Practice Exercise Key
Week #2 (part 1)

The even-numbered problems are selected from the required textbook. The answers to these problems are given in a separate file. The link to the answers to next to the link to this file.

Section 1.5.

Find the dy/dx of the following functions

14. $y = 3x^{10}$ **14.** $30x^9$

18. $y = 3x^{-5}$ **18.** $-15x^{-6}$

26. $y = -4.8x^{1/3}$ **26.** $-1.6x^{-2/3}$

Find the derivative of the following functions (Hint: simplifying before taking derivative if n**)**

30. $\frac{d}{dx}\left(\sqrt[3]{x} + \frac{4}{\sqrt{x}}\right)$ **30.** $\frac{1}{3\sqrt[3]{x^2}} - \frac{2}{x\sqrt{x}}$

38. $f(x) = \frac{5}{x} - x^{2/3}$ **38.** $-\frac{5}{x^2} - \frac{2}{3}x^{-1/3}$

48. $y = \frac{2}{x} - \frac{x}{2}$ **48.** $-\frac{2}{x^2} - \frac{1}{2}$

56. If $y = \frac{1}{3x^4}$, find $\frac{dy}{dx}$ at $x = -1$. **56.** $\frac{4}{3}$

For each function, find the points on the graph at which the tangent line is horizontal. If none exist, state that fact.

64. $y = -x^3 + 1$ **64.** $(0, 1)$

66. $y = 3x^2 - 5x + 4$ **66.** $\left(\frac{5}{6}, \frac{23}{12}\right)$

78. $f(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2 - 2$ **78.** $(0, -2), \left(-1, -\frac{11}{6}\right)$

For each function, find the points on the graph at which the tangent line has slope 1

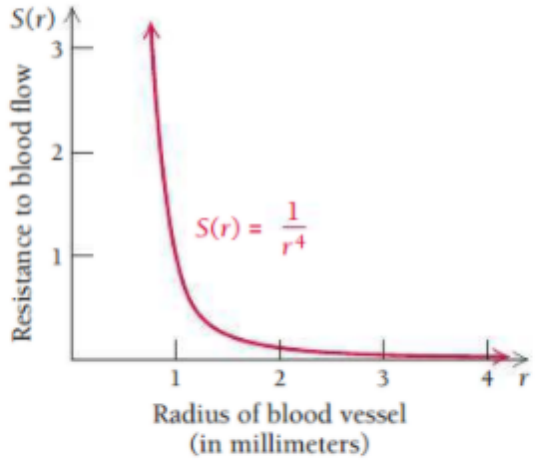
80. $y = 20x - x^2$ **80.** $(9.5, 99.75)$

86. $y = \sqrt{x} + \frac{1}{2}x$ **86.** $\left(1, \frac{3}{2}\right)$

90. Blood flow resistance. The equation

$$S(r) = \frac{1}{r^4}$$

can be used to determine the resistance to blood flow, S, of a blood vessel that has radius r, in millimeters (mm). (*Source*: *Mathematics Teacher*, Vol. 99, No. 4, November 2005.)



a) Find the rate of change of resistance with respect to r, the radius of the blood vessel.
b) Find the resistance at $r = 1.2$ mm.
c) Find the rate of change of S with respect to r when $r = 0.8$ mm.

90. (a) $S'(r) = -\dfrac{4}{r^5}$;

(b) 0.4823 unit of resistance;

(c) -12.2 units of resistance per millimeter