Selected Problems 10.4

19 $f(x) = (4 + 0.2x)^5$

$f'(x) = 5(4 + 0.2x)^4 (0.2)$

$= 1(4 + .2x)^4$

$H(u) = u^5$

$H'(u) = 5u^4$

$u = G(x) = 4 + 0.2x$

$G'(x) = 0.2$

55 $f(x) = (w^3 + 4)^{-5}$

$f'(x) = H'(G(w))\, G'(w)$

$= -5(w^3+4)^{-6}(3w^2)$

$= \frac{-15w^2}{(w^3+4)^6}$

$H(u) = u^{-5}$

$H'(u) = -5u^{-6}$

$u = G(w) = w^3 + 4$

$G'(w) = 3w^2$

47 $g(x) = 4xe^{3x}$ Product and Chain Rules

$g'(x) = 4e^{3x} + 4x(3e^{3x})$

$= 4e^{3x}(1 + 3x)$

$= 4(3x+1)e^{3x}$

$F(x) = 4x$

$F'(x) = 4$

$S(x) = e^{3x}$ Chain

$H(u) = e^u$

$H'(u) = e^u$

$u = G(x) = 3x$

$G'(x) = 3$

$S'(x) = 3e^{3x}$

63 Find x where tangent line equals 0.

$f(x) = x^2(x-5)^3$

$f'(x) = 2x(x-5)^3 + x^2(3)(x-5)^2$

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

$= x(x-5)^2(2x-10+3x)$

$= x(x-5)^2(5x-10)$

$= 5x(x-5)^2(x-2)$

Where is $f'(x) = 0$?

at

$x = 0$

$x = 5$

$x = 2$

Product

$F(x) = x^2$

$F'(x) = 2x$

$S(x) = (x-5)^3$ Chain

$H(u) = u^3$

$H'(u) = 3u^2$

$u = G(x) = x-5$

$G'(x) = 1$

$S'(x) = 3(x-5)^2(1)$

$= 3(x-5)^2$

Extra Credit Section 8.2

8 $P(A \cup B) = \frac{12+38+23}{100}$ $S = 100$

$= .73$

10 $P(A \cap B') = .12 = 12/100$

12 $P((A \cap B)') = (100-38)/100 = .62$