Math III Honors   Name _____

Rational Functions at Home Assessment – Unit 4

I) Multiple Choice – Select the best answer for each of the questions *2 Points each*

1) $\dfrac{1}{x^2 - x} + \dfrac{1}{x^2 + x}$

A) $\dfrac{2}{x^2(x-1)(x+1)}$ B) $\dfrac{2}{x(x-1)(x+1)}$ C) $\dfrac{1}{(x-1)(x+1)}$ D) $\dfrac{2}{(x-1)(x+1)}$

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2) $\dfrac{x^2 - 10x + 24}{x^2 - 16x - 80} \cdot \dfrac{x^2 - 16x - 80}{x^2 - 9x + 20}$

A) $\dfrac{x^2 - 10x + 24}{x^2 - 9x + 20}$ B) $\dfrac{x-6}{x-5}$ C) $\dfrac{x-5}{x-6}$ D) x – 11

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3) $\dfrac{\dfrac{1}{x} - 1}{\dfrac{1}{y} + 1}$

A) $\dfrac{y - x}{x + y}$ B) $\dfrac{y - xy}{x + xy}$ C) $\dfrac{xy - y}{xy + x}$ D) $\dfrac{x - 1}{y + 1}$

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4) $\dfrac{n-2}{3n^2 - 12n} - \dfrac{6n}{3n}$

A) $\dfrac{-6n^2 + 25n - 1}{3n(n-4)}$ B) $\dfrac{-5n - 1}{3n(n-5)}$ C) $\dfrac{-6n^2 + 25n - 2}{3n(n-4)}$ D) $\dfrac{-6n + 25}{3(n-4)}$

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5) $\dfrac{8x^5}{2y^2} \div \dfrac{3x^4}{y^6}$

A) $\dfrac{4xy^4}{3}$ B) $\dfrac{12x^9}{y^8}$ C) $\dfrac{3x}{4y^4}$ D) $\dfrac{8x}{6y^2}$
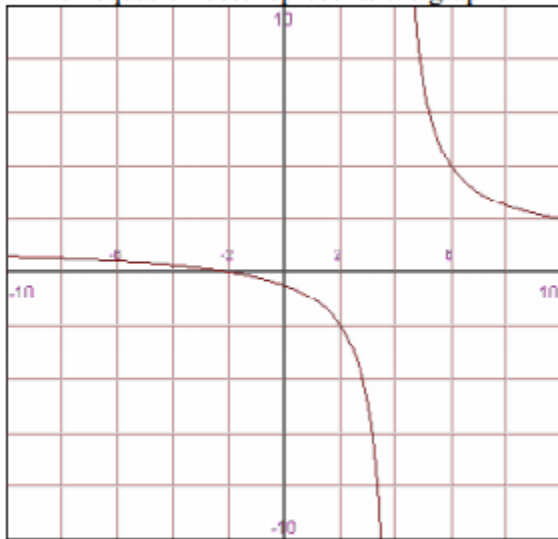
6. What is the maximum number of horizontal asymptotes can a rational function have?

   A) 0   B) 1   C) 2   D) ∞

7. Find all restrictions of the rational expression: $y = \dfrac{x-4}{x^2 - 8x + 12}$

   A) $x \neq 6, 2$ B) $x \neq 4, 6, 2$ C) $x \neq -6, -2$ D) $x \neq -4, -6, -2$

8. Which equation best represents the graph?

   A) $y = \dfrac{(x-2)}{(x-4)}$ C) $y = \dfrac{(x+4)}{(x-2)}$

   B) $y = \dfrac{(x+2)}{(x+4)}$ D) $y = \dfrac{(x+2)}{(x-4)}$

9. What are the x and y-intercepts of the rational function $R(x) = \dfrac{x^2 - x - 12}{x+6}$?

   A   x-intecepts: (4, 0) and (-3, 0)   C   x-intecepts: (4, 0) and (-3, 0)
        y-intercept: (0, –2)   y-intercept: (0, 2)

   B   x-intecepts: (-4, 0) and (3, 0)   D   x-intecepts: (-4, 0) and (3, 0)
        y-intercept: $(0, \frac{1}{6})$ y-intercept: (0, -2)

10. If $f(x) = x^2$ and $g(x) = x - 5$ then $f(g(x)) =$

   A) $x^2 + 25$ C) $x^2 - 5$

   B) $x^2 - 25$ D) $x^2 - 10x + 25$

11. Using the rational function below, identify the feature when x = 4:

$$y = \frac{(x-2)(x-4)}{(x-4)(x-7)(x+4)}$$

A) Vertical Asymptote   C) Hole

B) Horizontal Asymptote   D) None of the above

12.   Which function does **not** have a horizontal asymptote.

A $g(x) = \dfrac{x-6}{x^2+2}$

B $g(x) = \dfrac{x^2}{-3x^2+1}$

C $g(x) = \dfrac{x-9}{x+3}$

D $g(x) = \dfrac{x^3-2}{6x^2-5}$

13.   Solve.

$$\frac{x+1}{x-5} + \frac{2}{x-6} = \frac{2}{x^2-11x+30}$$

A) x = 6
B) x = 6 and x = -3
C) x= -3
D) No solutions

14. Mr. Nevola can paint a room in his home in 8 hours. If his wife helps, they can paint it together in 3 hours. How long would it take **Mr. Nevola's wife** to paint the room on her own?
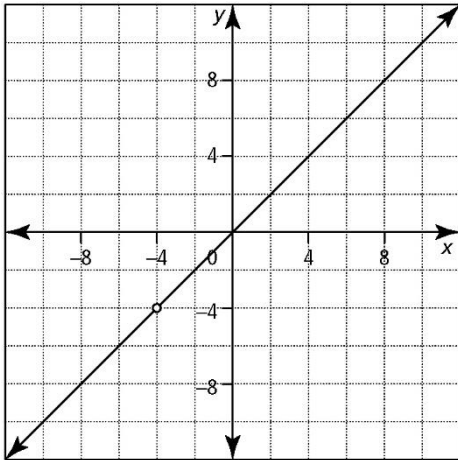
A) 5 hours
B) 4.8 hours
C) 10.2 hours
D) 2.6 hours

Match the equation of each rational function with the most appropriate graph.
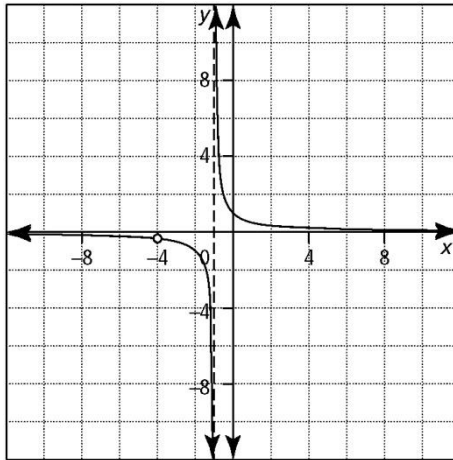
15) $y = \dfrac{x + 4}{x^2 - 3x - 4}$

16) $y = \dfrac{x + 4}{x^2 + 5x + 4}$

17) $y = \dfrac{x^2 + 4x}{x + 4}$

A

B

C