

Pre-Calculus Quiz ~ Curve Sketching

Name: TEACHER

Final Mark (/ 10)

Date: 18 Sep 2013

Show all work for full credit. Express all answers in exact form whenever possible.

1. Use polynomial long division to calculate the following: (1 pt)

$$\begin{array}{r} (x^3 + 2x^2 - 5x - 6) \div (x + 1) \\ \underline{x^2 + x - 6} \\ x+1 \overline{) x^3 + 2x^2 - 5x - 6} \\ \underline{-(x^3 + x^2)} \\ x^2 - 5x \\ \underline{-(x^2 + x)} \\ -6x - 6 \\ \underline{-(-6x - 6)} \\ 0 \end{array}$$

2. Use synthetic division to calculate the following: (1 pt)

$$\begin{array}{r} (4x^3 + 18x^2 + 5x - 12) \div (x + 3) \\ -3 \mid 4 \quad 18 \quad 5 \quad -12 \\ \quad \quad \downarrow \quad -12 \quad -18 \quad +39 \\ \hline x \mid 4 \quad 6 \quad -13 \quad 27 \end{array}$$

↪ remainder

3. Use the rational root theorem to list all possible rational zeros for the polynomial below: (1 pt)

$$y = 3x^3 + 9x^2 + 4x + 12$$

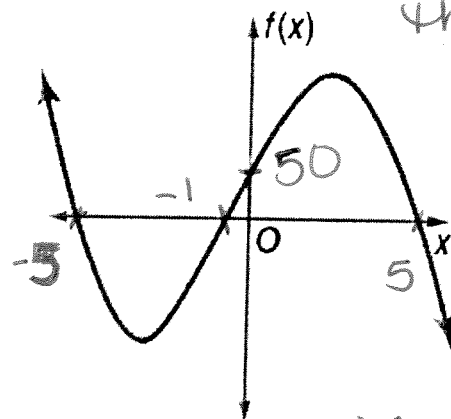
$$a = \pm 1, \pm 3$$

$$b = \pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$$

$$\frac{b}{a} = \pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12, \pm \frac{1}{3}$$

$$\pm \frac{2}{3}, \pm \frac{4}{3}, \pm \frac{6}{3}, \pm \frac{12}{3}$$

4. Write an equation (leave in factored form) that could have the following graph: (1 pt)



no #5...
I'll make them up!

$$y = a(x + 5)(x + 1)(x - 5)$$

$$y = a(x^2 - 25)(x + 1)$$

$$50 = a(0 - 25)(0 + 1)$$

$$50 = -25a$$

$$-2 = a$$

$$y = -2(x^2 - 25)(x + 1)$$

5. List all the roots of the following polynomial function: (2 pts)

$$f(x) = x^4 - 2x^3 - 6x^2 + 6x + 9$$

$$a = \pm 1, b = \pm 1, \pm 3, \pm 9$$

$$f(3) = (3)^4 - 2(3)^3 - 6(3)^2 + 6(3) + 9$$

$$f(3) = 0 \quad (x-3)$$

$$f(-1) = 1 - 2(-1) - 6 - 6 + 9$$

$$f(-1) = 0 \quad (x+1)$$

$$\begin{array}{r|rrrrr} 3 & 1 & -2 & -6 & 6 & 9 \\ & \downarrow & & & & \\ \hline & 1 & 1 & -3 & -3 & 0 \end{array}$$

$$\begin{array}{r|rrrr} -1 & 1 & 1 & -3 & -3 \\ & \downarrow & & & \\ \hline & 1 & 0 & -3 & 0 \end{array}$$

$$(x-3)(x+1)(x^2-3)$$

6. Given the function: $f(x) = x^3 - 2x^2 - 4x + 8$

a) What is the degree of this function? (1 pt)

3

b) List all roots of this function (2 pts)

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

$$= x^2(x-2) - 4(x-2)$$

$$= (x^2 - 4)(x-2)$$

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

$$= (x+2)(x-2)^2$$

$$(-2, 0) \quad (2, 0)$$

↳ Bounce :)

c) Sketch the graph. Label the x- and y-intercepts. (1 pt)

