Math 251

Derivative approximations.

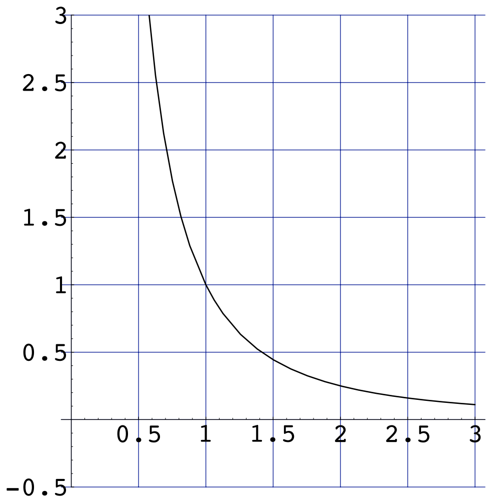
$\boxed{1.}$ From the definition of the derivative at a point,

$$f'(a) = \lim_{h\to 0} \frac{f(a+h) - f(a)}{h}:$$

- Approximate $f'(2)$ for $f(x) = e^x$.

$\boxed{2.}$ From the interpretation of the derivative at a point as the slope of the line tangent to $f(x)$ at that point:

- Approximate $f'(1)$ for $f(x)$ shown below by sketching the line tangent to $f(x)$ at $x = 1$ and estimating its slope.



If the vertical axis measures fuel in ounces and the horizontal axis measures distance in miles, interpret the meaning of you result for $f'(1)$.

$\boxed{3.}$ From the interpretation of the derivative at a point as the slope of the line tangent to $f(x)$ at that point (or the slope of the curve itself at that point):

- Approximate $f'(2)$ from the table for $f(x)$ below

x	0	1	2	3	4
$f(x)$	4	3	1	5	8