Homework 4 Answers
Section 1.5

Problem 32.
Solve $3(2x - 5) = 2(4x + 3)$ ⇒ $x = -\frac{17}{2}$

Problem 42.
$t = \frac{1}{2}$ hours.

Problem 44.
Let $x$ equal the average annual salary of an office manager. Then $48,533 = x - 248x \Rightarrow x \approx \$64538.56$.

Section 2.1

Problem 6.
Increasing: $(1, 4)$; Decreasing $(-1, 1) \cup (4, \infty)$; Constant: $(-\infty, -1)$

Problem 26.
$d(t) = \sqrt{(120t)^2 + (400)^2} = \sqrt{14,400t^2 + 16,000}$

Problem 38.
$f(-4) = -5(-4) - 8 = 12,
f(-2) = \frac{1}{2}(-2) + 5 = 4,
f(4) = \frac{1}{2}(4) + 5 = 7,
f(6) = 10 - 2(6) = -2$

Section 2.2

Problem 4.
$(fg)(2) = f(2)g(2) = 1 \cdot 5 = 5$

Problem 6.
$(f - g)(0) = f(0) - g(0) = -3 - 1 = -4$

Problem 8.
$(f/g)(-\sqrt{3}) = \frac{f(-\sqrt{3})}{g(-\sqrt{3})} = 0$.

Problem 42.
Domain of $F - G, FG, F/G$ is all the same: $[3, 9]$. 

Section 2.3

Problem 24.
$(f \circ g)(x) = 12x + 6$, domain is all real numbers except $x = -\frac{1}{2}$

$(g \circ f)(x) = \frac{1}{2x+1}$, domain is all real numbers except $x = 0, -12$.

Problem 36.
$(f \circ g)(x) = \frac{x}{x+2}$, domain is all reals numbers except $x = 0, 2$

$(g \circ f)(x) = 2x - 3$, domain is all real numbers except $x = 2$.

Problem 52.
Use the fact that $h = 2r$.
(a) $S(r) = 4\pi r^2 + 2\pi r^2 = 6\pi r^2$.
(b) $S(h) = \pi h^2 + \frac{\pi h^2}{2} = \frac{3\pi h^2}{2}$. 

Section 2.4

Problem 18.
$5y = 7x^2 - 2x$
Not symmetric with respect to x-axis, y-axis, or the origin.

Problem 24.
$3x = |y|$
Symmetric with respect to x-axis.

Problem 40.
$f(x) = 7x^3 + 4x - 2$; neither even nor odd.

Problem 42.
$f(x) = x + \frac{1}{x}$; odd.

Section 2.5

Problem 20.
To get the graph of $f(x) = -\frac{1}{2}\sqrt{x - 1}$, start with $y(x) = \sqrt{x}$.
First do a reflection over the x-axis ($-\sqrt{x}$). Second do a vertical shrink by $\frac{1}{2}$ ($-\frac{1}{2}\sqrt{x}$). Third and finally, do a horizontal shift by 1 units ($-\frac{1}{2}\sqrt{x - 1}$, so shift the graph right.)

Problem 50.
$y = \sqrt{x + 6} - 5$

Problem 52.
$y = -(x - 5)^3$

Problem 56.
$y = |2x| - 5$