Simplify without a calculator.

$$\frac{3}{22} - \frac{9}{14}$$

By factoring the denominators you should notice that they already have a common factor. You can use the factor that they don't have in common to actually create the Least Common Denominator.

$$\frac{7}{7} \cdot \frac{3}{2 \cdot 11} - \frac{9}{2 \cdot 7} \cdot \frac{11}{11}$$

$$\frac{21 - 99}{2 \cdot 7 \cdot 11} = \boxed{\frac{-78}{2 \cdot 7 \cdot 11}}$$

For the problems you will be asked to work on in this section you won't be asked to multiply the factors in the denominator nor will you be asked to try and simplify between the numerator and denominator of the answer. All you will be asked to do is simplify the numerator by using the distributive property when applicable then combining like terms.

Sec 9-5: Adding and Subtracting Rational Expressions.

Simplify.

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

Since the given denominators don't have any common factors you simply use the product of the two denominators as the Least Common Denominator.

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

$$\boxed{\frac{7x+2}{(x+2)(x-1)}}$$

Simplify.

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

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

After factoring the denominators you notice that they already have a common factor, (x+2). Therefore, you can use the factors that aren't common, (x-2) and 2x to get the Least Common Denominator

$$\frac{5x - 10 - 6x}{2x(x+2)(x-2)}$$

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

Simplify.
$$\frac{8}{x^2 + 2x - 24} - \frac{2}{x^2 + 3x - 18}$$

$$\frac{(x-3)}{(x-3)} \cdot \frac{8}{(x+6)(x-4)} - \frac{2}{(x+6)(x-3)} \cdot \frac{(x-4)}{(x-4)}$$

$$\frac{8x-24 \; -2x+8}{(x-3)(x+6)(x-4)}$$

$$\boxed{\frac{6x-16}{(x-3)(x+6)(x-4)}}$$