

Name: _____

Polynomial Functions of Higher Degrees

Exercise 1: Find three different polynomial functions that have the given zeros

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|---------------------|----------------------------|
| 1) 0,10 | 2) 5,-2 |
| 3) -3,-1 | 4) 3,0,-3 |
| 5) -4,3,8 | 6) $\sqrt{5},6,-2$ |
| 7) $3,2\sqrt{2},-1$ | 8) $3-\sqrt{2},5+\sqrt{3}$ |
| 9) 0,2,5 | 10) -2,-1,0,3 |

Exercise 2: Find a polynomial of degree n that has the given zeros. (There are many correct answers.)

- $x = -2$ is a zero and the polynomial is of degree $n = 2$
- $x = 9$ is a zero and the polynomial is of degree $n = 3$
- $x = 0, 4, -3$ are zeroes and the polynomial is of degree $n = 4$
- $x = -2, -1, 0, 5$ are zeroes and the polynomial is of degree $n = 4$
- $x = \sqrt{3}, 0, \sqrt{5}, -1, \sqrt{2} - 2$ are zeroes and the polynomial is of degree $n = 5$

Exercise 3: Find all the real zeroes. (Hint: Use the quadratic formula)

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| 1) $f(x) = x^2 - 121$ | 2) $f(x) = x^4 - 169x^2$ |
| 3) $f(x) = x^8 - 100x^4$ | 4) $f(x) = x^2 - 4x + 4$ |
| 5) $f(x) = x^2 - 10x + 25$ | 6) $f(x) = x^2 - 12x + 36$ |
| 7) $f(x) = x^2 - 18x + 81$ | 8) $f(x) = x^2 - 7x + 4$ |
| 9) $f(x) = x^2 + 9x + 23$ | 10) $f(x) = 23x^5 (2x + 7)^3 (2x - 8)$ |
| 11) $f(x) = 21x^3 (4x - 28)^3 (x - 2)^2$ | 12) $f(x) = \sqrt{7}x^3 (9 - 3x)^3 (-x + 5)^2$ |