AP Calculus AB   Name_____

5.4 Day 2 opener

Use Calculator to check answers only.

1) Evaluate the integral:

a. $\displaystyle\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \left(-\csc^2 x\right)dx$

b. $\displaystyle\int_{4}^{1} \frac{x^2 - x^4}{2x^4}\,dx$

2) Find the area between the curve $g(x) = x^2 - x$ and the x- axis on the interval $[-1,1]$.

3) If $f(x) = \sqrt{9 - x^2}$ and $F(0) = 4$, find $F(3)$.

4) Find the derivative:

a) $\displaystyle\int_{-2}^{x} \tan r\,dr$

$$\boxed{\frac{dy}{dx} = \tan x}$$

b) $\displaystyle\int_{0}^{3x} (t^2 - 1)\,dt$

$$\frac{dy}{dx}\,((3x)^2 - 1)\cdot 3$$
$$= (9x^2 - 1)3$$
$$\boxed{= 27x^2 - 3}$$

c) $\displaystyle\int_{x}^{x^2} \ln(1+t)\,dt$

$$= \int_{0}^{x^2} \ln(1+t)\,dt - \int_{0}^{x} \ln(1+t)\,dt$$
$$\frac{dy}{dx} = \ln(1+x^2)(2x) - \ln(1+x)$$
$$\boxed{= 2x\ln(1+x^2) - \ln(1+x)}$$