

Math 115  
4.4 Worksheet

Do not use a calculator for these problems. Determine the degree and sketch a quick graph of each of the following polynomials.

1.  $p(x) = (x - 1)(x - 2)(x - 3)$
2.  $p(x) = (x + 2)(x + 3)(x - 4)$
3.  $p(x) = -(x + 1)(x - 3)(x + 2)$
4.  $p(x) = x(x - 1)^2$
5.  $p(x) = x(x^2 - 1)$
6.  $p(x) = -x(x - 1)^2$
7.  $p(x) = -x(x^2 - 1)$
8.  $p(x) = (x^2 - 1)(x^2 - 4)$
9.  $p(x) = x^3 - 4x^2 + 3x$
10.  $p(x) = x^3 - 9x^2$
11.  $p(x) = (x^2 - x - 2)(x^2 + 2x - 15)$
12.  $p(x) = -(x - 1)^2(x - 2)^2$

**For all of the following problems, after you have found the polynomial, make a quick sketch of the graph showing all zeros and significant points.** In problems 13-18, three or four numbers are given. Find a third- or fourth-degree polynomial that has those numbers as zeros and that satisfies the given condition.

13. 2, 3, -1;  $p(0) = 12$
14. -1, 1, 7;  $p(0) = -3$
15.  $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ ;  $p(0) = 5$
16. 3, -2, 0;  $p(1) = 6$
17. 3, -2, 2, 4;  $p(0) = -1$
18. 1, -2, 3, -4;  $p(0) = 2$
19. Find a cubic polynomial with 1 and 2 as zeros such that  $p(0) = 2$  and  $p(3) = 14$ .
20. Find a cubic polynomial with 3 as the only zero such that  $p(0) = 4$ .