1. Simplify the following. Identify the non-permissible values,
2. $\frac{x-3}{x^{2}-9}$ b)$ \frac{x^{2}+3x-4}{x^{2}+2x-8}$

 2. Simplify each expression.

a)$ \frac{x^{2}-5x+4}{2x-8}$ b) $\frac{15m-5}{3-9m}$

c) $\frac{a^{2}-3ab+2b^{2}}{2b-2a}$ d) $\frac{4m^{2}+7mn-2n^{2}}{n-4m}$

 3. Simplify each expression.

a) $\frac{x-2}{x^{2}+3x}×\frac{2x^{2}+6x}{5x^{2}}$ b) $\frac{-2vw}{6v^{2}}÷\frac{-15w^{2}}{18v^{2}w}$

c) $\frac{x^{2}+7x+12}{x^{2}-3x-10}÷\frac{x-4}{x+2} $ d)$ \frac{h^{2}-4}{h^{2}-h-6}×\frac{h-3}{h+2}$

e) $\frac{m^{2}n-5mn^{2}}{m-3n}÷\frac{-m^{2}+5mn}{m^{2}-6mn+9n^{2}}$ f) $\frac{a^{2}+ab-6b^{2}}{a^{2}+4ab+3b^{2}}×\frac{-a^{2}-ab}{a^{2}-3ab+2b^{2}}$

g) $\frac{x^{2}-x-2}{3x^{2}-11x+6}÷\frac{2x^{2}-x-6}{2x^{2}-3x-9}$

 4. Simplify

a) $\frac{x}{x+5}-\frac{x-5}{x+5}$ b) $\frac{4}{a}-\frac{1}{2a}$

c) $\frac{4t-1}{t^{2}}-\frac{3t+2}{5t}$ d) $x+\frac{4}{x-3}$

e) $\frac{3}{a-3}-\frac{1}{a^{2}-9}$ f) $\frac{5}{6m-18}+\frac{2}{15-5m}$

 5. Simplify

a) $\frac{x}{x^{2}-3x-4}+\frac{x+1}{x^{2}+2x+1}$ b) $\frac{x+2}{x^{2}-5x+6}-\frac{2x}{x^{2}+3x-10}$

c) $\frac{4}{2x^{2}-5x-3}+\frac{3}{2x^{2}+5x+2}$ d) $\frac{3}{x+2}+\frac{2x-2}{x^{2}-x-6}÷\frac{x-1}{x-3}$

6. Simplify

a) $\frac{1-\frac{16}{m^{2}}}{1-\frac{4}{m}}$ b) $\frac{\frac{4}{x}+x}{\frac{x}{4}+x}$ c) $\frac{\frac{3}{4x^{3}}-\frac{1}{2x}}{\frac{3}{2x}+\frac{5}{4x^{3}}}$ d) $\frac{m-\frac{3m+2}{m+4}}{m-2+\frac{5}{m+4}}$

 7. Solve and identify non-permissible values

a) $\frac{1}{x+4}=\frac{2}{x-6}$ b) $\frac{2}{5x-10}=\frac{3}{x-2}$

c) $\frac{x^{2}}{x^{2}-9}=\frac{x}{x+3}+\frac{x}{3-x}$ d) $\frac{x}{2x-1}+\frac{5}{x-6}=0$

e) $x-\frac{6}{x+1}=-2 $ f) $x-\frac{2}{x+7}=-\frac{2}{x+7}$

g) $\frac{m+3}{m-2}+\frac{m+2}{m+3}=\frac{2m+1}{m-2}-\frac{1}{3}$

 8. Give an example of a rational expression that has the following non-permissible values:

 $x\ne 4, -3$

9. Given that both rational expressions are defined, what is the value of k?

a) $\frac{x^{2}-2x-8}{x^{2}+8x+12}=\frac{x-4}{x+k}$

b) $\frac{x(x+k)}{x^{2}+2x-3}=\frac{x}{x-1}$