Update Rational Expressions.md
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Unit 5: Rational Expressions.md 2.23 KB

Rational Expressions

Question 1 a)

Let S_r be Ron's speed and S_m be Mack's speed. Let t be the time.

$$t_a = \frac{30}{S_r}$$

$$t_b = \frac{20}{S_m}$$

$$t_{\text{total}} = \frac{30}{S_r} + \frac{20}{S_m} = \frac{30S_m + 20S_r}{(S_m)(S_r)}$$

Question 1 b)

Here, $S_r = 35, S_m = 25$ (Because we want the faster guy to travel more distance to save time). We plug it into our formula above:

$$t_{\text{tota}} = \frac{30(25) + (20)(35)}{(35)(25)} = 1.657$$

Therefore the minimum amount of time it will take to complete the race is 1.657 hours, or about 99.42 minutes or 99 minutes and 25.2 seconds.

Question 2 a)

I would first flip the second fraction and then cross-cross out the common factors like so:

$$\frac{(x+3)(x-6)}{(x+4)(x+5)} \times \frac{(x+4)(x-7)}{(x-6)(x+8)}$$

We can cross out the $(x+4)$ and $(x-6)$ since they cancel each other out.

The final fraction is therefore $\frac{(x+3)(x-7)}{(x+5)(x+8)}$

For restrictions, at each step, I would mark down the restrictions. Such without doing anthing, we know that $x \neq -4, -5, 7$, then after we flip the fraction, we know that $x \neq 6, -8$, and at the final step, we know that $x \neq -5, -8$.

Therefore the final restrictions on x would be: $x \neq -4, -5, -8, 6, 7$

Question 2 b)

By using the restrictions and the final product, we know that the 2 fraction can only have the following as its denominator: $(x+4), (x-2), (x-1)$

And since we know there is a $(x-2)$ as the denominator and $(x+5)$ as the numerator for the final product, we just need one of the fractions to cancel out the denominators $(x+4), (x-1)$.

Thus, 2 fractions such as below would work:

$$\frac{(x+5)}{(x-4)(x-1)} \times \frac{(x-4)(x-1)}{(x-2)}$$

Question 2 c)

The student forgot to multiply the numerator by the same number he used to multiply the denomiator.

Question 3 a)

Let V, SA be the volume and surface area respectively.

$$V = \pi r^2 h$$

$$SA = 2r\pi h + 2\pi r^2 \implies 2r\pi(h+r)$$

The ratio of $V : SA$ is equal to:

$$\frac{\pi r^2 h}{2r\pi(h+r)}$$

$$= \frac{rh}{2(h+4)}$$

Question 3 b)

The restrictions by looking at the fraction are $h \neq r, r \neq h$, also $r \neq 0$.