

Graphing Polynomials

Determine the function's domain, range, and end behavior. (Use interval notation for the domain and range.)

1. $f(x) = x^7$

2. $f(x) = -x^9$

3. $f(x) = x^{10}$

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

Determine the zeros and multiplicity of each zero and state the end behavior.

5. $f(x) = x(x+1)(x+3)$

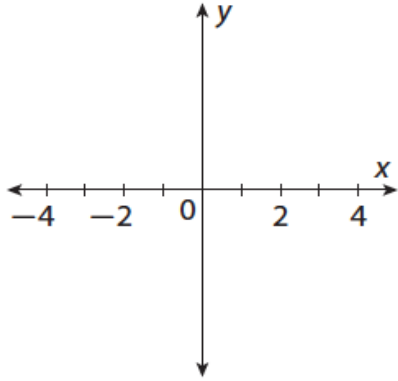
6. $f(x) = (x+1)^2(x-1)(x-2)$

7. $f(x) = -x(x-2)^2$

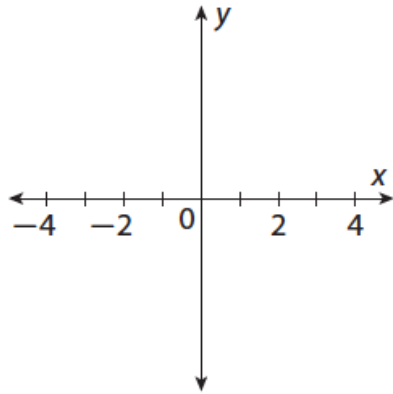
8. $f(x) = -(x-1)(x+2)^3$

Sketch the graph of the polynomial function.

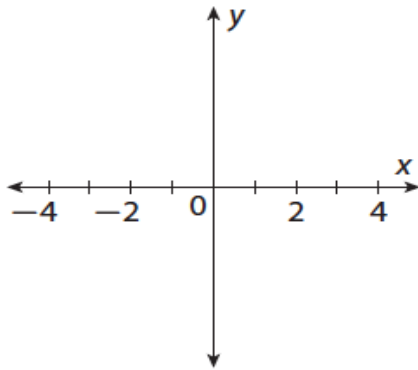
9. $f(x) = x^2(x - 2)$



10. $f(x) = -(x + 1)(x - 2)(x - 3)$

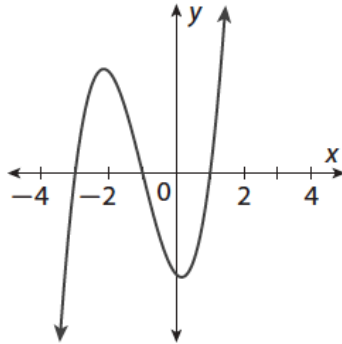


11. $f(x) = x(x + 2)^2(x - 1)$

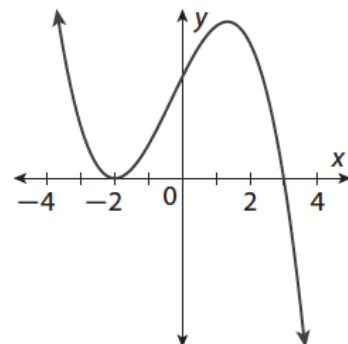


Write a cubic function in intercept form for the given graph, whose x -intercepts are integers. Assume that the constant factor a is either 1 or -1 .

14.

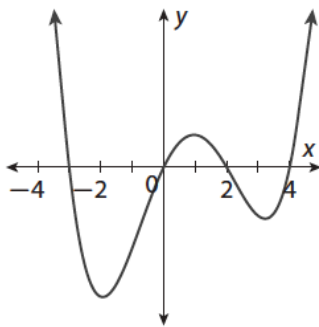


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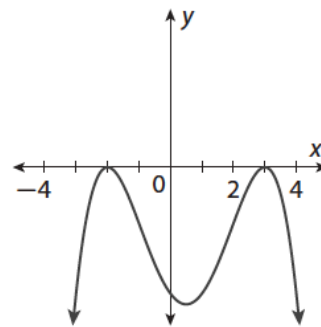


Write a quartic function in intercept form for the given graph, whose x -intercepts are integers. Assume that the constant factor a is either 1 or -1 .

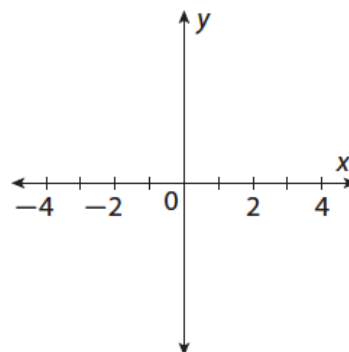
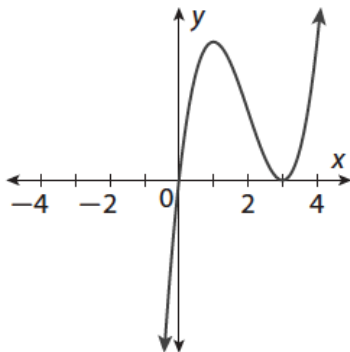
16.



17.



19. **Explain the Error** A student was asked to sketch the graph of the function $f(x) = x^2(x - 3)$. Describe what the student did wrong. Then sketch the correct graph.



Review

Use the binomial theorem to find the polynomial expansion for the function.

1. $(x+3)^6$

2. $(3x+4)^5$

Selected Answers:

1. Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow \infty$

As $x \rightarrow -\infty, f(x) \rightarrow -\infty$

3. Domain: $(-\infty, \infty)$

Range: $[0, \infty)$

End Behavior:

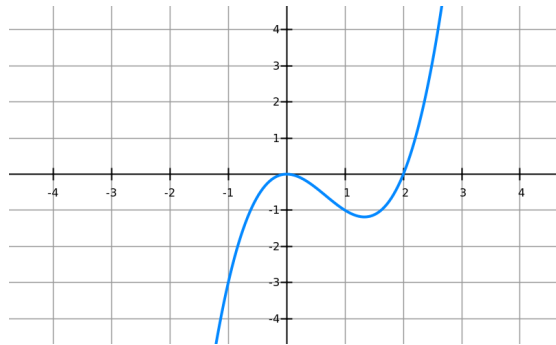
As $x \rightarrow \infty, f(x) \rightarrow \infty$

As $x \rightarrow -\infty, f(x) \rightarrow \infty$

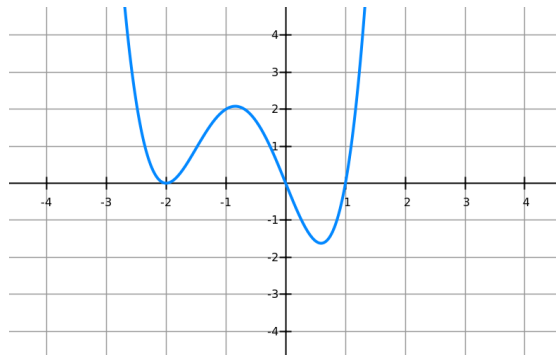
5. The graph has 2 turning points, one local minimum and one local maximum value

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9.



11.



14. $f(x) = (x + 3)(x + 1)(x - 1)$

17. $f(x) = -(x + 2)^2(x - 3)^2$

19. The student has the graph crossing at $x=0$ and tangent at $x=3$ when it should be tangent at $x=0$ and cross at $x=3$. (Actual graph on next page)

