NAME: _____

Problem 1: Find the limit $\lim\limits_{x \to 4} \dfrac{x-4}{\sqrt{x}-2}$

Problem 2: Differentiate $f(x) = \sqrt{x}$ by using the definition of the derivative.

Problem 3: Find the equation for the line that is tangent to the curve $y = \dfrac{1}{x-1}$ at the point (2, 1)

Problem 4: A dynamite blast blows a heavy rock straight up with a launch velocity of 160ft/sec (about 109 mph). It reaches a height of $s(t) = 160t - 16t^2$ ft after t sec.
A) How high does the rock go?
B) What is the velocity and speed of the rock when it is 256 ft above the ground on the way up? On the way down?
C) What is the acceleration of the rock at any time t during its flight (after the blast)?
D) When does the rock hit the ground?

Problem 5: Use implicit differentiation to find an equation of the tangent line to the curve $y^3 + y^2 - 5y - x^2 = -4$ at (5, 3).

Problem 6: Find the limit $\lim\limits_{x \to 2} \dfrac{\sin(x-2)}{x^2 + x - 6}$

Problem 7: The region bounded by the curve $x = y^2$ the y-axis, and the line $y = \sqrt{2}$ is revolved about the x-axis to generate a solid. Use the shell method to find the volume of the solid.
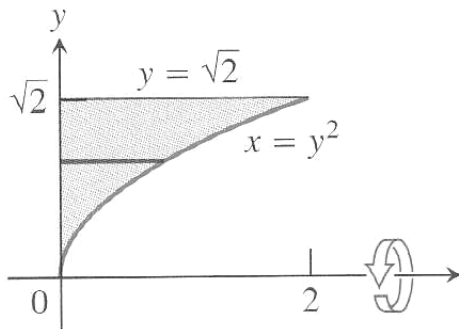
Problem 8: Use the washer method to find the volume of the solid generated when the region bounded by the curve $y = 2\sqrt{x}$ and the lines $y = 2$ and x = 0 is revolved about x-axis.

Problem 9: Find the area of the shaded region.
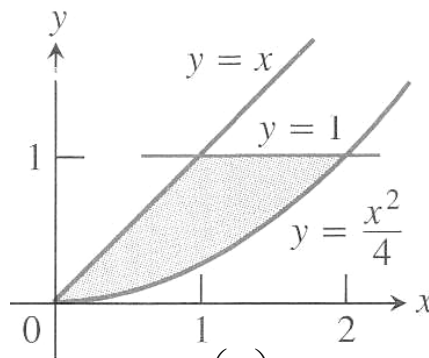
Problem 10: Find $f(x)$ given that $f''(x) = 2 + \cos x$, $f(0) = -1$ and $f\left(\dfrac{\pi}{2}\right) = 0$