Tutorial Assignments from Chapter 3

Note: Numbered problems are from the Chapter 3 Miscellaneous Problems section on page 195 of Edwards and Penney.

6. Compute $dy/dx$ for $y = \frac{x^4 + x^2}{x^2 + x + 1}$.

12. Compute $dy/dx$ for $y = \sqrt[3]{2x} + \sqrt[3]{3x} - 1$.

36. Find the equation of the tangent line to $y = \frac{x + 1}{x - 1}$ at the point $(0, -1)$.

42. Evaluate $\lim_{x \to 0} \frac{x - \tan x}{\sin x}$.

46. Evaluate $\lim_{x \to 0} x^2 \cdot \sin \left( \frac{1}{x^2} \right)$.

52. Figure out how to write $h(x) = \frac{(x + 1)^{10}}{(x - 1)^{10}}$ as the composition of functions $f(x)$ and $g(x)$. Then apply the chain rule to $f(g(x))$ to compute the derivative of $h(x)$.

56. What is an equation for the straight line through $(1, 0)$ that is tangent to the graph of $h(x) = x + \frac{1}{x}$ at a point in the first quadrant?

60. Five rectangular pieces of sheet metal measure 210 cm by 336 cm each. Equal squares are to be cut from all their corners, and the resulting five cross-shaped pieces of metal are to be folded and welded to form five boxes without tops. The 20 little squares that remain are to be assembled in groups of four into five larger squares, and these five larger squares are to be assembled into a cubical box with no top. What is the maximum possible total volume of the six boxes that are constructed in this way?

62. A right triangle has legs of lengths 3m and 4m. What is the maximum possible area of a rectangle inscribed in the triangle in the “obvious” way – with one corner at the triangle’s right angle, two adjacent sides of the rectangle lying on the triangle’s legs, and the opposite corner on the hypotenuse?

64. A farmer has 400 ft. of fencing with which to build a rectangular corral. He will use some or even all of an existing straight wall 100 ft long as part of the perimeter of the corral. What is the maximum area that can be enclosed.