

Pre-Calculus Chapter 2 Pre-Test

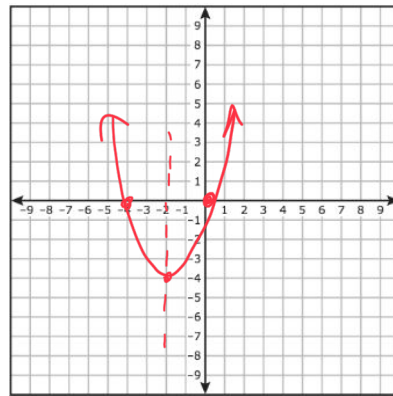
1.) (2.5 pts each, 5 pts total) Determine whether each of the following is a polynomial. If so, identify the degree

a) $f(x) = 2x^5 - 3x^3 + 7x^2 - 9x$

b) $f(x) = 5x^3 + 12x^2 + \sqrt{9x}$

2.) (5 pts) Graph the quadratic function, which is given in standard form

$f(x) = (x + 2)^2 - 4$ $(x - (-2))^2$
 $a(x - h)^2 + k$
 vertex: (h, k)

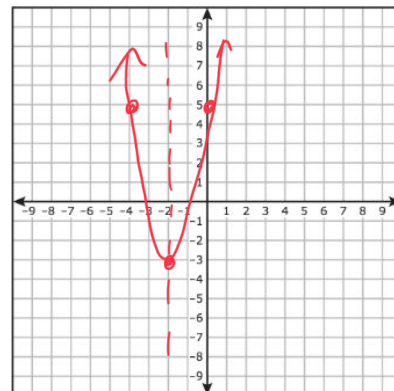


3.) (10 pts) Rewrite the quadratic function in standard form by completing the square. Then graph.

$f(x) = 2x^2 + 8x + 5$

1.) 2020 it
 2.) Factor out a
 3.) $(\frac{4}{2})^2$
 4.) Square root

$(2x^2 + 8x) + 5$
 $2(x^2 + 4x) + 5$
 $\uparrow \quad \uparrow$
 $4 \quad -4(2)$
 $2(x^2 + 4x + 4) + 5 - 8$



$2(x^2 + 4x + 4) - 3$
 $2(x + 2)^2 - 3$

4.) (5 pts) Find all of the real zeros (and their state of multiplicities) for the polynomial.

$$f(x) = 6x^2(x - 2)^4(x + 7)^3$$

$\frac{6x^2}{6} = \frac{0}{6}$
 $\sqrt{x^2} = \sqrt{0}$
 $x = 0$

0 mult of 2
 2 mult of 4
 -7 mult of 3

5.) (10 pts) Find a polynomial of minimum degree that has the given zeros.

-2, 0, 1, 3

$x = -2$
 $+2 +2$
 $x + 2 = 0$

$x = 0$

$x = 1$
 $-1 -1$
 $x - 1 = 0$

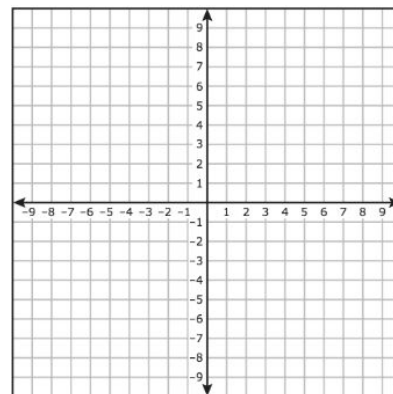
$x = 3$
 $-3 -3$
 $x - 3 = 0$

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

6.) (10 pts) For the polynomial function: (a) list each real zero and its multiplicity; (b) determine whether the graph touches or crosses at each x-intercept; (c) find the y-intercept; (d) sketch the graph.

$$f(x) = x^5 - 4x^3$$

$x^3(x^2 - 4)$



7.) (7.5 pts each, 15 pts total) Divide the polynomials by either long division or synthetic division.

a) $(x^4 - 2x^3 - 7x^2 + 8x + 12) \div (x + 2)$

$$x + 2 = 0$$

$$-2 \quad -2$$

$$x = -2$$

	-2	-7	8	12
↓	-2	8	-2	-12
1	-4	1	6	0
↓ x^3	↑ x^2	↑ x	↑ Constant	↓ remainder

$$x^3 - 4x^2 + x + 6$$

b) $(x^5 + 4x^4 + 3x^2 + 19x + 28) \div (x + 4)$

8.) (10 pts) For the function:

$$x^4 + 8x^3 + 9x^2 - 38x - 40$$

$$\begin{aligned} 1 &: \pm 1 \\ 40 &: \pm 1, \pm 40 \\ &\pm 2, \pm 20 \\ &\pm 4, \pm 10 \\ &\pm 5, \pm 8 \end{aligned}$$

a) Find all potential zeros.

$$\pm 1, \pm 2, \pm 4, \pm 5, \pm 8, \pm 10, \pm 20, \pm 40$$

b) Find the number of possible *positive* zeros.

$$(1)$$

$$\begin{array}{r} x^4 + 8x^3 + 9x^2 - 38x - 40 \\ \hline \end{array}$$

c) Find the number of possible *negative* zeros.

$$(3, 1)$$

d) Attempt to find **3 zeros** using long division or synthetic division. Show all work.

9.) (10 pts) Find a polynomial of minimum degree with the following zeros:

$$-4, 3-i, 3+i$$

$$-4, 3-i, 3+i$$

$$\sqrt{3}, -\sqrt{3}$$

$$\begin{array}{ccc} x = -4 & x = 3-i & x = 3+i \\ +4 & -3+i & -3-i \end{array}$$

$$x+4=0 \quad x-3+i=0 \quad x-3-i=0$$

$$*(x+4)(x-3+i)(x-3-i)$$

10.) (10 pts) Given a zero of the polynomial, determine all other zeros (real or complex) and write the polynomial as a product of linear factors.

$$x^4 + x^3 - 8x^2 + 4x - 48, \text{ zero } \neq 2i \quad 2i \quad -2i$$

$$(x - 2i)(x + 2i)$$

$$x = 2i \quad x = -2i$$

$$x^2 - \cancel{2i} + \cancel{2i} - 4i^2$$

$$x - 2i = 0 \quad x + 2i = 0$$

$$x^2 - 4i^2$$

$$x^2 - 4(-1)$$

$$x^2 + 4$$

$$x^2 + 0x + 4 \overline{) \begin{array}{r} x^4 + x^3 - 8x^2 + 4x - 48 \\ x^4 \\ \hline 0 \\ 0 \\ \hline 0 \\ 0 \\ \hline 0 \\ 0 \end{array}}$$

11.) (5 pts each, 10 pts total) Find the domain and asymptotes (vertical and horizontal) of each of the following rational functions.

a) $\frac{x^2 - 4}{3x^2 - 8x + 4}$

HW
HW/Q 29 May 17th
HW/Q 30 May 23rd
Pre-Test Complete
Actual Test May 23rd
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ch 2 Review

b) $\frac{4x^2 - 3x + 6}{8x^3 - 16x^2 + 8x}$