

Polynomial Functions Test Review:

- Solve:
  - $2x^2 + 5x - 12 = 0$  by factoring
  - $3x^2 + 4x - 5 = 0$  by quadratic formula
  - $2x^2 - 5x + 1 = 0$  by completing the square
- Without solving discuss the nature of the roots:
  - $2x^2 - 3x + 5 = 0$
  - $x^2 + 4 = 4x$
  - $4x^2 - 4x = 0$
- Find the sum and the product of the roots for the equation:  $5x^2 - 20x + 4 = 0$
- Write the quadratic equation whose roots are  $(3 + i, 3 - i)$
- Solve using the sign chart:  $2x - x^2 - x^3 < 0$  or knowing the nature of the graph.
- Find all the real values for  $k$  for which  $5x^2 - 10x + k = 0$  has two real roots
- If  $f(x) = 2x^4 - 2x^3 - 2x^2 + x - 4$ , find  $f(3)$  using the remainder theorem and synthetic division.
- Use synthetic division to determine whether  $-3$  is a zero for  $f(x) = 2x^3 - 2x^2 - x + 3$
- Determine  $k$  so that  $x - 3$  is a factor of  $f(x) = x^4 - 3kx^3 + x - 3k$
- Find a polynomial  $P(x)$  of degree 4 such that 3 of its zeros are  $i$ ,  $1$ , and  $-2$  and so that  $P(0) = 3$ .
- Find the zeros of the polynomial  $f(x) = (x + 1)^3(x + 2)^4$  and state the multiplicity of each.
- If  $P(x) = 2x^3 + 3x^2 - 3x + k$ , use the remainder theorem and synthetic division to find  $k$  so that  $P(2) = 8$
- If  $f(x) = 2x^4 - 2x^3 - 5$ ,
  - Sketch a graph of the function
  - Approximate the value of the largest zero to the nearest tenth.
- If  $3x^3 - x^2 - 6x + 2 = 0$ 
  - Use Descartes Rule of Signs to give the possible number of positive, negative, or imaginary roots.
  - Find all the roots of the function.
- Factor completely:  $2x^3 - 3x^2 - 8x - 3$
- If  $4 + i$  is a root of a polynomial equation with real coefficients, then what number will also be a root?
- Show that  $-3$  is a zero of multiplicity 2 and factor completely:  $x^4 + 7x^3 + 13x^2 - 3x - 18$
- Find a polynomial of degree 4 with zeros  $2 + i$  and  $-2i$
- Find all the roots for:  $3x^4 + 14x^3 + 14x^2 - 8x - 8$
- Approximate to the nearest tenth the zero between 1 and 2 in  $f(x) = x^4 - 3x^3 - 2x^2 + 3x + 8$ .