**Openers #4 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*Each day when you come into class, there will be a problem projected for you to complete. Find the appropriate box to complete the problem in and work on it when you arrive.*

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| **Date:**  **\_\_\_\_ / \_\_\_\_/ \_\_\_\_** | 4-1  Find all values of *f*(x) = such that *f*(x) > 0 and all x such that *f*(x) < 0.  If *f*(x) = *k*x3 + x2 – *k*x + 2, find a number *k* such that the graph of *f* contains the point (2,12).  If one zero of *f*(x) = x3 – 3x2 – *k*x + 12 is -2, find two other zeros. |
| **Date:**  **\_\_\_\_ / \_\_\_\_/ \_\_\_\_** | 4-2  4x - 4  2x2 – 5x  4x - 4  2x2 – 5x  Find the quotient and remainder if *f*(x) is divided by *p*(x).  *f*(x) = 3x5 – 4x3 + x + 5;  *p*(x) =x3 – 2x + 7  If *f*(x) = -4x4 + 3x3 – 5x2 + 7x – 10, use the remainder theorem to find *f*(-2).  Use the factor theorem to show that x-3 is a factor of *f*(x) = 2x4 -5x3 – 4x2 + 9. |
| **Date:**  **\_\_\_\_ / \_\_\_\_/ \_\_\_\_** | 4-3-1  Use synthetic division to find the quotient and remainder if f(x) is divided by p(x).  *f*(x) =6x5 – 4x2 + 8; *p*(x) = x+2  Find a polynomial *f*(x) of degree 3 that has the indicated zeros -3, -2, 0 and satisfies *f*(-4) =16.  Find a polynomial *f*(x) of degree 7 such that -2 and 2 are both zeros of multiplicity 2, 0 is a zero of multiplicity 3, and *f*(-1) = 27.  Find the zeros of *f*(x) = x(x+1)4(3x-7)2, and state the multiplicity of each zero. |
| **Date:**  **\_\_\_\_ / \_\_\_\_/ \_\_\_\_**  **Date:**  **\_\_\_\_ / \_\_\_\_/ \_\_\_\_**  **Date:**  **\_\_\_\_ / \_\_\_\_/ \_\_\_\_** | 4-3-2  Show that the number is a zero of *f*(x) of the given multiplicity, and express *f*(x) as a product of linear factors. f(x) = x4 – 9x3 + 22x2 – 32; 4(multiplicity 2)  Determine the number of positive, negative, and nonreal solutions of 3x3 – 4x2 + 3x + 7 = 0.  The polynomial function f(x) = x5 – 2.5x4 – 12.75x3 + 19.625x2 + 27.625x + 7.5 has only real zeros. Use a graph to factor it.  4-4  A polynomial of *f*(x) with real coefficients and leading coefficient 1 has the given zeros and degree. Express *f*(x) as a product of linear and quadratic polynomials with real coefficients that that are irreducible over **R**. -3, 1 – 7*i*; degree 3  Show that the equation 2x5 + 3x3 + 7 = 0 has no rational roots.  Find all solutions of 12x3 + 8x2 – 3x – 2 = 0.  The polynomial function f(x) = 0.5x3 + .65x2 – 5.365x + 1.5375 has only real zeros. Use a graph to factor it.  4-5  Label vertical and horizontal asymptotes and sketch the graph of f(x) =  Simplify f(x) =  Find an equation of a rational function f that satisfies the given conditions:  vertical asymptotes: x = -1 , x = 3  horizontal asymptote: y = 2  x-intercepts: -2, 1; hole at x = 0. |