Topic: Factoring to find a common denominator

Question: Simplify the expression by combining the two fractions.

$$\frac{5x}{x^2+5x+6}+\frac{2}{x+2}$$

Answer choices:

A $\dfrac{5x+6}{(x+2)(x+3)}$

B $\dfrac{8x+6}{(x+2)(x+3)}$

C $\dfrac{7x^2+6}{(x+2)(x+3)}$

D $\dfrac{7x+6}{(x+2)(x+3)}$

Solution: D

In order to add the fractions, we'll have to find a common denominator, which we'll try to do by factoring the denominator of the first fraction.

$$\frac{5x}{x^2+5x+6}+\frac{2}{x+2}$$

$$\frac{5x}{(x+2)(x+3)}+\frac{2}{x+2}$$

In order to get a common denominator, we'll have to multiply the second fraction by $(x+3)/(x+3)$.

$$\frac{5x}{(x+2)(x+3)}+\frac{2}{x+2}\cdot\frac{x+3}{x+3}$$

$$\frac{5x}{(x+2)(x+3)}+\frac{2(x+3)}{(x+2)(x+3)}$$

$$\frac{5x+2(x+3)}{(x+2)(x+3)}$$

$$\frac{5x+2x+6}{(x+2)(x+3)}$$

$$\frac{7x+6}{(x+2)(x+3)}$$

Topic: Factoring to find a common denominator

Question: Simplify the expression by combining the two fractions.

$$\frac{x-10}{x^2+10x+21}+\frac{2}{x+3}$$

Answer choices:

A $\dfrac{3x+4}{x^2+10x+21}$

B $\dfrac{x-8}{x^2+10x+21}$

C $\dfrac{x+4}{x^2+10x+21}$

D $\dfrac{3x-6}{x^2+10x+21}$

Solution: A

In order to add the fractions, we'll have to find a common denominator, which we'll try to do by factoring the denominator of the first fraction.

$$\frac{x-10}{x^2+10x+21}+\frac{2}{x+3}$$

$$\frac{x-10}{(x+3)(x+7)}+\frac{2}{x+3}$$

In order to get a common denominator, we'll have to multiply the second fraction by $(x+7)/(x+7)$.

$$\frac{x-10}{(x+3)(x+7)}+\left(\frac{2}{x+3}\right)\left(\frac{x+7}{x+7}\right)$$

$$\frac{x-10}{(x+3)(x+7)}+\frac{2x+14}{(x+3)(x+7)}$$

$$\frac{x-10+2x+14}{(x+3)(x+7)}$$

$$\frac{3x+4}{(x+3)(x+7)}$$

$$\frac{3x+4}{x^2+10x+21}$$

Topic: Factoring to find a common denominator

Question: Simplify the expression by combining the two fractions.

$$\frac{t+4}{t^2-3t+2}-\frac{2}{1-t}$$

Answer choices:

A $\dfrac{t+2}{(t-2)(t-1)}$

B $\dfrac{7t-8}{(t-2)(t-1)}$

C $\dfrac{2t-3}{(t-2)(t-1)}$

D $\dfrac{3t}{(t-2)(t-1)}$

Solution: D

In order to add the fractions, we'll have to find a common denominator, which we'll try to do by factoring the denominator of the first fraction.

$$\frac{t+4}{t^2-3t+2}-\frac{2}{1-t}$$

$$\frac{t+4}{(t-2)(t-1)}-\frac{2}{1-t}$$

We need to make $t-1$ match $1-t$.

$$\frac{t+4}{(t-2)(t-1)}-\frac{2}{1-t}\left(\frac{-1}{-1}\right)$$

$$\frac{t+4}{(t-2)(t-1)}+\frac{2}{t-1}$$

In order to get a common denominator, we'll have to multiply the second fraction by $(t-2)/(t-2)$.

$$\frac{t+4}{(t-2)(t-1)}+\frac{2}{t-1}\left(\frac{t-2}{t-2}\right)$$

$$\frac{t+4}{(t-2)(t-1)}+\frac{2t-4}{(t-2)(t-1)}$$

$$\frac{t+4+2t-4}{(t-2)(t-1)}$$

$$\frac{3t}{(t-2)(t-1)}$$