

9. Perform the following. Put answers in standard form.

a) $(4 - 7i) + (9 + 10i)$

$13 + 3i$

b) $(5 + i)(3 - 2i)$

$17 - 7i$

c) $\frac{(3 - 5i)}{(2 + i)}$

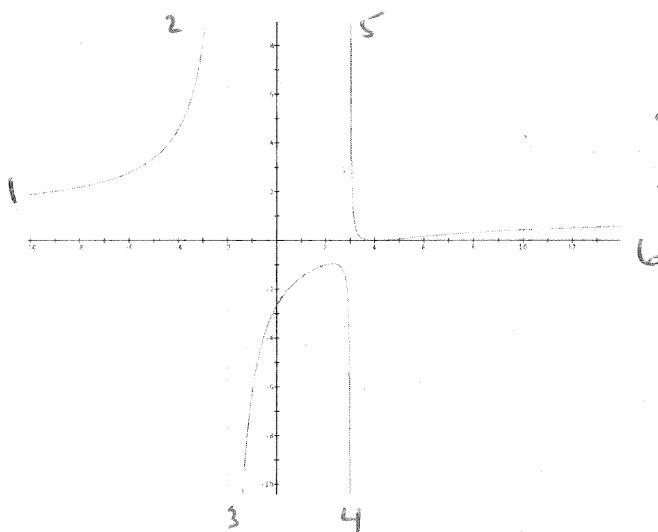
$\frac{1}{5} - \frac{13i}{5}$

~~$\frac{6 - 10i}{5}$~~
 ~~$\frac{6 - 10i}{5}$~~
 ~~$\frac{6 - 10i}{5}$~~

10. List the possible rational zeros of $7x^5 - 4x^4 + 8x^3 - x^2 - 24$

$x = \frac{\pm 1 \pm 2 \pm 3 \pm 4 \pm 6 \pm 8 \pm 12 \pm 24}{\pm 1 \pm 7}$

11. Show the behavior using $As x \rightarrow$ notation. The graph has a horizontal asymptote at $y=1$.



- 1 $As x \rightarrow -\infty f(x) \rightarrow 1^+$
- 2 $As x \rightarrow 2^- f(x) \rightarrow \infty$
- 3 $As x \rightarrow 2^+ f(x) \rightarrow -\infty$
- 4 $As x \rightarrow 3^- f(x) \rightarrow -\infty$
- 5 $As x \rightarrow 3^+ f(x) \rightarrow \infty$
- 6 $As x \rightarrow \infty f(x) \rightarrow 1^-$

12. Use Descartes' Rule of Signs to determine the possible number of positive, negative, and imaginary zeros of $f(x) = -x^5 + 3x^4 + x^3 + 8x^2 + 1$

Pos	Neg	Imag
1	2	2
1	0	4

13. Find all of the following that exist: domain, zeros, y intercept, asymptotes, P.O.D. $f(x) = \frac{x^4 - 5x + 4}{x^2 + 4x + 3}$

Domain $(-\infty, -3) \cup (-3, -1) \cup (-1, \infty)$

V.A. $x = -3$

P.O.D $x = -1$

Zeros $x = -2, 1, 2$

H.A. None

y int $(0, \frac{4}{3})$

Parabolic $y = x^2 - 4x + 8$

14. Write the partial fraction decomposition for the rational expression. $\frac{5x^3 - 3x^2 + 2x + 1}{x^4 + x^2}$

$\frac{5x^3 - 3x^2 + 2x + 1}{x^4 + x^2} = \frac{2}{x} + \frac{1}{x^2} + \frac{3x - 4}{x^2 + 1}$

Honors Pre-Calculus Chapter 2 Worksheet

1. Sketch the graph of the following quadratic functions.

a) $f(x) = (x-3)^2 - 1$

b) $f(x) = -\frac{3}{2}(x+1)^2 + 4$

c) $f(x) = 2x^2 - 10x + 5$

2. Find the quadratic function with the given information: vertex at (4,1) contains the point (10,10)

$$f(x) = \frac{1}{4}(x-4)^2 + 1$$

3. Put the following into vertex form: $f(x) = 4x^2 - 3x + 5$

$$f(x) = 4\left(x - \frac{3}{8}\right)^2 + \frac{71}{16}$$

4. Determine the left and right end behaviors of $f(x) = \frac{27}{8}x^9 - 4x^6 + \frac{3}{2}x^5 - 9x^4 + 3x^2 - 146$

$$\text{As } x \rightarrow +\infty, f(x) \rightarrow \infty, \text{ As } x \rightarrow -\infty, f(x) \rightarrow -\infty$$

5. Divide the following by long division $(5x^2 - 17x - 17) \div (x - 4)$.

$$5x + 3 - \frac{5}{x-4}$$

6. Divide by synthetic division.

a) $(4x^3 - 5x^2 - 11x - 13) \div (x - 3)$

$$4x^2 + 7x + 10 + \frac{17}{x-3}$$

b) $\frac{x^5 - 13x^4 - 120x + 180}{x + 3}$

$$x^4 - 16x^3 + 48x^2 - 144x + 312 - \frac{756}{x+3}$$

7. Find a polynomial function that has the given zeros.

a) $x = 2, -1, -1$

$$f(x) = x^3 - 3x - 2$$

b) $x = 5, 2i$

$$f(x) = x^3 - 5x^2 + 4x - 20$$

8. Find all zeros of the following:

a) $f(x) = x^2 - 3x - 28$

$$x = 7, -4$$

b) $f(x) = x^4 - x^3 - x + 1$

$$x = 1, 1, \frac{-1 \pm i\sqrt{3}}{2}$$

c) $f(x) = x^4 - 2x^3 - 10x^2 + 8x + 24$ given $x = 1 + \sqrt{7}$ is one zero

$$x = 1 + \sqrt{7}, 1 - \sqrt{7}, 2, -2$$