Lesson 6.2.3

6-123. See below:

a. See the "Suggested Lesson Activity" for a description of possible ways to solve this; $y = 0.1707(1.4)^x$ if x represents the date in March.

b. Solving $5 = 0.1707(1.4)^x$ yields $x \approx 10$, so implantation probably occurred on March 10.

c. While the due date is November 24, any answer between Nov. 10 and Dec. 10 is reasonable.

6-124. See below:

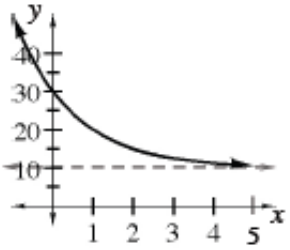
a. Answers vary.

b. i. $200 = ab^{21}$ and $392 = ab^{23}$
ii. While there are multiple possible approaches, most students will probably solve the equations for a and then set the two expressions for a equal to each other to solve for b.

6-125. See below:

a. Decreasing, because as x increases, y decreases.

b. Sample graph shown below.



c. 10, a shift up from the general case, $y = 20(0.5)^x + 10$

d. 30, the asymptote plus the a value, or $a + c$

6-126. See below:

a. Since investments involving compound interest grow by multiplying, this situation would best be modeled with an equation of the form $y = ab^x$.

b. Since (0, 1000) is the y-intercept, then $a = 1000$ and $y = 1000b^x$; using (8, 40000), $40000 = 1000b^8$ and $b \approx 1.586$, so the interest rate $\approx 58.6\%$.

c. 4.4%

d. Since realistic interest rates are usually less than 10%, Sarah's goal in part (c) is more realistic.

6-127. See below:

a. $y = 40(1.5)^x$

b. When $x = –9$, or 9 days before the last day of October (October 22).

6-128. Possible answer: $4^{(x+1)} = 6$

6-129. Sample solutions below:

a. $\frac{2}{3}\log(8)$, $\frac{1}{3}\log(8^2)$, $2\log\left(\sqrt[3]{8}\right)$

b. $\log 5^{-2}$, $-\log 25$, $2\log\frac{1}{5}$

c. $o\log n^b a^b$, $b\log(na)^o$, $bo\log na$

6-130. The graph should show a decreasing exponential function which will have an asymptote at room temperature. Students should realize that the temperature of the drink would not drop below the ambient temperature of the room.

6-131. $y = x^2 – 6x + 8$

6-132. See below:

a. $x \geq \frac{1}{2}$ and $y \geq 3$

b. $g(x) = \frac{(x-3)^2+1}{2}$

c. $x \geq 3$ and $y \geq \frac{1}{2}$

d. x

e. x (They are the same, because f and g are inverses.)

6-133. See below:

a. $x \approx 6.24$

b. $x = 5$

6-134. See below:

a. $(x-1)^2 + y^2 = 9$

b. $(x+3)^2 + (y-4)^2 = 4$

6-135. See below:

a. $x + 5$

b. $a + 5$

c. $x - y$

d. $\frac{x^2+1}{x^2-1}$

6-136. See below:

a. $p^{-1}(x) = \sqrt[3]{(\frac{x}{3} - 6)}$

b. $k^{-1}(x) = \sqrt[3]{(\frac{x-6}{3})}$

c. $h^{-1}(x) = \frac{x+1}{x-1}$

d. $j^{-1}(x) = \frac{3x-2}{x} = -\frac{2}{x} + 3$