

Polynomial and Rational Functions Review: math test, Grade 12 – download the PDF

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 End behavior and zeros

/ 3 pts

Let $f(x) = -x(x - 3)^2(x + 1)$. (a) Give the degree, the leading coefficient, and the end behavior. (b) List the zeros with their multiplicities and say whether the graph crosses or touches the axis at each.

2 Synthetic division and factoring

/ 4 pts

Let $P(x) = x^3 - 2x^2 - 5x + 6$. (a) Show that **1** is a zero. (b) Use synthetic division to divide $P(x)$ by $x - 1$. (c) Factor $P(x)$ completely and list its zeros.

3 Remainder Theorem

/ 3 pts

The polynomial $Q(x) = 2x^3 - x^2 + kx - 4$ leaves remainder **6** when divided by $x - 2$. (a) Find k . (b) Find the remainder when $Q(x)$ is divided by $x + 1$.

4 Real and complex zeros

/ 4 pts

Let $R(x) = 2x^3 - 11x^2 + 14x + 10$. (a) List the possible rational zeros. (b) Find a rational zero. (c) Factor $R(x)$ using synthetic division. (d) Find all complex zeros.

5 Asymptotes and intercepts

/ 3 pts

Let $g(x) = \frac{4x - 8}{x^2 - x - 6}$. (a) Find the vertical asymptotes. (b) Find the horizontal asymptote. (c) Find the x - and y -intercepts.

6 Rational inequality

/ 3 pts

Using the function g of the previous exercise, solve $g(x) \geq 0$. Give the answer in interval notation.



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