

REVIEW SKILLZ

Directions: Simplify. Use only positive exponents.

$$\begin{aligned}
 1) \quad & 4x^3(5x^{-6}) \\
 & = 20x^{3+(-6)} \\
 & = 20x^{-3} \\
 & = \frac{20}{x^3}
 \end{aligned}$$

$$\begin{aligned}
 2) \quad & \frac{10y^7}{4y^4} = \frac{5}{2}y^{7-4} \\
 & = \frac{5}{2}y^3
 \end{aligned}$$

$$\begin{aligned}
 3) \quad & (2h^3)^{-2} \\
 & = 2^{-2}h^{3(-2)} \\
 & = \frac{1}{2^2}h^{-6} \\
 & = \frac{1}{4}\left(\frac{1}{h}\right)^6 \\
 & = \frac{1}{4(h)^6} \\
 & = \frac{1}{4h^6}
 \end{aligned}$$

$$\begin{aligned}
 4) \quad & \left(\frac{2m^9n^{10} \cdot 2m^8n^7}{(m^8n^3)^5}\right)^3 \\
 & = \left(\frac{4m^{17}n^{17}}{m^{40}n^{15}}\right)^3 \\
 & = (4m^{-23}n^2)^3 \\
 & = 64m^{-69}n^6 \\
 & = \frac{64n^6}{m^{69}}
 \end{aligned}$$

APPLICATION

6.1 Solving Rational Equations

Directions: Solve. Check for extraneous solutions.

$$1) \quad -10 = \frac{5x+10}{x+2}$$

$$-10 = \frac{5(x+2)}{x+2}$$

$$-10 = 5$$

No Solution

$$2) \quad \frac{5}{x+1} = \frac{6}{x^2-2x-3} + \frac{1}{x-3}$$

$$\frac{5}{x+1} = \frac{6}{(x-3)(x+1)} + \frac{1}{x-3}$$

$$5(x-3) = 6 + (x+1)$$

$$5x - 15 = x + 7$$

$$4x - 15 = 7$$

$$4x = 22$$

$$x = \frac{11}{2}$$

Dnom ≠ 0

$$\begin{array}{|l}
 x-3 \neq 0 \\
 x \neq 3
 \end{array}
 \left\{
 \begin{array}{|l}
 x+1 \neq 0 \\
 x \neq -1
 \end{array}
 \right.$$

3) RULES AND PROPERTIES OF WORK: If two entities are working on the same job, and the first would take a hours to complete the job alone and the second b hours to complete the job alone, then the equations $\frac{1}{a} + \frac{1}{b} = \frac{1}{t}$, can be used to find t , the time it will take to complete the job together.

a) It takes Mr. Bean x hours to completely make one unit of Pre-Calculus and it takes Mr. Brust 20 hours less to do the same unit. If it takes them 12 hours to complete the unit together, how much time would it take Mr. Bean and Mr. Brust to do it by themselves?

$$\frac{1}{x} + \frac{1}{x-20} = \frac{1}{12}$$

$$12(x-20) + 1 \cdot x \cdot 12 = x(x-20)$$

$$12x - 240 + 12x = x^2 - 20x$$

$$24x - 240 = x^2 - 20x$$

$$0 = x^2 - 44x + 240$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-44) \pm \sqrt{(-44)^2 - 4(1)(240)}}{2(1)}$$

$$x = \frac{44 \pm \sqrt{1936 - 960}}{2}$$

$$x = \frac{44 \pm \sqrt{976}}{2}$$

$$x = \frac{44 \pm 4\sqrt{61}}{2}$$

$$x = 22 \pm 2\sqrt{61}$$

$$x \approx 6.380, 37.620$$

$$\textcircled{6.380}, \text{Brust} = 6.380 - 20$$

≈ -13 hrs (can't be negative hours)

Bean = 37.620 hours
Brust = 17.620 hours

b) It takes Mr. Sullivan x hours to completely make one unit of Pre-Calculus and it takes Mr. Kelly five hours less to do the same unit. If it takes them 6 hours to complete the unit together, how much time would it take Mr. Sullivan and Mr. Kelly to do it by themselves?

$$\frac{1}{x} + \frac{1}{x-5} = \frac{1}{6}$$

$$6(x-5) + 1 \cdot x \cdot 6 = 1 \cdot x(x-5)$$

$$6x - 30 + 6x = x^2 - 5x$$

$$0 = x^2 - 17x + 30$$

$$0 = (x-15)(x-2)$$

$$0 = x-15 \quad \left\{ \quad 0 = x-2 \right.$$

$$15 = x \quad \left\{ \quad 2 = x \Rightarrow \text{Kelly take } -3 \text{ hours?} \right.$$

Nonsense

Sullivan takes 15 hours
and Kelly takes 10 hours

4) Sketch the following graph: $y = \frac{2x+5}{x-1}$ in your graphing calculator or using www.desmos.com.

a) What are the x-, and y-intercepts?

$x\text{-int} = -\frac{5}{2}, y\text{-int} = -5$

b) What is the equation of the vertical asymptote?

$x = 1$

c) How does it relate to the original function?

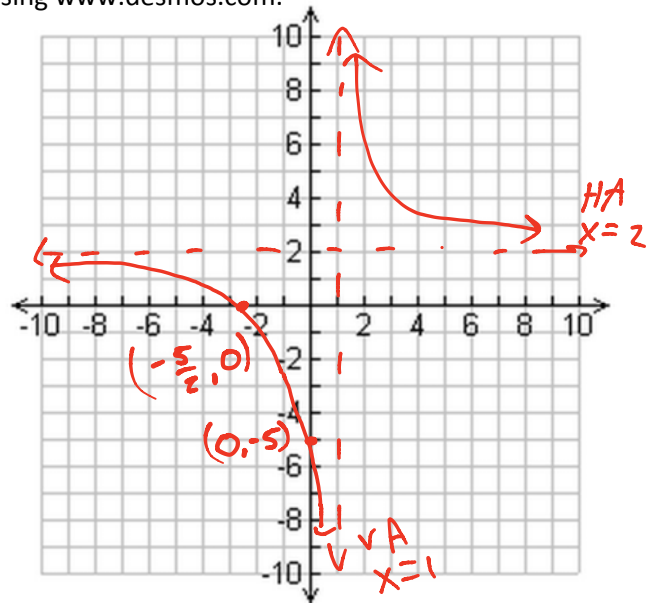
It makes denominator undefined.

d) What is the equation of the horizontal asymptote?

$y = 2$

e) How does it relate to the original function? (Hint: leading coefficients)

It is y equals the quotient of the leading coefficients of numerator and denominator.



5) Sketch the following graph: $y = \frac{(x^2+3x-4)}{x+2}$ in your graphing calculator or using www.desmos.com.

a) What are the x-, and y-intercepts?

$x\text{-int} = -4, 1, y\text{-int} = -2$

b) What is the equation of the vertical asymptote?

$x = -2$

c) Is there a horizontal asymptote?

NO

There is a new asymptote, a slant asymptote.

d) Use long division or synthetic division to divide the original function.

$$\begin{array}{r}
 x+1 + \frac{-6}{x+2} \\
 x+2 \overline{) x^2+3x-4} \\
 \underline{+(x^2+2x)} \\
 x-4 \\
 \underline{+(-x+2)} \\
 -6
 \end{array}$$

e) Disregard the remainder and come up with a linear equation. What is that equation? Graph that? Does the graph ever touch this line?

$y = x+1$. No the graph never touches the line.

