BECA / Huson / Algebra 2: Polynomials
6 November 2024

First and last name:
Section:

PreTest: Polynomial and rational expressions **A2.A.APR.6**

1. Given $x \neq -3$, which expression is equivalent to $\dfrac{2x^3 + 3x^2 - 4x + 5}{x + 3}$?

   (a) $2x^3 + 9x^2 + 23x + 74$

   (b) $2x^2 - 3x + 5 - \dfrac{10}{x + 3}$

   (c) $2x^3 - 3x^2 + 5x - 10$

   (d) $2x^3 + 9x + 23 + \dfrac{74}{x + 3}$

2. What is the solution set of the equation $\dfrac{4}{k^2 - 8k + 12} = \dfrac{k}{k - 2} + \dfrac{1}{k - 6}$?

   (a) $\{-1, 6\}$

   (b) $\{1, -6\}$

   (c) $\{-1\}$

   (d) $\{1\}$

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 to find an expression of the form $ax^3 + bx^2 + cx + d + \frac{e}{x+f}$ with a, b, c, d, e, f integers that is equivalent to $\dfrac{x^4 + 2x^3 - 7x^2 + x - 10}{x + 3}$ for $x \neq -3$.

5. Solve for x.

$$\frac{3}{x-4} = \frac{x-5}{x}$$

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A2-APR.1 Perform operations with polynomials

6. Find the difference $f(x) - g(x)$ as a polynomial in standard form, given $f(x) = 4x^4 + 5x^3 - 3x$ and $g(x) = 2x^3 - 2x^2 - 3x - 1$.

7. The expression $(x + a)^2 + 5(x + a) + 4$ is equivalent to

   (a) $(a + 1)(a + 4)$

   (b) $(x + 1)(x + 4)$

   (c) $(x + a + 1)(x + a + 4)$

   (d) $x^2 + a^2 + 5x + 5a + 4$

8. Write the expression $A(x) \cdot B(x) - 2C(x)$ as a polynomial in standard form.

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

9. Stone Manufacturing has developed a cost model, $C(x) = 0.27x^3 + 0.09x^2 + 7x + 110$, where x is the number of sprockets sold, in thousands. The sale price can be modeled by $S(x) = 56.2 - 5x$ and the company's revenue by $R(x) = x \cdot S(x)$. The company profits, $R(x) - C(x)$, could be modeled by

   (a) $0.27x^3 + 5.09x^2 + 63.2x + 110$

   (b) $-0.27x^3 - 5.09x^2 + 49.2x - 110$

   (c) $-0.27x^3 + 4.91x^2 + 49.2x - 110$

   (d) $0.27x^3 - 4.91x^2 + 49.2x - 110$

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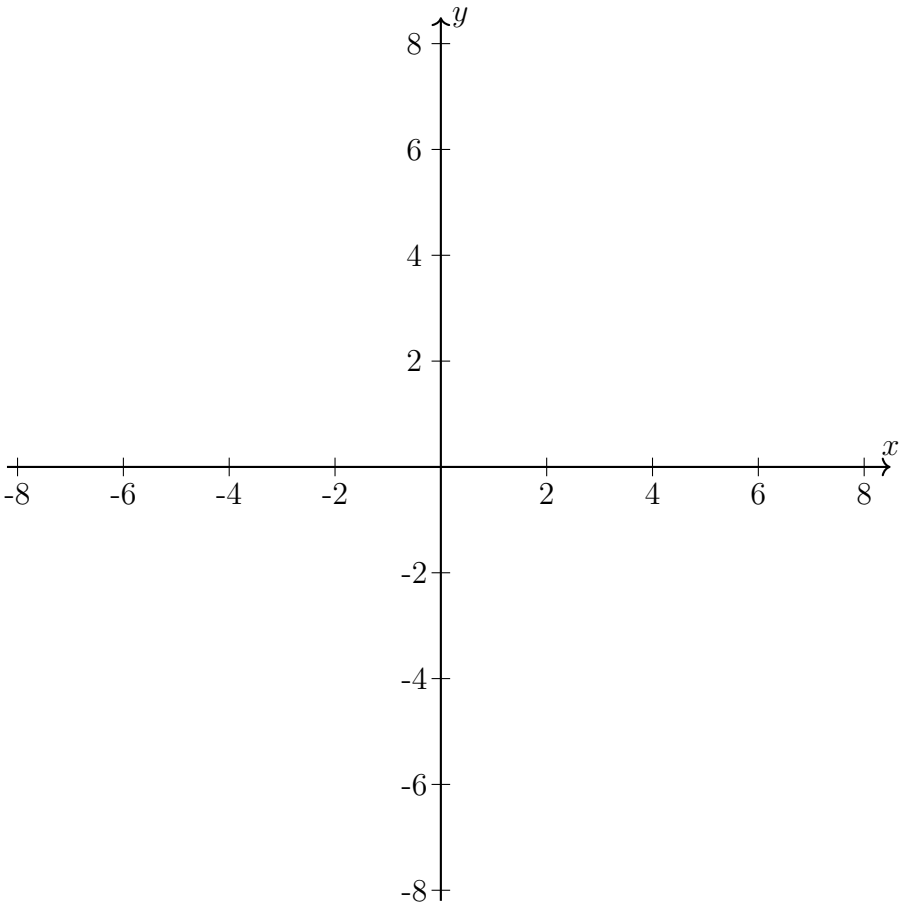
10. Given the rational function $r(x) = 3 + \dfrac{x-1}{x+2}$.

    (a) Sketch a graph of the function.

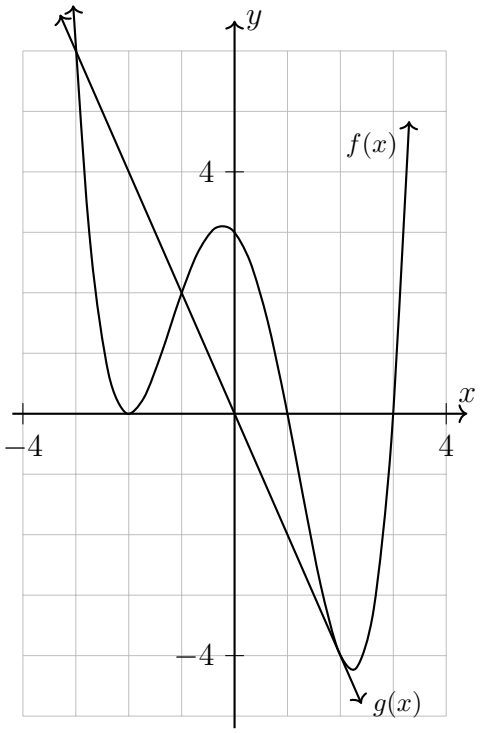
    (b) Mark the vertical asymptote as dotted line and label it with its equation.

    (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 the function $f(x)$?

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

(c) Which factor of $f(x)$ has a multiplicity of 2?

(d) Describe the end behavior of $f(x)$.

(e) 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 $a_1 = 4$, $a_2 = 12$, $a_3 = 36$, $a_4 = 108, \ldots$