

Precalculus · Polynomial and Rational Functions in Depth · Test

Common Core A-APR.B.2, A-APR.B.3, F-IF.C.7c, F-IF.C.7d, N-CN.C.9 · mathovore.fr

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

This precalculus polynomial rational test checks polynomial and rational functions in depth in 45 minutes, with 9 questions for a total of 20 points.

This test covers the Rational Root Theorem, complex zeros, polynomial graphs, asymptotes and inequalities. It has 9 questions worth 20 points. Allow 45 minutes, write intervals in interval notation, and show your work for full credit. Calculators are not needed.

Test information

- **Grade:** Precalculus
- **Chapter:** Polynomial and Rational Functions in Depth
- **Common Core:** A-APR.B.2, A-APR.B.3, F-IF.C.7c, F-IF.C.7d, N-CN.C.9
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 3 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 2 pts; Question 5: 2 pts; Question 6: 3 pts; Question 7: 3 pts; Question 8: 2 pts; Question 9: 1 pt)

Precalculus Polynomial Rational Test: questions 1-5

Question 1: Rational Root Theorem (3 points)

Let $P(x) = 2x^3 + x^2 - 13x + 6$.

- How many possible rational zeros does the Rational Root Theorem give? (1 point)
- Find all zeros of P . (2 points)

Question 2: Complex zeros of a quartic (2 points)

Find all real and complex zeros of $f(x) = x^4 - 16$.

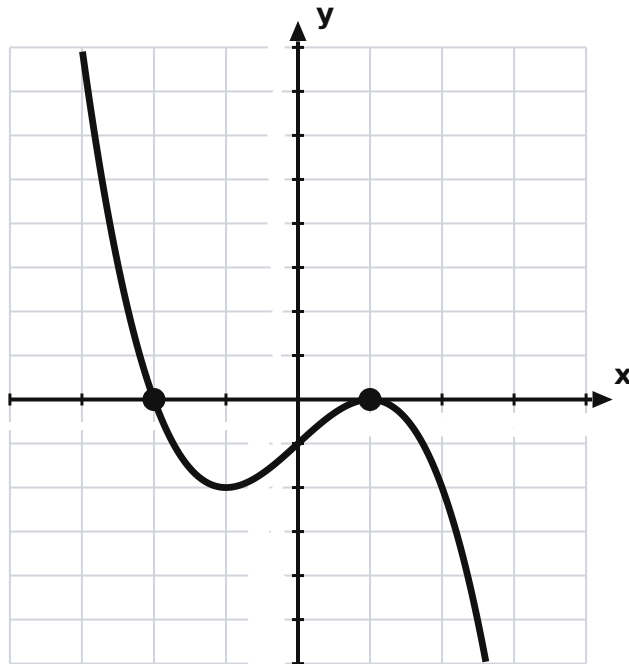
Question 3: Build a polynomial (2 points)

Write a monic cubic polynomial with real coefficients that has zeros 4 and $1+3i$. Give the

answer in standard form.

Question 4: Read a polynomial graph (2 points)

The graph shows a polynomial g with a zero at -2 and a zero at 1 .

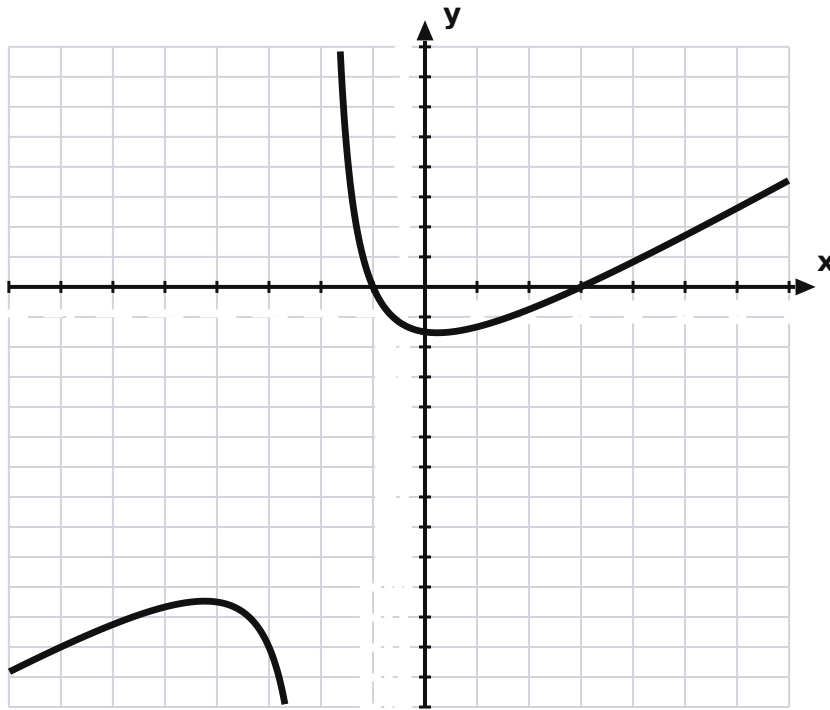


Graph of g .

- State the multiplicity of each zero as odd or even. (1 point)
- State the least possible degree and the sign of the leading coefficient. (1 point)

Question 5: Asymptotes from a graph and a rule (2 points)

The graph shows $f(x) = \frac{x^2 - 2x - 3}{x + 2}$.



Graph of f .

- Find the equation of the vertical asymptote. (1 point)
- Find the equation of the slant asymptote. (1 point)

Precalculus Polynomial Rational Test: questions 6-9

Question 6: Cubic inequality (3 points)

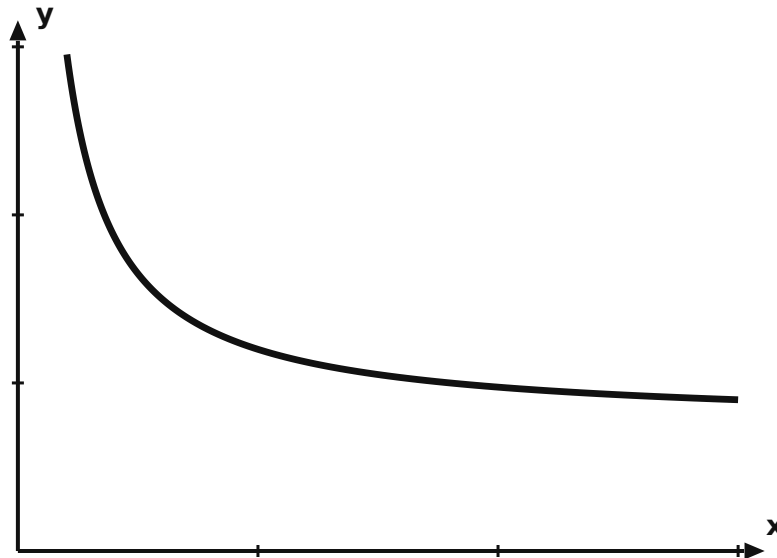
Solve $(x+3)(x-1)(x-4) > 0$ and write the answer in interval notation.

Question 7: Rational inequality (3 points)

Solve $\frac{x-5}{x+1} \leq 2$ and write the answer in interval notation.

Question 8: Average cost model (2 points)

The average cost per shirt for a team store is $A(x) = \frac{15x+900}{x}$ dollars for x shirts.



Graph of A.

- Find the horizontal asymptote of A and interpret it. (1 point)
- Find the smallest number of shirts for which the average cost is at most \$20. (1 point)

Question 9: Conjugate zeros (1 point)

A polynomial with real coefficients has degree 5 and zeros 2 , $1-i$ and $3i$. Write the other two zeros.

How to use this precalculus polynomial rational test

Take this precalculus polynomial rational test without notes, then grade it with the test answer key out of 20 points.

