1}(2)$

c. $a_n = a_1(2)^{n-1}$

$a_n = 6(2)^{n-1}$

d. $a_8 = 6(2)^{8-1}$

$a_8 = 768$ 768 flies.

e. $2400 = 6(2)^{n-1}$

$400 = 2^{n-1}$

$\log_2(400) = n-1$

$n = 9.4$ hours.

20. 3

21. 4

22. 6

23. 1

24. 2

25. 5

26. decay because $b<1$

27. growth because $b>1$

28. decay because $b<1$

29. D: $(-\infty, \infty)$ R: $(0, \infty)$

y: $(0, 64)$ Asymptote: $y=0$

30. D: $(-\infty, \infty)$ R: $(-3, \infty)$

y-int: $(0, -2)$ Asymptote: $y=-3$

31. D: $(-\infty, \infty)$ R: $(0, \infty)$

y-int $(0, 1)$ asymptote $y=0$

32. D: $(-\infty, \infty)$ R: $(-\infty, 0)$

y-int $(0, -1)$ asymptote: $y=0$

33. D: $(-\infty, \infty)$ R: $(0, \infty)$

y-int $(0, 5)$ Asymptote: $y=0$

34. growth; 21%

35. decay; 74%

36. decay; 51%

37. growth; 100%

38. $f^{-1}(x) = \frac{x-1}{3}$

39. $g^{-1}(x) = 5x+7$

40. $h^{-1}(x) = 4x+20$

41. $j^{-1}(x) = \frac{2x-8}{5}$

42. $y = 250(1 + .031)^5$

$\boxed{y = \$291.23}$

43. $y = 250\left(1 + \frac{.031}{4}\right)^{4 \cdot 5}$

$\boxed{y = \$291.74}$

44. $y = 2000\left(1 + \frac{.023}{12}\right)^{12 \cdot 10}$

$\boxed{y = \$2516.65}$

45. $y = 5000\left(1 + \frac{.012}{2}\right)^{2 \cdot 30}$

$\boxed{y = \$7158.94}$

46. $y = Pe^{rt}$

$y = 8000e^{.04 \cdot 10}$

$\boxed{y = \$11934.60}$

47. $y = 500\left(1 + \frac{.027}{1}\right)^3$

$\boxed{y = \$541.60}$

Choose Bank A

$y = 500e^{.019 \cdot 3}$

$\boxed{y = \$529.33}$

48. a) $y = 30{,}000\,(1-.04)^t$

$y = 30{,}000\,(1-.04)^8$

$\boxed{\$\,21641.69}$

b) $10000 = 30000\,(.96)^t$

$\frac{1}{3} = (.96)^t$

$\log_{.96}\left(\frac{1}{3}\right) = t$

$t = 26.91$

$\boxed{26.91 \text{ years}}$

49. a) $8000 = 3500\,e^{.089t}$

$\frac{8000}{3500} = e^{.089t}$

$\ln\left(\frac{8000}{3500}\right) = \ln e^{.089t}$

$.83 = .089t$

$t = \frac{.83}{.089}$

$t = 9.28$

$\boxed{9.28 \text{ years}}$

b) $8000 = 3500\,e^{r(5)}$

$\frac{8000}{3500} = e^{r(5)}$

$\ln\left(\frac{8000}{3500}\right) = 5r$

$r = 0.165$

$\boxed{16.5\%}$

50. 2 units down

D: $(0, \infty)$

R: $(-\infty, \infty)$

VA: $x = 0$

51. 2 units right

D: $(2, \infty)$

R: $(-\infty, \infty)$

VA: $x = 2$

52. reflection over y-axis

D: $(-\infty, 0)$

R: $(-\infty, \infty)$

VA: $x = 0$

53. 5 units up

D: $(0, \infty)$

R: $(-\infty, \infty)$

VA: $x = 0$

54. reflection over x-axis

D: $(0, \infty)$

R: $(-\infty, \infty)$

VA: $x = 0$

55. 3 units left

D: $(-3, 0)$

R: $(-\infty, \infty)$

VA: $x = -3$

56. False

57. true

58. true

59. False

60. $2^x = 30$

$\log_2(30) = x$

$x = \frac{\log 30}{\log 2}$

$\boxed{x = 4.91}$

61. $3(10)^x = 450$

$10^x = 150$

$\log 150 = x$

$\boxed{x = 2.18}$

62. $2^{3x} - 5 = 123$

$2^{3x} = 128$

$2^{3x} = 2^7$

$3x = 7$

$\boxed{x = 7/3}$

63. $\log_2(x-7) = \log_2(2x+1)$

$x - 7 = 2x + 1$

$\boxed{-8 = x}$

64. $3^4 = 5x + 1$

$81 = 5x + 1$

$80 = 5x$

$\boxed{x = 16}$

65. $f(x) = x^4 - 3x^2 - 5$

$f(1) = 1 - 3 - 5$

$= -7$

$f(-1) = 1 - 3 - 5$

$= -7$

$\rightarrow$ $f(-1) = f(1)$ even!

66. $f(x) = -x^3 + 6x$

$f(1) = -1 + 6 = 5$

$f(-1) = 1 - 6 = -5$

$\rightarrow$ $f(1) = -f(-1)$ odd!

67. $f(x) = 2x^2 + 7x$

$f(1) = 2 + 7 = 9$

$f(-1) = 2 - 7 = -5$

neither!