

Polynomial Functions: math test, Grade 11 – download the PDF

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

1 Operations with polynomials

/ 4 pts

Simplify each expression.

a. $(3x^2 - 4x + 1) - (x^2 + 2x - 6)$

b. $(x - 3)(2x^2 + x - 5)$

c. $(2x - 3)^2$

2 Long division

/ 4 pts

Use long division to divide $x^3 + 4x^2 - 3x + 12$ by $x + 5$. Write the answer in the form $p(x) = d(x)q(x) + r$.

3 Synthetic division and the Factor Theorem

/ 4 pts

Let $p(x) = 2x^3 - 9x^2 + 4x + 15$.

- Use synthetic division to divide $p(x)$ by $x - 3$.
- What does the remainder tell you?
- Factor $p(x)$ completely and list its zeros.

4 End behavior and zeros

/ 3 pts

Let $f(x) = -2x^5 + 3x^2 - 1$.

- State the degree and the leading coefficient, and describe the end behavior.
- How many complex zeros does f have, counting multiplicity? What is the greatest possible number of turning points?

5 Rational Root Theorem

/ 3 pts

Consider $p(x) = 2x^3 + 3x^2 - 8x + 3$.

- List the possible rational zeros.
- Find all the zeros of p .

6 Difference of cubes

/ 2 pts

Factor $8x^3 - 125$ as far as possible using real numbers.



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