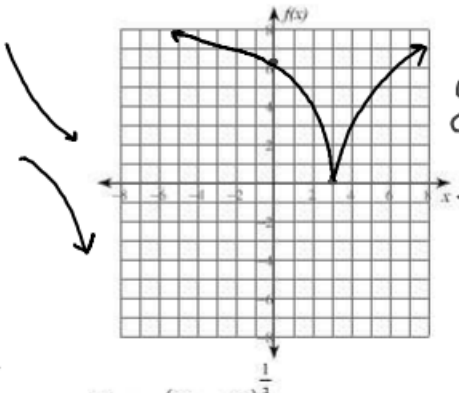
AP Calculus Name _____

Winter Break Curve Sketching Packet of Misery

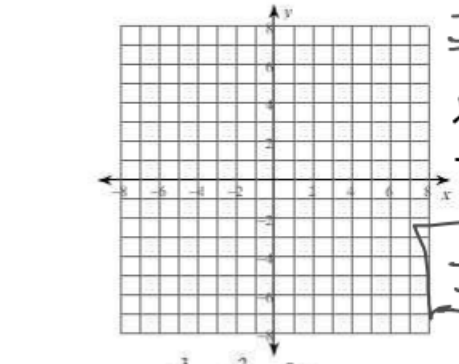
Date _____

Find x and y intercepts, x-coordinates of the critical points, open intervals where the function is increasing and decreasing, x-coordinates of the inflection points, open intervals where the function is concave up and concave down, and relative extrema. Then graph. No calculators.

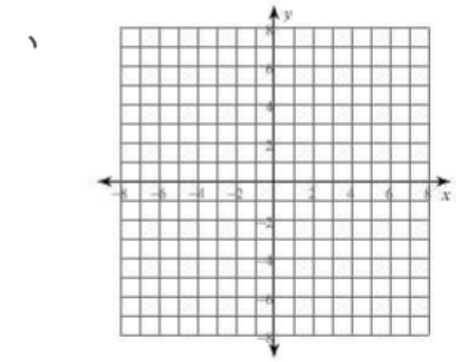
1) $f(x) = (5x-15)^{\frac{2}{3}}$



2) $y = (6x-12)^{\frac{1}{3}}$



3) $y = \frac{x^3}{3} - \frac{x^2}{3} - \frac{8x}{3}$



f' f'' f'''

x-int: $y = (0) = ((5x-15)^{2/3})^{3/2}$

$0 = 5x - 15$

$x = 3$

y-int: $x = 0$

$y = (-15)^{2/3} \approx 6.082$

$f' = \frac{2}{3}(5x-15)^{-1/3} \cdot 5$

$\frac{10}{3}(5x-15)^{-1/3} = \frac{10}{3(5x-15)^{1/3}}$

$f' = \frac{10}{3\sqrt[3]{5x-15}}$ $x = 3$

INC/DEC

x		0		3	
f'	—		—		+
f	DEC		DEC		INC.

f''

$f' = \frac{10}{3}(5x-15)^{-1/3}$

$f'' = \frac{10}{3} \cdot -\frac{1}{3}(5x-15)^{-4/3} \cdot 5$

$-\frac{10}{9} \cdot 5$

$-\frac{50}{9}(5x-15)^{-4/3}$

$f'' = \frac{-50}{9\sqrt[3]{(5x-15)^4}}$

$x = 3$

x		3	
f''	—	3	—
f	CONCAVE Down		

$\therefore (3,0)$ min. b/c f decline.