Panel 1

$y = 2x^4 - 4x^3$ incr/decr/max, min.

① $y' = 8x^3 - 12x^2 = 0$

$\underbrace{4x^2}(2x-3) = 0$ $x = 0$ and $3/2$ are critical

nothing is a minimum

②

	-1	0	1	$3/2$	2000
f'	$-$		$-$		$+$
f	↘		↘		↗

1

Panel 2

Concavity of $y = x^3 + x^2 - 5x - 5$

① $f'(x) = 3x^2 + 2x - 5$

$f''(x) = 6x + 2 = 0$, $x = -\frac{1}{3}$

②

	-11987	$-1/3$	5385921
f''	$-$		$+$
f	$\frown$		$\smile$

concave down $(-\infty, -1/3)$

concave up $(-1/3, \infty)$

2

Panel 3

Graph $f(x) = 2x^3 + 3x^2 - 12x - 3$

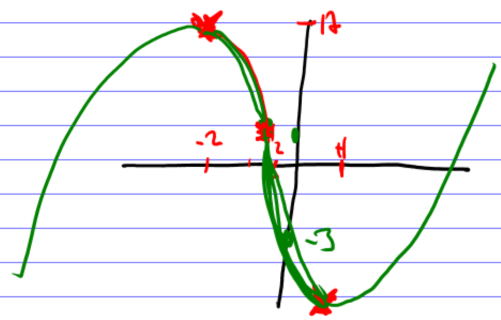
(1) $f'(x) = 6x^2 + 6x - 12 = 0$

$6(x^2 + x - 2) = \boxed{6(x+2)(x-1)} = 0$, $x = 1, -2$ are critical

$f''(x) = \boxed{12x + 6} = 0 \Rightarrow x = -\frac{1}{2}$ is poss. infl. point

(2)

	-10	-2	-1	$-\frac{1}{2}$	0	1	10
f'	+		−	−		+	
f''	−		−	+		+	
f							



(3) Eval f at all special points:

$f(-2) = 17$ $\quad f(-\frac{1}{2}) = \cancel{-6.25}$ 3.5 (?) $\quad f(1) = -10$ and $f(0) = -3$

3

Panel 4

$$\lim_{x \to 4} \frac{x^2 - 16}{x^2 - x - 12} = \lim_{x \to 4} \frac{(x+4)\cancel{(x-4)}}{\cancel{(x-4)}(x+3)} = \lim_{x \to 4} \frac{x+4}{x+3} = \frac{8}{7}$$

Average change: $\frac{f(b) - f(a)}{b - a} = \frac{I(3) - I(1)}{3 - 1} = \frac{4}{2}$

Inst. rate of change: $f'(x)$, $I'(x)$, $x = 3$

Test on Monday!

4