b) \( 14.52 - 0.000105 \cdot x \)  
Hard to think about significant digits here especially in comparing the data with that slope – rescaling data would help!

c) \( 13.95 - 0.0000998 \cdot x \)

d) \( x = 25,000, \ y = 11.456, \) or about 11.5 per 100 population

e) \( x = 50,000, \ y = 5.968, \) or about a 6\% change

f) \( x = 200,000, \ y < 0, \) model does not apply

Note a slope having units of \( \frac{\% \ change}{1000 \ dollars} \) would make more sense, i.e. they ought to report income in “thousands of dollars”

(8) A cubic ft does better than exponential

I get: \[ \text{Cost per can (\% reduction)} = f(x) = -5163.94 + 247.975x - 3.8037x^2 + .0261243x^3 \]

Note that we usually think of “diminishing returns” in terms of less effect on the outcome per dollar input, so that it would be best to report the data with \( y \) as the independent variable.

\[ \text{Cost per can} \]

In this case a logarithmic or logistic regression would work best
(20) Using Pwr Reg

you should get \( y = 1.0064 \times 1.49 \)

Since \( y = a \times x^{3/2} \),

\[ y^2 = a^2 \times x^3 \]

and this agrees with

\[ (\text{period})^2 = \text{constant} \times (\text{distance})^3 \]

which is Kepler's Law
1.3 (1) a) \( f(x) + 3 \)
   b) \( f(x) - 3 \)
   c) \( f(x-3) \)
   d) \( f(x+3) \)
   e) \( \frac{f(-x)}{f(x)} \)

3 \( \frac{3}{3} \) c) 4
   d) 5
   e) 2

f) \{ \text{answers from solution manual (YES mL) } \}
g) \( 3f(x) \)
h) \( \frac{1}{3} f(x) \)

62

\[
\begin{align*}
\text{d)} & \quad \text{\textcolor{red}{\ldots}} \rightarrow 350 \text{ mph} \\
1 & \quad \text{\textcolor{red}{\ldots}} \text{ s}
\end{align*}
\]

\[
\begin{align*}
a) & \quad d(t) = 350 \times t \\
b) & \quad \frac{1}{2} s(d) = \sqrt{t^2 + d^2} \\
c) & \quad s(t) = s(d(t)) = \sqrt{1^2 + (350t)^2}
\end{align*}
\]

1.4 (c) \( f(x) = \sqrt{8x-x^2} \)

As an alternative to experimenting with window size, you might consider the domain of \( f \), which is \( \{ x \mid 8x-x^2 > 0 \} \), giving the interval \( 0 \leq x \leq 8 \).

Completing the square for \( x^2-8x \) gives \( (x^2-8x+16)-16 \)

\[= (x-4)^2 - 16 \]

and since we have \(-x^2+8x\) this gives the quantity under the square root as \(16 - (x-4)^2\), a parabola with vertex \((4,16)\). Taking the square root, we see that \( f(x) \) has its maximum at \( x = 4, y = 4 \) and that \( x_{\text{Min}} = 0 \ x_{\text{Max}} = 8 \ y_{\text{Min}} = 0 \ y_{\text{Max}} = 4 \) works.
To find values of $x$ for which $|\sin x - x| < 0.1$.

I'd think

$-0.1 < \sin x - x < 0.1$

The plot of $f(x) = \sin x - x$ with a window having $Y_{\text{MIN}} = -1$ $Y_{\text{MAX}} = 1$

Experimenting with $X_{\text{MIN}}$ and $X_{\text{MAX}}$

or using Trace to read off $x$-values along the graph

or using the equation solver

I find $-0.85 < x < 0.85$

(The point of the exercise was to set $Y_{\text{MIN}}$ and $Y_{\text{MAX}}$)

\(24\)

$P(x) = 3x^5 - 5x^3 + 2x$

$Q(x) = 3x^5$

On the small window, the graphs look quite different.

On the large window, the graphs look nearly the same.