4 Topic Assessment Form B

1. The width, y, of a rectangle with a fixed area varies inversely with its length, x. The width is 4 inches when the length is 18 inches. Find the width when the length is 40 inches.

Ⓐ 0.56 inches Ⓒ 10.08 inches

Ⓑ 8.9 inches Ⓓ 1.8 inches

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2. What is the domain of the function $f(x) = \frac{x^2 - x - 2}{x^4 - 81}$?

Ⓐ All real numbers except 3

Ⓑ All real numbers except -1 and 3

Ⓒ All real numbers except -3 and 3

Ⓓ All real numbers except -3, 1, and 3

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3. What are the horizontal and vertical asymptotes of the graph of $y = \frac{x^2 - 3x - 4}{3 - x^2}$?

Ⓐ $y = -1$; $x = \pm\sqrt{3}$

Ⓑ $y = 1$; $x = \pm\sqrt{3}$

Ⓒ $y = -1$; $x = 1$ and $x = \sqrt{3}$

Ⓓ $y = -1$; $x = 1$ and $x = -\sqrt{3}$

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4. Simplify $\frac{1}{x - y} - \frac{-6}{y - x}$. What are the any restrictions on the domain of the expression?

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The domain is $\{x | x \neq$ ( ) $\}$.

5. Describe the transformations needed to translate the graph of $y = \frac{1}{x}$ to the graph of $y = 2 + \frac{1}{x - 5}$.

Ⓐ to the left 5 and up 2

Ⓑ to the left 2 and down 5

Ⓒ to the right 2 and down 5

Ⓓ to the right 5 and up 2

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6. Solve $\frac{2x + 4}{x^2 + 4x + 3} = \frac{1}{x + 1} + \frac{1}{x + 3}$.

Ⓐ no solution

Ⓑ $x = 2$

Ⓒ $x = 1$ and 2

Ⓓ all values of x, $x \neq -1$ and $x \neq -3$

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7. Two robots can do a task in 5 min, working together. The first robot, working alone, can do the task in 15 min. How many minutes will it take the second robot, working alone, to do the task?

Ⓐ 10 Ⓑ 7.5 Ⓒ 5 Ⓓ 2

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8. What is the remainder when $4x^4 - 10x^2 + 2x + 1$ is divided by $4x - 1$?

Ⓐ $-\frac{1}{2}$ Ⓑ 4 Ⓒ $\frac{57}{64}$ Ⓓ $-\frac{18}{37}$

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9. Solve $\frac{2(1 - x)}{3x} = 1 - \frac{3}{x}$.

$x =$ ( )

10. What is the sum $\frac{1}{x-4} + \frac{-8}{x^2-16}$?

Ⓐ $\frac{-8}{x^2+x-20}$

Ⓑ $\frac{-7}{x+4}$

Ⓒ $\frac{1}{x^2+x+2}$

Ⓓ $\frac{1}{x+4}$

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11. Solve $x = \frac{2x^2+x-7}{2x+8}$.

Ⓐ 1 Ⓒ -1

Ⓑ $\frac{1}{2}$ Ⓓ no solution

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12. What are the horizontal and vertical asymptotes of the graph of $y = \frac{x^4+3}{x^4+2x^2-3}$?

Ⓐ $y = 1; x = \pm 1$

Ⓑ $y = 1; x = \pm 3$

Ⓒ $y = 0; x = 1$

Ⓓ $y = 0; x = -1$

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13. It takes 4 h for Faucet A to fill a tank, and it takes Faucet B 6 h. How many hours will it take the two faucets to fill the tank together?

Ⓐ 1.4 Ⓑ 2.4 Ⓒ 2.0 Ⓓ 5.0

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14. The graph of $xy = 6$ is translated up 2 units and to the left 2 units. Select all the possible equations for the translated graph.

☐ **A.** $y = 2 + \frac{6}{x+2}$

☐ **B.** $\frac{y}{2} = \frac{x+5}{x+2}$

☐ **C.** $y = \frac{2x+10}{x+2}$

☐ **D.** $y = \frac{6x+10}{x-2}$

☐ **E.** $y = 4 + \frac{4}{x-2}$

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15. If $a = \frac{2}{x} + \frac{1}{y}$, what is the value of $\frac{1}{a}$?

Ⓐ $\frac{2y+x}{xy}$ Ⓒ $\frac{xy}{x+2y}$

Ⓑ $\frac{x+2y}{2xy}$ Ⓓ $x + 2y$

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16. What are the horizontal and vertical asymptotes of the graph of $y = \frac{-x+3}{x-8}$?

Ⓐ $y = -1; x = 8$

Ⓑ $y = -1; x = -8$

Ⓒ $y = 1; x = 8$

Ⓓ $y = 1; x = -8$

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17. Solve $\frac{x^2+x-4}{x-2} = x - \frac{1}{x-2}$.

Ⓐ -2 Ⓒ -1

Ⓑ 1 Ⓓ 3

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18. Select all the functions whose graphs have a horizontal asymptote at $y = \frac{2}{3}$.

☐ **A.** $y = \frac{2}{3x-1}$

☐ **B.** $y = \frac{2x^2+1}{3x^2-2}$

☐ **C.** $y = \frac{2}{3} + \frac{1}{x}$

☐ **D.** $y = \frac{2x-3}{3x^2+1}$

☐ **E.** $y = 3 + \frac{3}{2x}$

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19. A rectangle has area $x^3 - 15x - 4$ cm^2 and width $x - 4$ cm. What is the length in centimeters?

Ⓐ $x^2 + 4x$

Ⓑ $x^2 - 4x + 2$

Ⓒ $x^2 + 4x + 1$

Ⓓ $x^2 + 1$