

## Advanced Precalculus

### Unit 2 Review Key

#### Polynomial Basics

2.)  $-\frac{5}{2}, \frac{4}{3}, -1, \frac{3}{7}$

4.)  $(-1.325, -10.809); (0.338, 2.074)$  **zoom in!**

3.)  $(-1.756, 17.213); (0.582, 3.294)$

5.)  $(-3.107, 0.278) \cup (0.578, \infty)$

6.)  $(-\infty, -0.565) \cup (0, 0.692) \cup (3.073, \infty)$

#### Polynomial Division

1.)  $x^{10} - 1 = (x - 1)(x^9 + x^8 + x^7 + x^6 + x^5 + x^4 + x^3 + x^2 + x + 1)$

2.)  $x^9 + x^8 - x^6 - x^5 + 3x^3 + 5x^2 + 3x + 58 = (x + 1)(x^8 - x^5 + 3x^2 + 2x + 1) + 57$

3.)  $x^5 + 3x^4 - 3x^3 - 7x^2 + 5x + 7 = (x + 3)(x^4 - 3x^2 + 2x - 1) + 10$

4.)  $x^5 + 4x^4 - 2x^3 - 17x^2 - 23x + 54 = (x^2 + 3x - 4)(x^3 + x^2 - x - 10) + 3x + 14$

5.)  $5x^5 + 2x^4 - 15x^3 + 4x^2 + 9x + 22 = (5x + 2)(x^4 - 3x^2 + 2x + 1) + 20$

6.)  $x^8 - 2x^6 - 3x^5 + 2x^4 + 7x^3 - 3x^2 - 2x - 4 = (x^3 - 2x)(x^5 - 3x^2 + 2x + 1) + x^2 - 4$

#### Rational Zeros Theorem / Remainder Theorem / Factor Theorem

1.)  $\pm\left(1, 5, \frac{1}{2}, \frac{5}{2}\right)$  2.) No 3.) 12 4.)  $\pm\left(1, 2, 4, \frac{1}{3}, \frac{2}{3}, \frac{4}{3}\right)$  5.)  $k = -14$  6.)  $r(x) = 2x + 3$

#### Factoring Completely

4.)  $f(x) = (2x + 3)(2x - 3)(2x + 1)(2x - 1)$

5.)  $f(x) = (x + 1)(3x + 2)(3x - 2)(2x + 1)$

6.)  $f(x) = -4(x + 1)^3(3x + 1)^2(x - 2)$

#### Finding Zeros

4.)  $x = 1, x = -2, x = 3, x = \frac{1}{2} + \frac{\sqrt{17}}{2}, x = \frac{1}{2} - \frac{\sqrt{17}}{2}$

5.)  $x = 3 + \sqrt{2}, x = 3 - \sqrt{2}, x = 1, x = 4 + i, x = 4 - i$

6.)  $x = 1 + \sqrt{5}, x = 1 - \sqrt{5}, x = -2 + i, x = -2 - i, x = i, x = -i$

### Solving Equations

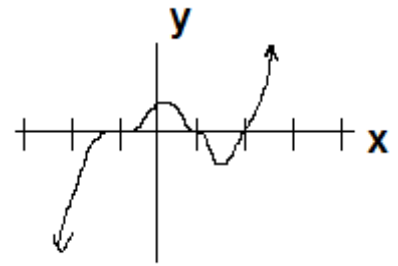
5.)  $x=1, x=-1, x=\sqrt{7}, x=-\sqrt{7}$

6.)  $x=5-2\sqrt{6}, x=5+2\sqrt{6}, x=\frac{1}{3}, x=2i, x=-2i$

### Graphs of Polynomials

5.)  $f(x) = -(x+4)(x+1)^5(x-2)^4(x-5)^3$

6.)



### Polynomial Inequalities

4.)  $(-2, 2) \cup (3, 4)$

5.)  $(-\infty, -2) \cup (-2, 1)$

6.)  $(-\infty, -\sqrt{5}] \cup [\sqrt{5}, \infty)$

### Tricky Problems

6.  $a=2; b=-4$

8.)  $a=-6; b=3$

10.)  $r(x) = -3x + 2$