2.2 58, 60, 62, 73-76
2.3 64, 56, 70, 72, 76
2.4 85, 96-98
2.5 87-93

Section 2.2

58 Revenue = $f(x)$ x = $ on adv.
so $x = g(t)$ so $f(g(t))$ is the revenue at time t.

60. a) $D = .33t^2 + 1.1t + 16.9$
$D(4) = 5.28 + 4.4 + 16.9 = 26.58$ (in billions so 26,580,000,000)
This gives the # of non-spam e-mails per day in 2007

b) $P = \frac{1.54t^2 + 7.1t + 31.4}{1.21t^2 + 6t + 14.5} = \frac{84.44}{57.86} \approx 1.459$
this is the ratio of email to spam. The reciprocal of this, $\approx .686$ means almost 68% of the email in 2007 was SPAM...

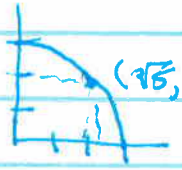
62. I really think they meant to say $f(0) = 64$ and $g(64) = 26$.
but for a) it doesn't matter $g \circ f(0) = 26$ means there were 26 motorcycle deaths per 100 million miles traveled in 2000.

for b $g \circ f(6) = 42$ so there were 42 deaths per... in 2006
c) did fewer, or at least a smaller % of people riding cycles really ~~skip the helmet~~ wear helmets! I guess more people had a death wish in 2006!

73 yes addition is commutative
74 no! a could be in dom f but not dom g.
75 no! ditto
76 no! let $f(x) = \sqrt{x}$ $f \circ f(x) = \sqrt[4]{x}$ $(f(x))^2 = x$.

Section 2.3

54 $p = \sqrt{9-x^2}$ $p = 2 \Rightarrow 2 = \sqrt{9-x^2} \Rightarrow 4 = 9 - x^2 \Rightarrow x^2 = 5$ or $x = \sqrt{5}$



$\sqrt{5} \times 1000$ units would be demanded if $p = \$2$ thus is somewhat nonsensical, however. so you could sell 2,236 units at $2.

56 $p = 2x^2 + 18$

~~$2x^2 + 18 = 2000 \Rightarrow x^2 + 9 = 1000$~~

~~$x^2 = 991 \Rightarrow x =$~~ oops $x = 2$

so $p(2) = 2(4) + 18 = 26$

so if the price is $26 the manuf. will make 2000.

70. $A = xy$ $2x + 2y = 80$ so $x + y = 40$ and $y = 40 - x$

Thus $A(x) = x(40-x)$ or $40x - x^2$ gives the area as a function of the width, x.

72. $V = l \times w \times h = (8-2x)(15-2x)\,x$

76 $A = (y-1)(x-2)$ but $xy = 50$ so $y = 50/x$ and

Area $= \left(\frac{50}{x} - 1\right)(x-2)$

oops! Switch the 1 and the 2

Section 2.4 — 85, 96-98

85. a) $T(1) = \frac{120}{5} = 24$; $T(2) = \frac{480}{8} = 60$ $T(3) = \frac{1080}{13} \approx 83.08$

So 24 million, 60 million and approx 83.08 million, respectively

b) $\lim_{x\to\infty} \frac{120x^2}{x^2+4} = \lim_{x\to\infty} \frac{120}{1+4/x^2} = 120$

So, in the long run, it will gross 120 million.

96. $f(x) = 1 + \frac{1}{x}$ $g(x) = -1/x$ $a = 0$ $\lim_{x\to 0} f+g = 1$

97. $f(x) = \frac{x}{|x|}$ $g(x) = \frac{x}{|x|}$ $a = 0$ (can't believe I couldn't think of these in class!)
$\lim_{x\to 0} fg = 1$

98. $f(x) = \frac{1}{x}$; $g(x) = \frac{1}{x^2}$ $a = 0$.
$\lim_{x\to 0} f/g = 0$.

None of these contradict the theorem. They contradict the converse which is not true.

Section 2.5

87-93 all are false discussed in class.