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

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

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

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

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.

$$\frac{x - 10}{2x^2 + 17x + 21} + \frac{2}{2x + 3}$$

Answer choices:

A $\dfrac{3x + 4}{2x^2 + 17x + 21}$

B $\dfrac{x - 8}{2x^2 + 17x + 21}$

C $\dfrac{x + 4}{2x^2 + 17x + 21}$

D $\dfrac{3x - 6}{2x^2 + 17x + 21}$

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.

$$\frac{x - 10}{2x^2 + 17x + 21} + \frac{2}{2x + 3}$$

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

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

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

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

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

$$\frac{3x + 4}{2x^2 + 17x + 21}$$

Topic: Factoring to find a common denominator

Question: Simplify the expression by combining the two fractions.

$$\frac{t+4}{3t^2 - 5t + 2} - \frac{2}{1-t}$$

Answer choices:

A $\dfrac{t+2}{3t^2 - 5t + 2}$

B $\dfrac{7t-8}{3t^2 - 5t + 2}$

C $\dfrac{2t-3}{3t^2 - 5t + 2}$

D $\dfrac{7t}{3t^2 - 5t + 2}$

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.

$$\frac{t+4}{3t^2-5t+2} - \frac{2}{1-t}$$

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

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

$$\frac{t+4}{(3t-2)(t-1)} - \frac{2}{1-t} \cdot \frac{-1}{-1}$$

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

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

In order to get a common denominator, we'll have to multiply the second fraction by $(3t-2)/(3t-2)$.

$$\frac{t+4}{(3t-2)(t-1)} + \frac{2}{t-1} \cdot \frac{(3t-2)}{(3t-2)}$$

$$\frac{t+4}{(3t-2)(t-1)} + \frac{6t-4}{(3t-2)(t-1)}$$

$$\frac{t+4+6t-4}{(3t-2)(t-1)}$$

$$\frac{7t}{3t^2 - 5t + 2}$$