

No calculators are permitted on this quiz!**Do work on separate paper and attach answers / work in sequential order.**

- 1.) Identify a possible factored form for $f(x)$ as given in **Figure 1**. [10 Points]

- 2.) Given the graph of $p(x)$ in **Figure 2**, fill in the corresponding table. [15 Points]

- 3.) According to the Rational Zeros Theorem, what are all possible rational zeros of [8 Points]

$$f(x) = 22x^4 + 5x - 8 \quad ?$$

- 4.) What is the remainder when the following division is performed? [6 Points]

$$\frac{x^{81} - 8x^{50} + 13x^{41} + 12x^{30} - 3x^3 + 21}{x + 1} \quad ?$$

- 5.) Use Synthetic Division to express the result below in $p(x) = d(x) \cdot q(x) + r(x)$ form. [10 Points]

$$\frac{3x^4 - 4x^3 + 46x + 65}{3x + 5}$$

- 6.) Given the division listed below, express the result in $p(x) = d(x) \cdot q(x) + r(x)$ form. [10 Points]

$$\frac{x^5 + 2x^4 - 7x^3 + 10x^2 - 14}{x^2 + 3x - 5}$$

- 7.) Is $(x-1)$ a factor of $(x^{48} + 2x^{10} - 5x^{22} + 3x^3 - 4x + 3)$? Justify your answer! [6 Points]

- 8.) Find values of A and B so that both $(x-1)$ and $(x+1)$ are factors of [10 Points]

$$p(x) = 5x^6 - 8x^4 + 2x^3 + Ax^2 + Bx - 6 \quad .$$

- 9.) If $x = -\frac{9}{5}$ is a zero of a polynomial $p(x)$, what must its corresponding factor be? [5 Points]
(Please be sure your corresponding factor has integers as coefficients.)

- 10.) Given that $x = 3 + \sqrt{2}$ is a zero, find the other zeros (in exact form) of [20 Points]

$$p(x) = 3x^9 - 20x^8 + 25x^7 + 39x^6 - 79x^5 - 11x^4 + 71x^3 - 15x^2 - 20x + 7 \quad .$$

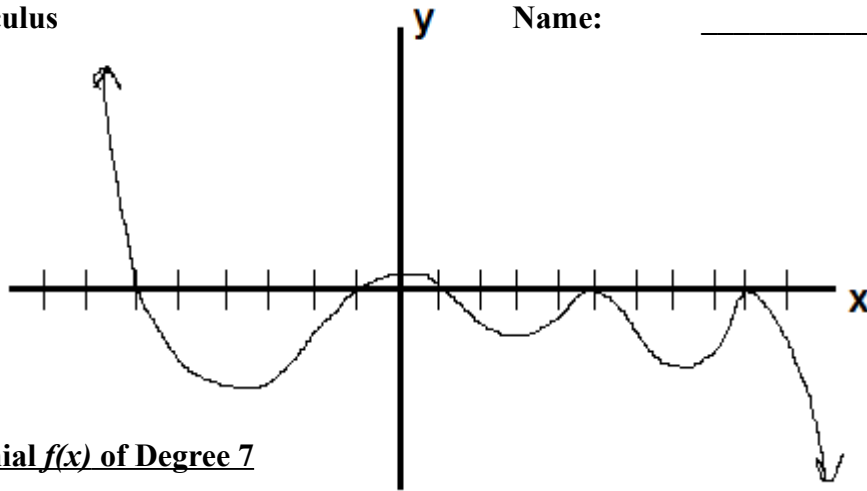


Figure 1

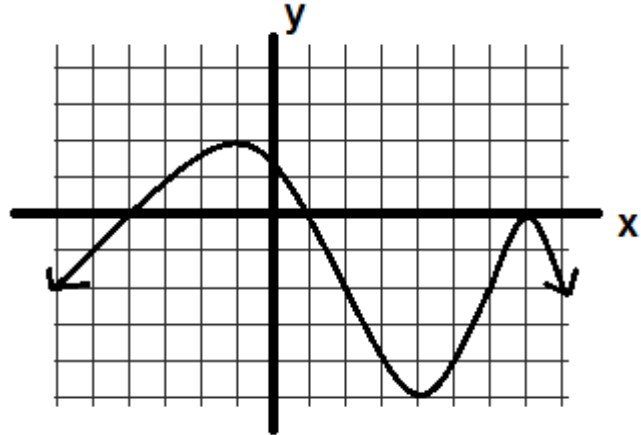
A Polynomial $f(x)$ of Degree 7

Answer: _____

Figure 2

A Polynomial $p(x)$ is pictured.
 Fill in the chart below.

Assume its special points all have integer coordinates.



Property	
Zero(s):	
Local Maximum Points:	
Local Minimum Points:	
Increasing Intervals:	
Decreasing Intervals:	
# of Turning Points:	
End Behavior:	
Domain:	
Range:	
Factored Form of $p(x)$	$p(x) =$