

Math 3 Worksheet

Writing Equations of Polynomial Functions

Complete each statement to make it true.

1. According to the Fundamental Theorem of Algebra, a polynomial has the same number of roots as its degree.

2. If $x = 3 + 2i$ is a zero of a polynomial graph, then $3 - 2i$ must also be a zero since imaginary zeros always come in pairs.

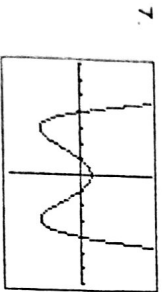
3. If the graph of an even degree polynomial does not cross the x-axis, then it has only complex zeros.

4. $f(x) = x(x + 3)^3(x - 2)$ is a degree 5 polynomial with a 7 leading coefficient. The left end of the graph points down, and the right end of the graph points up. It has three real zeros at $x = 0$, $x = -3$, and $x = 2$ with multiplicity three.

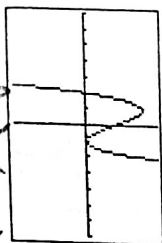
5. $f(x) = (x - 1)^2(x - 6)^3(x + 4)$ is a degree 6 polynomial with a + leading coefficient. The graph will behave at the zero of $x = 1$ slide at the zero of $x = 6$ and cross at the zero of $x = -4$.

6. A polynomial with a real zero with multiplicity four and two imaginary zeros must be a degree 6 polynomial.

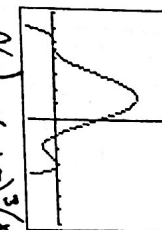
Write a factored form polynomial function $f(x)$ of least degree that has a leading coefficient of 1 with the real zeros shown in the graph.



7.



8.

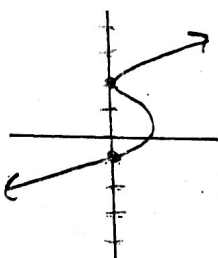


9.

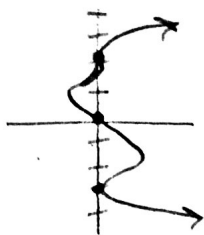
$f(x) = (x + 1)(x + 1)(x - 1)(x - 1)$ $f(x) = (x + 2)(x - 1)^2$ $f(x) = -(x + 5)^3(x - 1)(x - 3)^2$

WITHOUT a calculator, sketch the graph of each polynomial function using the information provided.

11. A polynomial with a negative leading coefficient and zeros of $x = -2$ (multiplicity 2) and $x = 1$



12. A polynomial with a positive leading coefficient and zeros of $x = -2$ (multiplicity 3), $x = 0$, and $x = 3$ (multiplicity 2)



Write a standard form polynomial function $f(x)$ of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.

13. -7 and -4 $f(x) = (x + 7)(x + 4)$

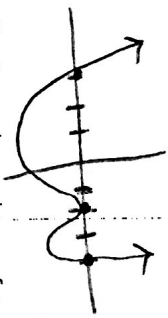
$x^2 + 11x + 28 = f(x)$

14. $1, 2$, and 5

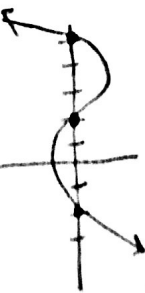
$f(x) = (x - 1)(x - 2)(x - 5) = x^3 - 8x^2 + 17x - 10$

15. $-3, 2$, and 6 (multiplicity 2) $f(x) = (x + 3)(x - 2)(x - 6)^2 = x^4 - 5x^3 - 12x^2 + 36x$

16. $y = (x + 3)(x - 2)^2(x - 4)$

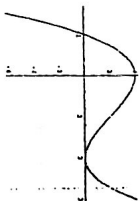


17. $y = x^3 - 5x^2 - 4x - 20$



Describe the number and type of roots for each polynomial graph.

18.



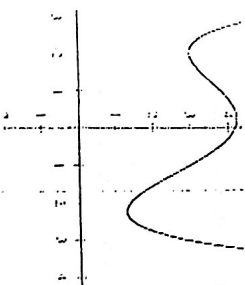
$(x + 1)(x - 2)$ $x^2 - x - 2$ positive leading coefficient

19.



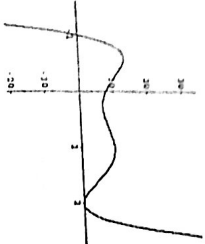
negative leading coefficient $x^2 - 2x - 3$ multiplicity 2 $x = 1$ $x = 3$

20.



only complex zeros positive leading coefficient

21.



positive leading coefficient $x^2 - 3x + 2$ multiplicity 3 at 0 complex root multiplicity 2 at $x = 2$