

5.2 Evaluate and Graph Polynomial Functions

pp. 337–344

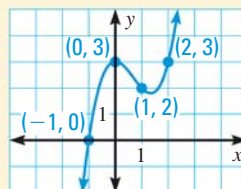
EXAMPLE

Graph the polynomial function $f(x) = x^3 - 2x^2 + 3$.

Make a table of values.

x	-2	-1	0	1	2	3
$f(x)$	-13	0	3	2	3	12

Plot the points, connect the points with a smooth curve, and check the end behavior.



The degree is odd and the leading coefficient is positive, so $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$ and $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$.

EXERCISES

Graph the polynomial function.

13. $f(x) = -x^4$

14. $f(x) = x^3 - 4$

15. $f(x) = x^3 + 2x + 3$

16. **FISH CONSUMPTION** From 1990 to 2002, the amount of fish F (in millions of pounds) caught for human consumption in the United States can be modeled by

$$F = -0.907t^4 + 28.0t^3 - 258t^2 + 902t + 12,700$$

where t is the number of years since 1990. Graph the function. Use the graph to estimate the year when the amount of fish caught first was greater than 14.5 billion pounds.

EXAMPLES 5 and 6

on p. 340
for Exs. 13–16

5.3 Add, Subtract, and Multiply Polynomials

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EXAMPLE

Perform the indicated operation.

$$\begin{aligned} \text{a. } (3x^3 - 6x^2 - 7x + 5) + (x^3 + 8x + 3) &= 3x^3 + x^3 - 6x^2 - 7x + 8x + 5 + 3 \\ &= 4x^3 - 6x^2 + x + 8 \end{aligned}$$

$$\begin{aligned} \text{b. } (x - 4)(2x^2 - 7x + 5) &= (x - 4)2x^2 - (x - 4)7x + (x - 4)5 \\ &= 2x^3 - 8x^2 - 7x^2 + 28x + 5x - 20 \\ &= 2x^3 - 15x^2 + 33x - 20 \end{aligned}$$

EXERCISES

Perform the indicated operation.

17. $(5x^3 - x + 3) + (x^3 - 9x^2 + 4x)$

18. $(x^3 + 4x^2 - 5x) - (4x^3 + x^2 - 7)$

19. $(x - 6)(5x^2 + x - 8)$

20. $(x - 4)(x + 7)(5x - 1)$

EXAMPLES 1, 2, 4, and 5

on pp. 346–348
for Exs. 17–20