Solving Differential Equations

Warm up – finding derivatives, forward thinking.

1. Find the slope function (derivative) for any point on the given curves:

   a) $y = x^2 + 2x - 3$ b) $y = 3e^{2x}$ c) $y = \sin^2 x$

2. Find the slope of the above curve at the point where

   a) $x = 3$ b) $x = 3$ c) $x = \dfrac{\pi}{4}$

Outcome: Find the equation for the anitderivative given initial conditions.

SKILL: Work backwards. Solve for C given a point on the function.

Examples:
1. A curve has a general slope described by $2x - 5$. If the original curve passes through the point (2,17), then what is the equation of the original curve?

2. Find the equation of each curve:
   a) $f(x) = \dfrac{6}{x^2} =$ and passing through (-1, 6).

   b) $f(x) = 3\sqrt{x}$ and passing through (4, 5)

c) $f(x) = 4sin$ and passing through $\left(\frac{\pi}{2}, 6\right)$

2. Find the displacement function for an object moving on a horizontal line given the velocity function: $\frac{ds}{dt} = 2t$, with the initial condition: $s = 3$ when $t = 0$.

3. Find the curve $y = F(x)$ that passes through (-1, 0) and satisfies $\frac{dy}{dx} = 6x^2 + 6x$

4. For the graph G at every point $\frac{dy}{dx} = e^{-x}$ Find the equation of a graph parallel to G that passes through the origin.

Homework: Page 411 #1, 2, 3, 4abc, 5, 6