Bellwork Alg 2 Wednesday, March 6, 2019

1. One maid can clean a room in 20 minutes. Another maid can clean the same room in 24 minutes. Find the exact amount of time it will take the two maids to clean the room together.

2. Solve. $\frac{x-2}{x+3} - 1 = \frac{3}{x+2}$

3. Find all x-intercepts, Holes and equations of VA, if any: $y = \frac{2x^4 + 6x^3 - 50x^2 - 150x}{4x^2 + 28x + 40}$

x-int: Holes: Eq of VA:

4. For each rational function find all y-intercepts and equations of HA, if any.

a) $y = \frac{7x^3 + 8x^2 - 4}{5x^3 - 8x^2 + 2x}$

y-int:

Eq of HA:

b) $y = \frac{6x^2 - 9x + 13}{12x^3 + 8x^2 - 3}$

y-int:

Eq of HA:

5. Simplify. State restrictions on the variable. $\frac{10x^3 + 30x^2}{x^2 - x - 20} \div \frac{6x^3 + 6x^2 - 36x}{x^3 - 5x^2 - 16x + 80}$

Answer:

Restrictions:

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1. One maid can clean a room in 20 minutes. Another maid can clean the same room in 24 minutes. Find the exact amount of time it will take the two maids to clean the room together.

1st maid 1 room in 20 min → $\frac{1\text{ rm}}{20\text{ min}}$ → rate = $\frac{1}{20}\frac{\text{rm}}{\text{min}}$

2nd maid 1 room in 24 min → $\frac{1\text{ rm}}{24\text{ min}}$ → rate = $\frac{1}{24}\frac{\text{rm}}{\text{min}}$

$Q = r \cdot t$ Q = 1 room t = # min working together

$120 \cdot 1 = \left(\frac{1}{20}t + \frac{1}{24}t\right) \cdot 120$

$120 = 6t + 5t$

$\frac{120}{11} = \frac{11t}{11}$

$t = \frac{120}{11}$ minutes working together

2. Solve. $\frac{x-2}{x+3} - 1 = \frac{3}{x+2}$

$(x+3)(x+2)\left(\frac{x-2}{x+3} - 1\right) = \left(\frac{3}{x+2}\right)(x+3)(x+2)$

$(x-2)(x+2) - (x+3)(x+2) = 3(x+3)$

$x^2 - 4 - (x^2 + 5x + 6) = 3x + 9$

$x^2 - 4 - x^2 - 5x - 6 = 3x + 9$

$-5x - 10 = 3x + 9$

$+5x \quad +5x$

$-10 = 8x + 9$

$-9 \quad -9$

$\frac{-19}{8} = \frac{8x}{8}$

$x = -\frac{19}{8}$

3. Find all x-intercepts, Holes and equations of VA, if any:

x-int:	Holes:	Eq of VA:
$x = 0, -3, 5$	$x = -5$	$x = -2$

$y = \frac{2x^4 + 6x^3 - 50x^2 - 150x}{4x^2 + 28x + 40}$

$4(x^2 + 7x + 10)$

$4(x+5)(x+2)$

$2x(x^3 + 3x^2 - 25x - 75)$

	x	$+3$
x^2	x^3	$+3x^2$
-25	$-25x$	-75

$2x(x+3)(x+5)(x-5)$

$y = \frac{2x(x+3)(x+5)(x-5)}{4(x+5)(x+2)}$

4. For each rational function find all y-intercepts and equations of HA, if any.

a) $y = \dfrac{7x^3 + 8x^2 - 4}{5x^3 - 8x^2 + 2x}$

y-int: $\frac{-4}{0}$ NO y-int

Eq of HA:

deg of num = deg of denom

HA: $y = \frac{7}{5}$

b) $y = \dfrac{6x^2 - 9x + 13}{12x^3 + 8x^2 - 3}$

y-int: $y = \frac{13}{-3}$

Eq of HA:

deg of num < deg of denom

HA: $y = 0$

5. Simplify. State restrictions on the variable.

$$\frac{10x^3 + 30x^2}{x^2 - x - 20} \div \frac{6x^3 + 6x^2 - 36x}{x^3 - 5x^2 - 16x + 80}$$

(A) (B) (C) (D)

Answer: $\dfrac{5x(x-4)}{3(x-2)}$

Restrictions: $x \neq 5, \pm 4, 0, -3, 2$

$$\frac{A}{B} \cdot \frac{D}{C}$$

(A) $10x^3 + 30x^2 = 10x^2(x+3)$

(B) $x^2 - x - 20 = (x-5)(x+4)$

(C) $6x^3 + 6x^2 - 36x = 6x(x^2 + x - 6) = 6x(x+3)(x-2)$

(D) $x^3 - 5x^2 - 16x + 80$

	x	-5
x^2	x^3	$-5x^2$
-16	$-16x$	$+80$

$(x-5)(x+4)(x-4)$

$$= \frac{10x^2(x+3)}{(x-5)(x+4)} \cdot \frac{(x-5)(x+4)(x-4)}{6x(x+3)(x-2)}$$

$$= \frac{5x(x-4)}{3(x-2)}$$