BECA / Huson / Algebra 2: Polynomials   First and last name:
8 November 2024   Section:

2.25 Test: Polynomial and rational expressions   **A2.A.APR.6**

1. The expression $\dfrac{x^4 - 5x^2 + 4x + 14}{x + 2}$ is equivalent to

   (a) $x^3 - 2x^2 - x + 6 + \dfrac{2}{x + 2}$

   (b) $x^3 - 5x + 4 - \dfrac{14}{x + 2}$

   (c) $x^3 + 2x^2 - x + 2 + \dfrac{18}{x + 2}$

   (d) $x^3 + 2x^2 - 9x + 22 - \dfrac{30}{x + 2}$

2. What is the solution set of the equation $\dfrac{x + 2}{x} + \dfrac{x}{3} = \dfrac{2x^2 + 6}{3x}$?

   (a) $\{-3\}$

   (b) $\{-3, 0\}$

   (c) $\{3\}$

   (d) $\{0, 3\}$

3. Which equation represents a polynomial identity?

   (a) $x^3 + y^3 = (x + y)^3$

   (b) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

   (c) $x^3 + y^3 = (x + y)(x^2 - xy - y^2)$

   (d) $x^3 + y^3 = (x - y)(x^2 + xy + y^2)$

4. Use polynomial long division $\hspace{3cm}$ (A.APR.6 Rewrite rational expressions)

   to find an expression of the form $ax^2 + bx + c + \frac{d}{x+e}$ with a, b, c, d, e integers that is equivalent to $\dfrac{x^3 + 9x^2 - 5x - 90}{x + 4}$ for $x \neq -4$.

5. Solve algebraically for n: $\dfrac{2}{n^2} + \dfrac{3}{n} = \dfrac{4}{n^2}$

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A2-APR.1 Perform operations with polynomials

6. Find the sum in standard form $(4x^4 + 5x^3 + 3x^2 - 4) + (x^4 - 2x^3 - 2x^2 - x + 1)$.

7. Which expression is equivalent to $(x + 2)^2 - 5(x + 2) + 6$?

　(a) $x(x + 1)$

　(b) $(x - 3)(x + 2)$

　(c) $(x - 4)(x + 3)$

　(d) $(x - 6)(x + 1)$

8. Write the expression $A(x) \cdot B(x) - 3C(x)$ as a polynomial in standard form.

$$A(x) = x^3 + 2x - 1$$
$$B(x) = x^2 + 7$$
$$C(x) = x^4 - 5x$$

9. Stone Manufacturing has developed a cost model, $C(x) = 0.18x^3 + 0.02x^2 + 4x + 180$, where x is the number of sprockets sold, in thousands. The sale price can be modeled by $S(x) = 95.4 - 6x$ and the company's revenue by $R(x) = x \cdot S(x)$. The company profits, $R(x) - C(x)$, could be modeled by

(a) $0.18x^3 + 6.02x^2 + 91.4x + 180$

(b) $0.18x^3 - 5.98x^2 - 91.4x + 180$

(c) $-0.18x^3 - 6.02x^2 + 91.4x - 180$

(d) $0.18x^3 + 5.98x^2 + 99.4x + 180$

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10. Given the rational function $r(x) = \dfrac{x+3}{x-2} - 3.$ (F.IF.7d Graph rational functions)

   (a) Sketch a graph of the function.

   (b) Mark the vertical asymptote as dotted line and label it with its equation.

   (c) Explain why the asymptote is located there.
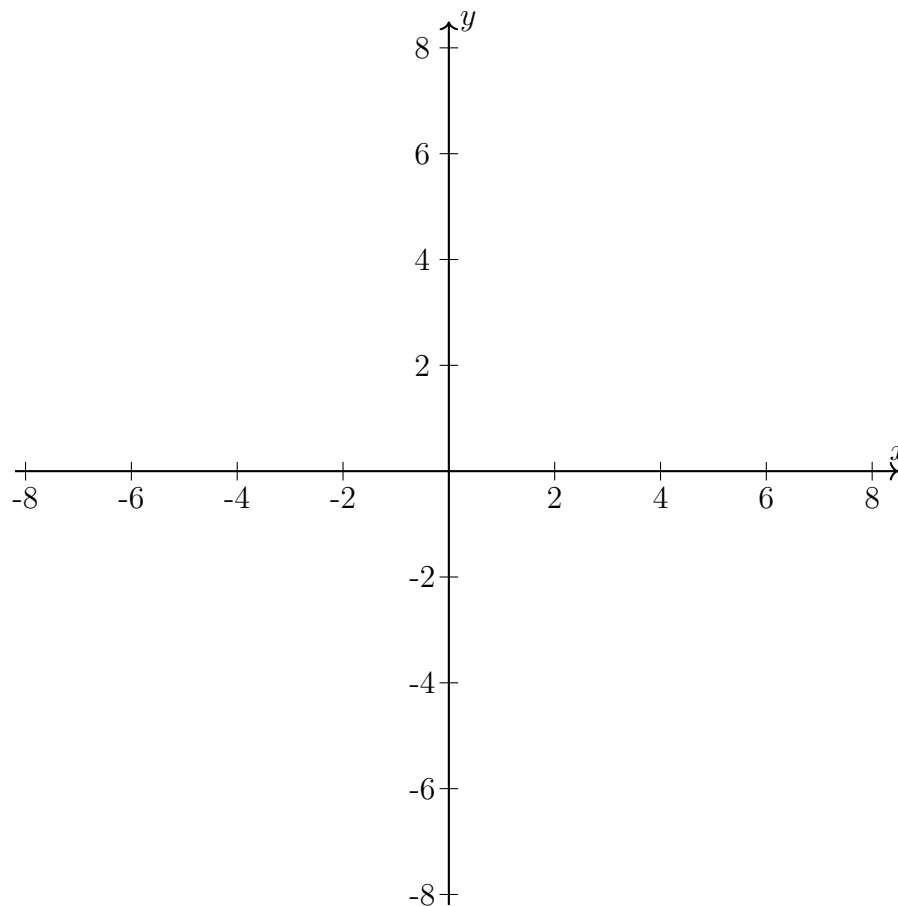
A2-F.IF.7c Graph polynomials, identify zeros, end behavior

11. The polynomial $f(x)$ and linear function $g(x)$ are graphed below.

    (a) What is the degree of $f(x)$?

    (b) Is the leading coefficient of $f(x)$ positive, negative, or zero?

    (c) If the polynomial $f(x)$ is written as the product of linear factors, what factor would be squared?

    (d) Write down the three solutions to $f(x) = g(x)$ as ordered pairs.
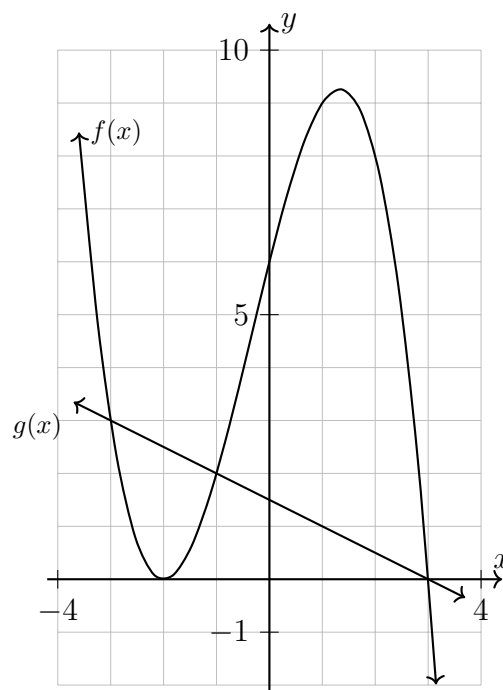
A2-F.BF.2 Write arithmetic and geometric sequences with recursive formulas

12. Write a recursive definition of the sequence $a_1 = 2$, $a_2 = 6$, $a_3 = 18$, $a_4 = 54, \ldots$