

Polynomial Functions and Models

Higher-degree polynomial behavior, end behavior, and polynomial models.

Name _____ Date _____

32 main 2-up grid 2 pages

Completion Reward

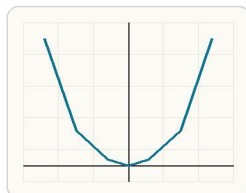


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1. What is the degree of $4x^5 - 3x^2 + 7$?

- A. 4
- B. 2
- C. 7
- D. 5

2. How does an even-degree polynomial with positive leading coefficient behave at the ends?



End behavior is controlled by the highest-power term, so a positive even-degree polynomial goes up left and right.

- A. Down on both ends
- B. Up left and down right
- C. Down left and up right
- D. Up on both ends

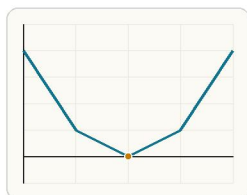
3. How does an odd-degree polynomial with negative leading coefficient behave?



For an odd degree with negative leading coefficient, the graph comes down as x increases and rises as x decreases.

- A. Up left and down right
- B. Down on both ends
- C. Up on both ends
- D. Down left and up right

4. If a factor $(x - 2)^2$ appears, what does that suggest about $x = 2$?



A factor like $(x - 2)^2$ means $x = 2$ is a zero of multiplicity 2.

- A. It is a repeated zero.
- B. It is never a zero.
- C. It must be a y-intercept.
- D. It forces odd degree.

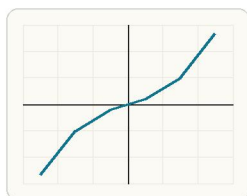
5. For a large positive x , what mostly controls the value of $2x^5 - x + 7$?

- A. The leading term $2x^5$
- B. The constant 7
- C. The term $-x$ only
- D. The sign of x only

6. In $x^4 + 2x + 1$, what determines the degree?

- A. The number of terms
- B. The coefficient of x
- C. The largest exponent
- D. The constant term

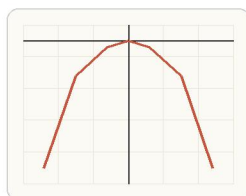
7. Which polynomial has degree 3 and positive leading coefficient?



Use the highest power and its sign to judge which polynomial matches the required degree and leading-coefficient behavior.

- A. $-x^3 + 4x$
- B. $x^2 - 5$
- C. $-3x^4 + 2$
- D. $2x^3 - x + 1$

8. Which polynomial has both ends going downward?



An even-degree polynomial with negative leading coefficient falls on both ends.

- A. $x^4 - 3$
- B. $2x^3 + 1$
- C. $-x^4 + x$
- D. $x^3 - 4x$

9. Which factor form has zeros 1, 1, and -2?

- A. $(x + 1)^2(x - 2)$
- B. $(x - 1)^2(x + 2)$
- C. $(x - 1)(x - 2)^2$
- D. $(x + 1)(x + 2)^2$

10. What is the best first step when building a polynomial with zeros 1 and -4?

- A. Add the zeros together first.
- B. Square both zeros.
- C. Write factors $x - 1$ and $x + 4$.
- D. Start with $y = mx + b$.

11. A student says a zero at -3 gives factor $x - 3$. What is the mistake?

- A. A zero at -3 gives $x + 3$ because $x - (-3) = x + 3$.
- B. They should always square the factor.
- C. The factor should be $3x$.
- D. Negative zeros do not make factors.

12. Evaluate $f(x) = x^3 - 2x$ when $x = 3$. Answer with a number.

13. Evaluate $p(x) = 2x^3 + x^2 - 1$ when $x = 2$. Answer with a number.
14. Evaluate $q(x) = x^4 - 5$ when $x = -2$. Answer with a number.
15. Evaluate $r(x) = (x - 1)(x + 2)(x - 3)$ when $x = 4$. Answer with a number.
16. What is the leading term of $7 - 2x^3 + 5x^2$? Answer with a number.
17. A degree-4 polynomial can have at most how many turning points? Answer with a number.
18. A projectile model is $h(t) = -t^2 + 6t$. Find $h(2)$. Answer with a number.
19. A cubic model is $p(x) = x^3 - x$. Find $p(-2)$. Answer with a number.
20. Evaluate $s(x) = x^4 - 2x^2$ when $x = 3$. Answer with a number.
21. Evaluate $m(x) = (x - 1)^2$ at $x = 5$. Answer with a number.
22. Evaluate $n(x) = x^4 + x$ when $x = -2$. Answer with a number.
23. Evaluate $u(x) = (x + 1)(x - 2)$ when $x = 6$. Answer with a number.
24. Write a polynomial in factored form with zeros 2 and -5. Answer as an equation.
25. Write a polynomial in factored form with zeros -1, 3, and 4. Answer as an equation.
26. Expand $(x - 2)(x + 3)$. Answer with an equivalent expression.
27. Expand $x(x - 1)(x + 2)$. Answer with an equivalent expression.
28. Which statement about $y = -x^3 + 2x$ is correct?
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- The right side falls because the leading term is negative.
- A. Both ends go up.
 B. As x goes right, y goes down.
 C. As x goes left, y goes down.
 D. The graph has even-degree end behavior.
29. Write a polynomial in factored form with zeros 1, 1, and -2. Answer as an equation.
30. Write a polynomial in factored form with zeros -3, -1, 2, and 4. Answer as an equation.
31. Expand $(x - 1)^2$. Answer with an equivalent expression.
32. Expand $(x - 1)^2(x + 2)$. Answer with an equivalent expression.