

7R Exponential + Log Review

1. $100(1 + \frac{.058}{2})^{2x}$

a) $100(1 + .058/2)^4 = \boxed{\$112.11}$

b) $\frac{100(1 + .058/2)^{2x}}{100} = \frac{300}{100}$

$$2x \log(1 + .058/2) = \log 3$$

$$2x = 38.4298 \dots \quad x = 19.214$$

19 years

c) $\frac{100(1 + b/2)^{2(3)}}{100} = \frac{500}{100}$

$$(1 + b/2)^6 = 5^{1/2}$$

$$1 + b/2 = 1.30766$$

$$-1 \quad -1$$

$$b/2 = .30766$$

61.532

2. $59.2(b)^3 = 57.4$

$$b^3 = .96959 \dots$$

a) $b = .98976$

c) $59.2(.98976)^5 = 56.23$

d) $59.7(.98976)^x = 63$

$$x \log(.98976) = \log 1.064189$$

$$x = -6.044 \quad (\text{6 years before she was 59.2 inch})$$

$$3. \quad 500 e^{r \cdot 5} = 1000$$

$$e^{5r} = 2$$

$$5r \ln e = \ln 2$$

$$5r = .693147 \dots$$

$$r = .138629$$

$$4.) \quad 1000 e^{.138629(10)} = 1148.70$$

$$4. \quad 25000 e^{.075 \cdot 20} = 41218.03$$

$$25000 (1 + .03/12)^{12 \cdot 20} = 45518.87$$

$$5. \quad 11,000 = P e^{.04 \cdot 8}$$

$$11,000 = P (1.37712)$$

$$P = 7987.64$$

$$6. \quad 35,000 e^{-.043x} =$$

$$35000 e^{-.043(30)} = 9634.477$$

$$35,000 e^{-.043x} = 3500$$

$$e^{-.043x} = .1$$

$$-.043x \ln e = \ln .1$$

$$-.043x = -2.303$$

$$7. \quad 2 = (1 + .15/12)^{12x}$$

$$\log 2 = 12x \log (1 + .15/12)$$

$$12x = 55.7976$$

$$x = 4.64$$

8. $148(1 - .0062)^x = 104(1 + .03)^x$
 use a graphing calc! Find intersection.
 set window $x = 5$ to 50
 $y = 5$ to 150

9. $\frac{1}{2}^{\frac{1}{2}} = .707$

10. $100 = (212 - 70)e^{-.046t} + 70$
 -70 -70

$30 = \frac{142}{142} e^{-.046t}$

$.21126 = e^{-.046t}$

$\ln .21126 = \ln e^{-.046t}$

$-1.55466 = -.046t$

Same but use 78 instead

$t = 40.53$

11. a) $180.6335(.98418)^x = 130$

$x \log .98418 = \log .719668$

$x = 20.6293$

b) $155 = 186.6335(.98418)^x$

$\log .8580659 = x \log .98418$

$x = 9$

13 a) $5^{2(x+1)} = 5^3$

$$4x + 2 = 3$$

$$4x = 1$$

d) $3^{-2x} = 3^3$

$$x = -3/2$$

g) $2^{4(x+1)} = 2^{3(\frac{1}{2}x)}$

$$4x + 4 = \frac{3}{2}x$$

$$8x + 8 = 3x$$

$$5x = -8$$

$$x = -8/5$$

b) $2x + 3 = 0$

$$x = -3/2$$

e) $2^5 = \frac{3}{4}x$

$$\frac{4}{3} \cdot 32 = \frac{3}{4}x \cdot \frac{4}{3}$$

$$x = 128/3$$

h) $2x - 5 = x - 6$

$$x = \cancel{1}$$

c) $\sqrt{5^2} = \sqrt{(x-3)^2}$

$$\pm 5 = x - 3$$

$$x = 3 \pm 5$$

$$= 8, \cancel{-2}$$

f) $10^2 = x^2 + 20$

$$x^2 + 20 = 100$$

$$\sqrt{x^2} = \sqrt{80}$$

$$\pm 4\sqrt{5}$$

i.

$$x^2 = 4x - 3$$

$$x^2 - 4x + 3 = 0$$

$$(x-3)(x-1) = 0$$

$$x = 3, \cancel{1}$$

Practice Level A

1. yes 2. no 3. no 4. yes 5. yes 6. no
7. no 8. yes 9. no 10. yes 11. yes 12. no
13. all real numbers 14. 2 15. 3 16. 1
17. $\frac{1}{2}$ 18. 3 19. 4 20. $\frac{1}{2}$ 21. $\frac{5}{2}$ 22. 4
23. $\log_5 22$ 24. $\ln 3$ 25. $\frac{\ln 6}{3}$ 26. $\log_4 9$
27. $\frac{\log 14 - 1}{4}$ 28. 5 29. $\frac{1}{2}$ 30. 1 31. $\frac{5}{4}$
32. no solution 33. $\frac{4}{5}$ 34. 1000 35. 17
36. 81 37. -170 38. $e^4 - 7$ 39. 0 40. C
41. 17.4 yr 42. 28.0 yr 43. 34.7 yr

Practice Level B

1. 0 2. 1.386 3. 1.792 4. 1.544 5. 1.661
6. 0.750 7. 0.693 8. 0.462 9. 2.102
10. -0.405 11. -0.469 12. no solution
13. $\frac{5}{2}$ 14. 7 15. 2.243 16. -0.462 17. 5
18. 1.391 19. 2 20. -9 21. $\frac{4}{5}$ 22. -3.497
23. 2.730 24. no solution 25. 0.327 26. 0.362
27. no solution 28. 1000 29. 54.598 30. 243
31. $\frac{1}{3}$ 32. no solution 33. $\frac{2}{7}$ 34. 1365.333
35. 85.667 36. 30.375 37. -58,824
38. 39.121 39. -134.143 40. $\frac{10}{7}$ 41. 29.333
42. 4 43. 6 44. 36.399 45. 0.152 46. B
47. 13.0 yr 48. 28.1 yr 49. 38.2 yr 50. 22.88