

Algebra 2

This class will show you how to evaluate expressions and how to add fractions.

Evaluating expressions

Put number in instead of the letters.

Here we can use the calculator to obtain our answer. You must practice with your calculator, as each one is slightly different.

Remember when using a calculator

- (i) Do not be greedy.
- (ii) Write down results as you go along.

Example 1 If $a = 3$ and $b = -4$ find the value of

- (i) $(a + 2b)^2$
- (ii) $2a^2 - b^2$

$$\begin{aligned}
 \text{(i)} \quad & (a + 2b)^2 \\
 &= (3 + 2(-4))^2 \\
 &= (3 - 8)^2 \\
 &= (-5)^2 \\
 &= 25
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad & 2a^2 - b^2 \\
 &= 2(3)^2 - (-4)^2 \\
 &= 2(9) - 16 \\
 &= 2
 \end{aligned}$$

Example 2 If $x = \frac{1}{3}$ find the value of $\frac{1}{x+1} + \frac{1}{x+2}$

Sub in $x = \frac{1}{3}$

$$\frac{1}{\frac{1}{3}+1} + \frac{1}{\frac{1}{3}+2} \quad \text{get a top-heavy fraction on the bottom}$$

$$= \frac{1}{\frac{4}{3}} + \frac{1}{\frac{7}{3}} \quad \text{turn second fraction up side down and multiply}$$

$$= \frac{3}{4} + \frac{3}{7} \quad \text{add fractions using calculator}$$

$$= \frac{33}{28}$$

To add and subtract fractions

A fraction has two parts, the top (called the numerator) and a bottom (called a denominator)

Proper fraction is where the top is smaller than the bottom $\frac{2}{5}$, $\frac{3}{7}$ and so on.

A top heavy fraction is where the top is bigger than the bottom like $\frac{3}{2}$, $\frac{7}{3}$.

A mixed fraction has a whole number and a fraction together $2\frac{1}{3}$.

To add or subtract fractions find a common denominator.

Example 3 Write as a single fraction $\frac{1}{2} + \frac{1}{3}$

Find a common denominator of 6.

$$\frac{1}{2} \text{ is the same as } \frac{3}{6}$$

$$\frac{1}{3} \text{ is the same as } \frac{2}{6}$$

Once we have the same denominator we can add the top.

$$\frac{1}{2} + \frac{1}{3}$$

$$= \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

Example 4 Write as a single fraction $\frac{4x-2}{3} - \frac{5x-7}{4}$

$$\frac{4x-2}{3} - \frac{5x-7}{4} \quad \text{common denominator is 12}$$

$$= \frac{4(4x-2) - 3(5x-7)}{12}$$

$$= \frac{16x-8-15x+21}{12}$$

$$= \frac{x+13}{12}$$

Example 5 Write as a single fraction $\frac{1}{2x+1} - \frac{5}{3x+2}$

$$\begin{aligned} & \frac{1}{2x+1} - \frac{5}{3x+2} && \text{common denominator } (2x+1)(3x+2) \\ &= \frac{1(3x+2) - 5(2x+1)}{(2x+1)(3x+2)} \\ &= \frac{3x+2 - 10x - 5}{(2x+1)(3x+2)} && \text{multiply out and then add and subtract on top line} \\ &= \frac{-7x-3}{(2x+1)(3x+2)} \end{aligned}$$

Example 6 Write as a single fraction $\frac{3}{2x-1} - 6$

Note When there is a whole number put it over 1 and then get the common denominator.

$$\begin{aligned} & \frac{3}{2x-1} - \frac{6}{1} && \text{common denominator } 2x-1 \\ &= \frac{3(1) - 6(2x-1)}{2x-1} \\ &= \frac{3 - 12x + 6}{2x-1} \\ &= \frac{9 - 12x}{2x-1} \end{aligned}$$