

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 $p(0) = 4$.