1.2/15. (a) We want \( T \) as a function of \( N \). The slope of the linear function is given by \( \frac{80-70}{173-113} = \frac{10}{60} = \frac{1}{6} \). By the point-slope form, \( T - 70 = \frac{1}{6}(N - 113) \), so \( T = \frac{1}{6}N + \frac{307}{6} \).

(b) The slope is \( \frac{1}{6} \). The meaning of this is that each increase of 6 chirps per minute corresponds to a 1 degree increase in temperature.

(c) If \( N = 150 \), then \( T = \frac{1}{6}(150) + \frac{307}{6} \approx 76 \) degrees Fahrenheit.

1.3/7. The graph \( y = \sqrt{3x - x^2} \) is shifted 4 units to the right, reflected over the \( x \)-axis and shifted 1 unit down:
\[
y = -\sqrt{3(x + 4) - (x + 4)^2} - 1 = -\sqrt{-x^2 - 5x - 4} - 1.
\]

1.3/16. The graph \( y = \frac{1}{x-4} \) is obtained by shifting the graph \( y = \frac{1}{x} \) four units horizontally to the right. (This also shifts the vertical asymptote to the line \( x = 4 \).)

1.3/24. The graph \( y = |\cos(\pi x)| \) is obtained from \( y = \cos(x) \) by compressing horizontally (the period becomes 2 rather than \( 2\pi \)), and reflecting the parts of the graph \( y = \cos(\pi x) \) that lie below the \( x \)-axis over the \( x \)-axis. See Figure 1 (on the back page).

1.5/21. Since \((1, 6)\) and \((3, 24)\) must be on the graph \( y = Ca^x \), we get the two equations
\[
6 = Ca = Ca
\]
\[
24 = Ca^3.
\]
Solving for \( C \) in the first equation, \( C = \frac{6}{a} \). So substituting into the second equation, we get \( 24 = \frac{6}{a}a^3 = 6a^2 \). Since \( a > 0 \), this shows \( a = 2 \), and hence \( C = 3 \). The equation is \( y = 3 \cdot 2^x \).

1.6/26. First we solve the equation \( y = \frac{e^x}{1+2xe^x} \) for \( x \) as a function of \( y \):
\[
(1 + 2e^x)y = e^x \quad \text{(after clearing denominators)}
\]
\[
y + 2ye^x = e^x
\]
\[
y = (1 - 2y)e^x
\]
\[
\frac{y}{1 - 2y} = e^x
\]
\[
\ln \left( \frac{y}{1 - 2y} \right) = x \quad \text{(after taking logarithms to solve for } x \text{).}
\]
Then \( f^{-1}(x) = \ln \left( \frac{y}{1 - 2y} \right) \) is the inverse function (swap \( x \) and \( y \)).
1.6/51. Solve for $x$ in the exponent by taking logarithms. Using natural log,

\[
\ln (2^x - 5) = \ln(3)
\]
\[
(x - 5) \ln(2) = \ln(3)
\]
\[
\ln(2)x = \ln(3) + 5 \ln(2)
\]
\[
x = \frac{\ln(3) + 5 \ln(2)}{\ln(2)} = \frac{\ln(96)}{\ln(2)}, \text{ or } 5 + \frac{\ln(3)}{\ln(2)}.
\]

2.2/5 (a) $\lim_{t \to 0^-} g(t) = -1$.
(b) $\lim_{t \to 0^+} g(t) = -2$.
(c) $\lim_{t \to 0} g(t)$ does not exist since the one-sided limits are different.
(d) $\lim_{t \to -2^-} g(t) = 2$.
(e) $\lim_{t \to -2^+} g(t) = 0$.
(f) $\lim_{t \to -2} g(t)$ does not exist (same reason as in (c)).
(g) $g(2) = 1$
(h) $\lim_{t \to 4} g(t) = 3$.

2.2/15. There are infinitely many correct graphs here. They would all have jump discontinuities at $x = 3$, and removable discontinuities at $x = -2$. 