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 $(t-2)/(t-2)$.

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

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

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

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