Name: _____

Basic Integration Techniques

1) If the function f is defined by f(x) = $\sqrt{x^3 + 2}$ and g is an anti-derivative of f such that g(3)= 5, find g(1)

2) Find all possible functions with the following derivative.

1. $y' = 2x$

2. $y' = 2x - 1$

3. $y' = 3x^2 + 2x - 1$

4. $y' = 2x + \sin x + \dfrac{1}{x^2}$

3) Find antiderivative for each function. Check your answers by differentiation.

1) $\int -\dfrac{1}{2}x^{-3/2}dx$　　　　2) $\int -\dfrac{3}{2}x^{-5/2}dx$

3) $\int \sec x \tan x\,dx$　　　　4) $\int \dfrac{1}{2}x^{-1/3}dx$

5) $\int \sec\dfrac{\pi x}{2}\tan\dfrac{\pi x}{2}dx$　　　　6) $\int 4\sec 3x\tan 3x\,dx$

7) $\int\left(\dfrac{\sqrt{x}}{2}+\dfrac{2}{\sqrt{x}}\right)dx$　　　　8) $\int\left(\dfrac{1}{7}-\dfrac{1}{x^{5/4}}\right)dx$

9) $\int\left(-\dfrac{\sec^2 x}{3}\right)dx$　　　　10) $\int\left(2+\tan^2 x\right)dx$

11) $\int 7^x\,dx$　　　　12) $\int 4^x\,dx$

4) Find the equation of the function y=f(x)

      1) $f'(x) = e^x$ and y = f (x) passes through the point (0,2).

      2) $h'(x) = 3x^2$ and y = h(x) passes through the point (1,2).

5) Calculate the following integrals according to the indicated conditions:

    1) $F(x) = \int (x^2 - x)dx$ $F(0) = 1$

    2) $F(x) = \int 2x(1+x^2)^2 dx$ $F(0) = 0$

    3) $F(x) = \int (1+2x)^3 dx$ $F(1) = 2$