

Section 4.3 HW Answers

p. 247 #'s 6, 8, 11, 13, 16-18, 23, 24, 38, 42, 44, 48, 50, 56, 61

4. e^4

6. $\frac{e^8}{16}$

8. e^{-2x+4}

11. $3e^{1-x}$

13. $2e^{3x}$

16. D

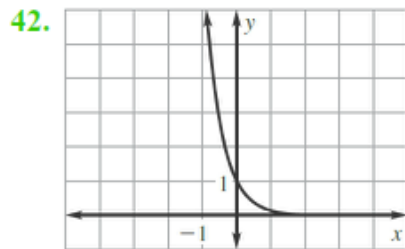
17. The 3 should be raised to the second power also;
 $(3e^{5x})^2 = 3^2 e^{(5x)(2)} = 9e^{10x}$.

18. $-2x$ should be subtracted;
 $e^{6x - (-2x)} = e^{8x}$.

23. about 0.670

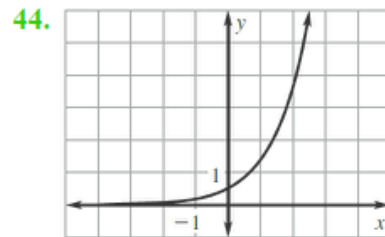
34. exponential growth

38. exponential decay



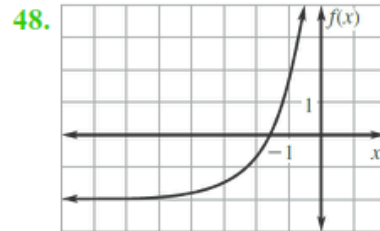
domain: $(-\infty, \infty)$

range: $(0, \infty)$



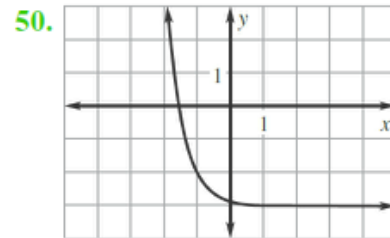
domain: $(-\infty, \infty)$

range: $(0, \infty)$



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

range: $(-2, \infty)$



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

range: $(-3, \infty)$

56. about 23,247 termites

61. about 1.986 cm²

p. 272 #'s 17, 19, 23, 57, 58

17. about -0.723

19. about 0.650

23. about -0.203

57. about 6967 yr

58. C

Carbon14 Problem

$$0.5 = e^{k \cdot 5700}$$

$$\ln 0.5 = \ln e^{k \cdot 5700}$$

$$\ln 0.5 = 5700k$$

$$k = \frac{\ln .5}{5700}$$

$$2 = 30e^{\frac{\ln 0.5}{5700}t}$$

$$\frac{1}{15} = e^{\frac{\ln 0.5}{5700}t}$$

$$\ln \frac{1}{15} = \ln e^{\frac{\ln 0.5}{5700}t}$$

$$\ln \frac{1}{15} = \frac{\ln 0.5}{5700}t$$

$$\frac{5700}{\ln 0.5} \cdot \ln \frac{1}{15} = t$$

$$t \approx 22,269 \text{ years}$$

Plutonium Problem

$$0.5 = e^{k \cdot 24,360}$$

$$\ln 0.5 = \ln e^{k \cdot 24,360}$$

$$\ln 0.5 = 24,360k$$

$$k = \frac{\ln 0.5}{24,360}$$

$$1 = 10e^{\frac{\ln 0.5}{24,360}t}$$

$$0.1 = e^{\frac{\ln 0.5}{24,360}t}$$

$$\ln 0.1 = \ln e^{\frac{\ln 0.5}{24,360}t}$$

$$\ln 0.1 = \frac{\ln 0.5}{24,360}t$$

$$\frac{24,360}{\ln 0.5} \cdot \ln 0.1 = t$$

$$t \approx 80,922 \text{ years}$$

Mt Pleasant Problem

$$44,354 = 30,108e^{k \cdot 9}$$

$$\frac{44,354}{30,108} = e^{k \cdot 9}$$

$$\ln \frac{44,354}{30,108} = 9k$$

$$k = \frac{\ln \frac{44,354}{30,108}}{9}$$

$$A(25) = 30,108e^{\frac{\ln \frac{44,354}{30,108}}{9} \cdot 25}$$

$$A(25) \approx 88,317$$