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

PreTest: Polynomial and rational functions

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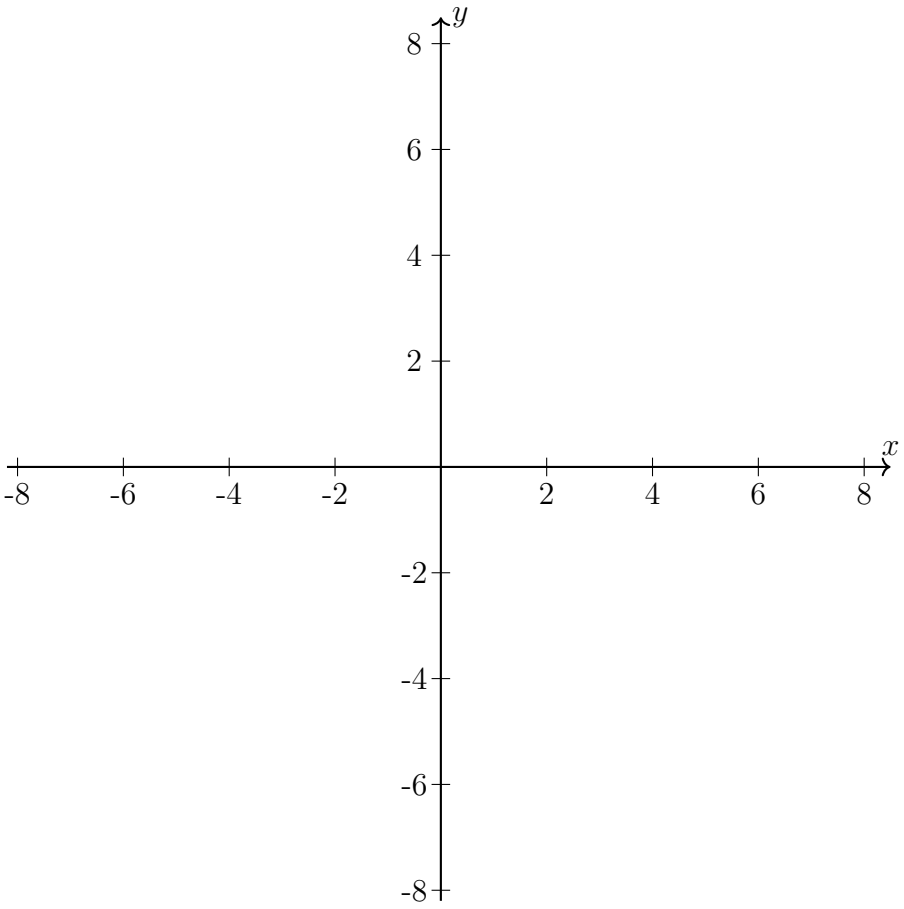
10. Given the rational function $r(x) = 3 + \dfrac{x-1}{x+2}$.

    (a) Sketch a graph of the function.

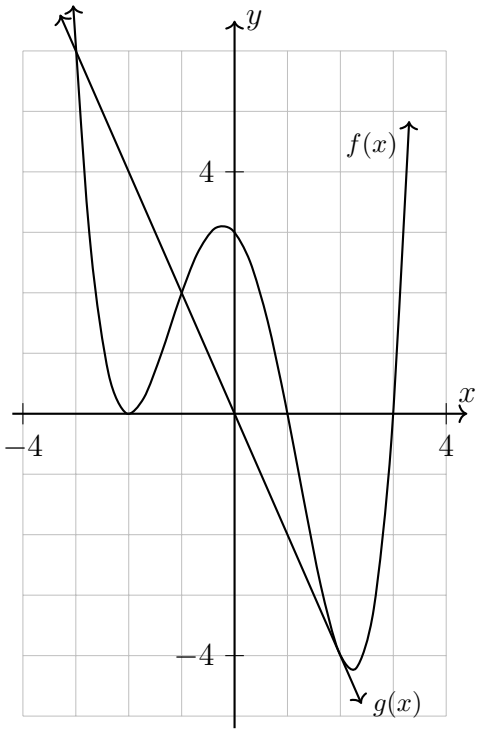
    (b) Mark the vertical asymptote as dotted line and label it with its equation.

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