

Algebra 2 · Polynomial Functions and Their Graphs · Test

Common Core F-IF.C.7c, A-APR.B.3, F-IF.B.4 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This test covers polynomial functions: degree, end behavior, zeros, multiplicity, sketching graphs and modeling, Common Core F-IF.C.7c, A-APR.B.3 and F-IF.B.4. It has eight questions worth 20 points in total. A calculator is allowed. Show all work for full credit.

Test information

- **Grade:** Algebra 2
- **Chapter:** Polynomial Functions and Their Graphs
- **Common Core:** F-IF.C.7c, A-APR.B.3, F-IF.B.4
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 3 pts; Question 5: 3 pts; Question 6: 2 pts; Question 7: 3 pts; Question 8: 3 pts)

Question 1: Degree and end behavior (2 points)

Consider $f(x) = -3x^5 + 2x^3 - x + 4$.

- State the degree and the leading coefficient. (1 point)
- Describe the end behavior. (1 point)

Question 2: Zeros and multiplicity (2 points)

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

- List each zero with its multiplicity. (1 point)
- State the degree and how the graph behaves at each zero. (1 point)

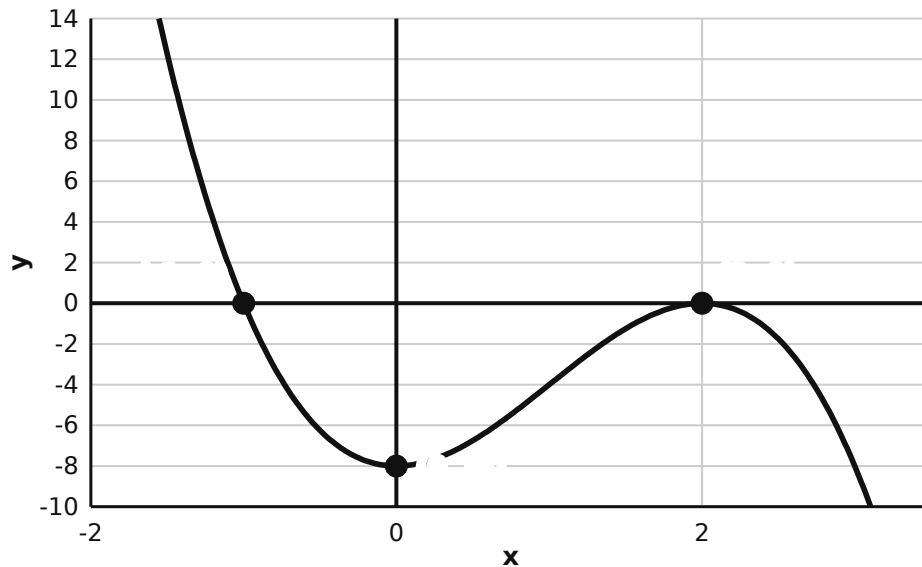
Question 3: Factor by grouping (2 points)

Let $g(x) = x^3 - 4x^2 - 9x + 36$.

- Factor $g(x)$ completely. (1 point)
- Find all zeros. (1 point)

Question 4: Equation from a graph (3 points)

The graph of a polynomial function of degree 3 is shown.



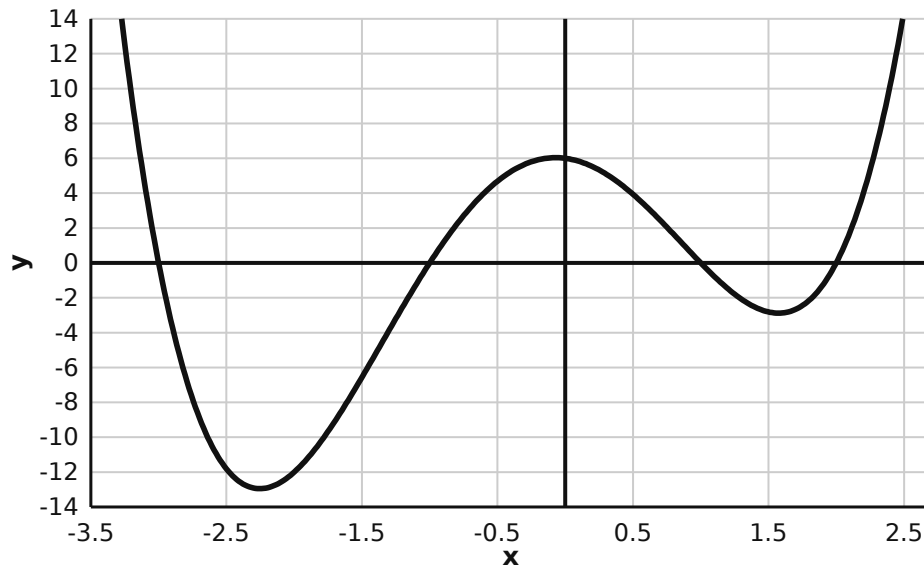
- Name each zero and its multiplicity. (1 point)
- Find the leading coefficient. (1 point)
- Write the function in factored form. (1 point)

Question 5: Sketch a graph (3 points)

Sketch the graph of $f(x) = x(x-3)(x+2)$. Label the zeros and show the end behavior.

Question 6: Turning points (2 points)

- What is the greatest number of turning points a polynomial of degree 6 can have? (1 point)
- The graph below rises on both ends. State the least possible degree and whether the leading coefficient is positive or negative. (1 point)



A polynomial graph.

Question 7: Trail elevation (3 points)

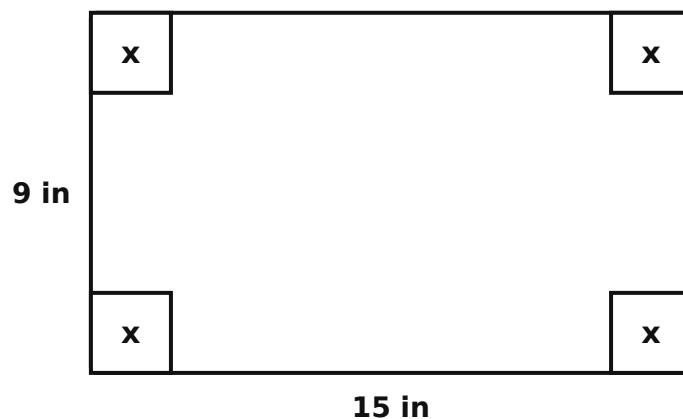
A trail's elevation in feet relative to its start is $e(x) = x(x-2)(x-6)$ after x miles. The table shows values for whole miles.

x	0	1	2	3	4	5	6	7
$e(x)$	0	5	0	-9	-16	-15	0	35

- At which distances is the trail level with the start? (1 point)
- Between which distances is the trail below the start? (1 point)
- What is the lowest elevation in the table, and at which mile? (1 point)

Question 8: Open box (3 points)

Ethan makes an open box from a 9-inch by 15-inch sheet by cutting a square of side x inches from each corner and folding up the sides.



Not drawn to scale.

- a. Write a function $V(x)$ for the volume of the box. (1 point)
- b. State a sensible domain. (1 point)
- c. Compare $V(2)$ and $V(3)$. Which cut gives the greater volume? (1 point)