Name: ___________________________________

2 Approaches to Finding Particular Solutions

1. Given $\frac{df}{dx} = 3x^2 + 4x - 5$ with the initial condition *f(2)*=-1, find *f(3)*.

Method 1: Integrate $f(x) = \int 3x^2 + 4x - 5\, dx$, and use the initial condition to find C. Then write the particular solution, and use your particular solution to find *f(3)*.

Method 2: Use the Fundamental Theorem of Calculus: $\int_a^b f'(x)\, dx = f(b) - f(a)$

2. Sometimes there is no anti-derivative so we must use Method 2 and our graphing calculator.
   Ex. $f'(x) = \sin x^2$ and *f(2) =-5.* Find *f(1).*

3. The graph of *f'(x)* is shown. Use the figure and the fact that *f(4)=5* to find:
   a. *f(0)*
   b. *f(2)*
   c. *f(6)*

Graph of f'

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You Try…

Work problem 1 by both methods. Do not use your calculator.

1. $f'(x) = 2 + \frac{1}{x^2}$ and f(1)=6. Find f(3).

Work problems 2 -5 using the Fundamental Theorem of Calculus and your Calculator.

2. $f'(x) = \cos x^3$ and f(0)=2. Find f(1).

3. $f'(x) = e^{-x^2}$ and f(5)=1. Find f(2).

4. A particle moving along the x-axis has position *x(t)* at time t with the velocity of the particle $v(t) = 5sint^2$. At time *t=6*, the particle's position is (4,0). Find the position of the particle when t=7.

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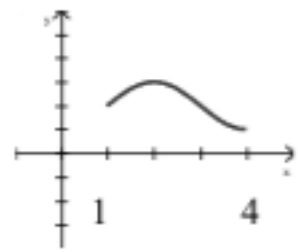
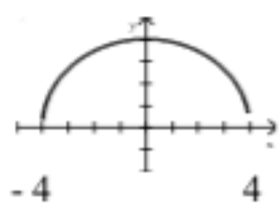
5. A particle moves along a line so that at any time $t \geq 0$ its velocity is given by $v(t) = \frac{t}{1+t^2}$. At time t=0, the position of the particle is s(0)=5. Determine the position of the particle at t=3.

Use the Fundamental Theorem of Calculus and the given graph.

6. The graph of *f'* is shown on the right.
   $\int_1^4 f'(x)dx = 6.2$ and f(1) = 3. Find f(4).



7. The graph of *f'* is the semicircle shown on the right.
   Find f(-4) given f(4) = 7.



8. The graph of *f'*, consisting of two line segments and a semicircle, is shown on the right. Given that *f(-2) = 5, find:*
   a. *f(1)*
   b. *f(4)*
   c. *f(8)*