Lesson 6.1.1

6-1. See below:

a. \$2

b. \$2.61

c. \$2.71

d. $\left(1+\frac{1}{n}\right)^n$

6-2. See below:

a. \$2.72

b. $e = \lim\limits_{n\to\infty}\left(1+\frac{1}{n}\right)^n$

c. e is not repeating, but you need to see at least 10 decimal digits to see this. $e \approx$ 2.718281828459….

6-3. See below:

a. $e^2 \approx 7.38905...$

b. e^x

6-4. See below:

a. $\lim\limits_{h\to 0}\frac{e^{x+h}-e^x}{h}$

b. e^x

c. It is its own derivative.

6-5. See below:

a. $\approx 0.693 \cdot 2^x$

b. $\approx 1.099 \cdot 3^x$

c. $2 < e < 3$

6-6. $b \approx 2.718$

6-7. See below:

a. $\lim\limits_{h \to 0} \frac{b^{x+h} - b^x}{h}$

b. $b = (h + 1)^{1/h}$

Review & Preview

6-8. The Power Rule applies only when the variable is the base.

6-9. See below:

a. $f^{-1}(x) = \log_2 x$

b. $f^{-1}(x) = 3^x$

c. $f^{-1}(x) = e^x$

d. $f^{-1}(x) = \log_9\left(\frac{x}{5}\right)$

6-10. See below:

a. $y = 5^{x \log_5 3}$

b. $y = 10^{x \log 7}$

c. $y = e^{x \log_e 2}$

6-11. See below:

a. $c = 0.50n$, $k = 0.5$

b. Not proportional.

c. Not proportional. Graph is a line, but not through the origin.

d. $t = 10n$, $k = 10$

6-12. See below:

a. $\sqrt{3}$

b. $\sec y - 2y^{5/2} + C$

c. Students must use a calculator. The answer is ≈ 0.3285.

d. Students must expand first. $\frac{1}{5}t^5 - 2t^3 + 9t + C$

6-13. See below:

a. $+\infty$

b. $+\infty$

c. 0

d. $\frac{1}{6}$

e. $-\frac{1}{2000}$

f. 0

6-14. $f'(0) = 0$

6-15. Answers can vary: Relative max at $x = -2$ and a cusp or vertical tangent at $x = 3$.

6-16. (0, 0)