

## Calculus Warm Up

day after 5.2

Use the analytic method to find increasing and decreasing intervals.

$$f(x) = \frac{1}{3}x^3 - \frac{1}{2}x^2 - 2x$$

a)

d)

b)

e)

c)

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$$f(x) = \frac{1}{3}x^3 - \frac{1}{2}x^2 - 2x$$

a) Domain  
 $(-\infty, \infty)$

b)  $\frac{dy}{dx}$

$$f'(x) = x^2 - x - 2$$

c)  $f' = 0$        $f' = \text{undef.}$   
 $0 = x^2 - x - 2$       never

$$0 = (x-2)(x+1)$$

$$x = 2, -1$$

d) #line  
 $f'$   $\leftarrow + \quad | \quad - \quad | \quad + \rightarrow$   
incr. -1    decr. 2    incr.

e) Answer

$f$  is increasing  $(-\infty, -1)(2, \infty)$  b/c  $f' > 0$

$f$  is decreasing on  $(-1, 2)$  b/c  $f' < 0$