

Let $x=0$
 $y\text{-int} = 100$

Also find the x and y-intercepts of each graph

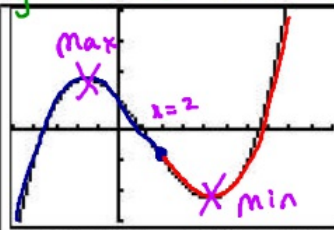
x-int: $x \approx -3.5$
 $x \approx 1$
 $x \approx 6.7$

Concavity changes at the pt. of inflection
 - Find where the slope is the steepest

$y\text{-int} = -75$

x-int: $x \approx -2$
 $x \approx 1.1$
 $x \approx 5.1$

$$y = 4x^3 - 16x^2 - 81x + 100$$



$[-5, 10]$ by $[-300, 400]$

a) Intervals of concavity

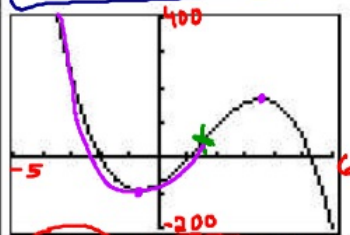
Down $(-\infty, 2)$
 up $(2, \infty)$

b) End Behavior

$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

$$x \rightarrow -\infty \quad y \rightarrow -\infty$$



$[-5, 6]$ by $[-200, 400]$

$$y = -7x^3 + 30x^2 + 50x - 75$$

a) Intervals of concavity

up $(-\infty, 1.5)$
 down $(1.5, \infty)$

b) End Behavior

$$\lim_{x \rightarrow -\infty} f(x) = \infty$$

$$\lim_{x \rightarrow \infty} f(x) = -\infty$$

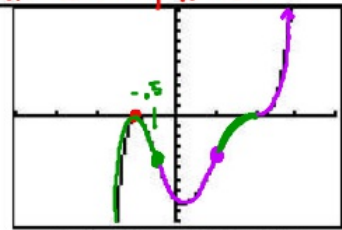
Match the Polynomial Function with its graph.

~~1~~ $f(x) = 4x^3 - 16x^2 - 81x + 100$

3) $f(x) = -x^5 + 3x^4 + 5x^3 - 5x^2 + 6x + 8$

$$y = x^5 - 4x^4 + x^3 + 10x^2 - 4x - 8$$

x-int: $x = -1, x = 2$



$[-4, 4]$ by $[-10, 10]$

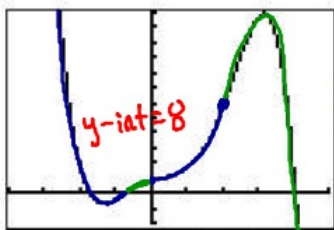
a) Intervals of concavity

Down $(-\infty, -1) \cup (1, 2)$
 up $(-1, 1) \cup (2, \infty)$

b) End Behavior

$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$



$[-4, 5]$ by $[-20, 120]$

$$y = -x^5 + 3x^4 + 5x^3 - 5x^2 + 6x + 8$$

a) Intervals of concavity

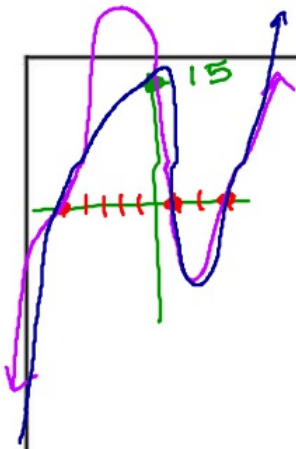
up $(-\infty, -1.6) \cup (0, 2)$
 down $(-1.6, 0) \cup (2, \infty)$

b) End Behavior

$$\lim_{x \rightarrow -\infty} f(x) = \infty$$

$$\lim_{x \rightarrow \infty} f(x) = -\infty$$

$$0 = x^5 - 4x^4 + x^3 + 10x^2 - 4x - 8$$



$(-4) (4) (-2)$

Describe the end behavior of each function

A) $f(x) = (x-3)(x+5)(x-1)$

End Behavior Model: x^3

$$\lim_{x \rightarrow -\infty} f(x) = -\infty \quad \lim_{x \rightarrow \infty} f(x) = \infty$$

x-int: $x=3, x=-5, x=1$

y-int: $(0-3)(0+5)(0-1)$
 $= (-3)(5)(-1)$
 $= 15$

C) $f(x) = (x-3)^2(x+5)(x-1)$

EBM: x^4

$$f(x) = (x-3)(x-3)(x+5)(x-1)$$

$$x \rightarrow \pm\infty \quad y \rightarrow \infty$$

$$\lim_{x \rightarrow \pm\infty} f(x) = \infty$$

B) $f(x) = (x-3)(5-6x)(x-1)$

End Behavior:

$$(x)(-6x)(x) = -6x^3$$

$$x \rightarrow \infty \quad y \rightarrow \infty \quad \text{Left}$$

$$x \rightarrow \infty \quad y \rightarrow -\infty \quad \text{Right}$$

D) $f(x) = (x-3)(5-6x)^3$

EBM: $(x)(-6x)^3 \rightarrow -x^4$

$$x \rightarrow \pm\infty \quad y \rightarrow -\infty$$