1. ANSWER: $\dfrac{f(x+h)-f(x)}{h} = 8x + 4h$

2. ANSWER: $T(x) = \dfrac{\sqrt{16+x^2}}{3} + \dfrac{\sqrt{(7-x)^2+1}}{4.5}$ hours

3. (a) ANSWER: The range of $g(x)$ is $[-1, 2]$.

   (b) HINT: x is in the domain of h if, and only if, $\frac{1}{3}x - 1$ is in the domain of g. The domain of g is the interval $[-3, 4]$. So, solve the inequality

$$-3 \leq \frac{1}{3}x - 1 \leq 4.$$

   ANSWER: The domain of $h(x)$ is the interval $[-6, 15]$.

   (c) HINT: The domain of k will be the set of all x in the domain of g for which $-g(x) \geq 0$. That is, you must find where $g(x) \leq 0$.
   ANSWER: The domain of $k(x)$ is the interval $[\frac{4}{3}, 3]$.

4. (a) HINT: The y-coordinate of point B is 500. Solve the equation $500 = \frac{1}{120}x^2 - \frac{25}{6}x$ for x to find the x-coordinate.
   ANSWER: $(600, 500)$

   (b) ANSWER: $y = \frac{5}{6}x$

   (c) ANSWER: $h(x) = \frac{5}{6}x - \left(\frac{1}{120}x^2 - \frac{25}{6}x\right) = -\frac{1}{120}x^2 + 5x$

   (d) HINT: Myra's height is greatest at $x = 300$ (the x-coordinate of the vertex of the height function). To get the y-coordinate of Myra's location, use the equation of Myra's path from part (b).
   ANSWER: $(300, 250)$

5. (a) HINT: Answers may vary. First, $\sin^{-1}\frac{2}{3} = 0.7297$. So, solving

$$10x + 4 = 0.7297$$

   for x will give one solution. We can use the symmetry of the sine curve: $\pi - 0.7297 = 2.4119$. Solving

$$10x + 4 = 2.4119$$

   for x will give another solution. Finally, we can use the periodicity of the sine curve to find many more solutions. For example, $2\pi + 0.7297 = 7.0129$. Solving

$$10x + 4 = 7.0129$$

   for x will give yet another solution. And so forth.
   THREE POSSIBLE ANSWERS: $x = -0.32703$, $x = -0.15881$, $x = 0.30129$

   (b) ANSWER: 4 ($345.79°$, $374.21°$, $705.79°$, and $734.21°$)

6. (a) HINT: Here are a few intermediate calculations that you might need in order to find Trey's speed:
   - Rita's angular velocity is 0.0502857 radians per second.
   - It takes Rita 78.09358957 seconds to get to point A.
   - The distance Trey runs is 305.1638904 feet.

   ANSWER: Trey's speed is 3.908 feet per second.

   (b) HINT: Trey runs from the point $(250, 0)$ to $(0, 175)$ in 78.09 seconds. Use the parametric equations for linear motion.

   ANSWER: $x(t) = 250 - 3.20t,\ y(t) = 2.24t$

7. (a) ANSWER: $f^{-1}(x) = \dfrac{4e^x}{e^x - 3}$

   (b) ANSWER: $t = \dfrac{3 + \frac{\ln 9}{\ln 4}}{7} = 0.6550$

8. HINT: $A(-2) = A_0 e^{\alpha(-2)} = 1.24$. So, $A_0 = 1.24e^{2\alpha}$. Similarly, $A(3) = A_0 e^{3\alpha} = 35.45$. Combine the two equations to get:

$$(1.24e^{2\alpha})e^{3\alpha} = 35.45$$

and solve for α.

ANSWER: $\alpha = 0.670602374$ and $A_0 = 4.741322612$

9. (a) ANSWER: The angular speed of the wheel is 0.4189 radians per second.

   (b) ANSWER: $x(t) = 3\cos\left(\frac{2\pi}{15}t\right),\ y = 3\sin\left(\frac{2\pi}{15}t\right)$

   (c) HINT: The y-coordinate of end B is always 0 and the distance from A to B is always 7. The coordinates of end A are $\left(3\cos\left(\frac{2\pi}{15}t\right), 3\sin\left(\frac{2\pi}{15}t\right)\right)$ and the coordinates of end B are $(x(t), 0)$. By the distance formula, we have:

$$7^2 = \left(x(t) - 3\cos\left(\frac{2\pi}{15}t\right)\right)^2 + 9\sin^2\left(\frac{2\pi}{15}t\right).$$

   Solve this equation for $x(t)$.

   ANSWER: $x(t) = 3\cos\left(\frac{2\pi}{15}t\right) + \sqrt{49 - 9\sin^2\left(\frac{2\pi}{15}t\right)}$