1. (5 pts) Solve the equation:

$$\frac{2x+1}{3x-2} = \frac{x+5}{3x-1}$$

(a) Cross multiply (clear denominators):

$$\implies (2x+1)(3x-1) = (x+5)(3x-2) \implies 6x^2 + x - 1 = 3x^2 + 13x - 10$$

(b) Collect terms and divide by 3:

$$\implies 3x^2 - 12x + 9 = 0 \implies x^2 - 4x + 3 = 0$$

(c) Factor or use the quadratic formula to solve:

$$x^2 - 4x + 3 = (x-1)(x-3) = 0 \implies x = 1 \text{ or } x = 3$$

or

$$x = \frac{4 \pm \sqrt{16-12}}{2} \implies \text{same solutions}$$

2. (5 pts) Solve the pair of equations:

$$3x + 2y = 5$$
$$4x + 3y = 8$$

(a) Solve the first equation for x (or y):

$$3x + 2y = 5 \implies x = \frac{5}{3} - \frac{2}{3}y$$

(b) Substitute into the second equation and solve for y (or x):

$$4x + 3y = 8 \implies 4\left(\frac{5}{3} - \frac{2}{3}y\right) + 3y = 8 \implies \frac{1}{3}y = \frac{4}{3} \implies y = 4$$

(c) Find x (or y):

$$x = \frac{5}{3} - \frac{2}{3}y \implies x = \frac{5}{3} - \frac{2}{3} \cdot 4 = -1.$$

3. (3 pts) $\lim_{x\to 2} \dfrac{x^2 - x - 2}{x^2 - 4} = \lim_{x\to 2} \dfrac{\cancel{(x-2)}(x+1)}{\cancel{(x-2)}(x+2)} = \lim_{x\to 2} \dfrac{x+1}{x+2} = \dfrac{3}{4}$

4. (2 pts) $\lim_{x\to\infty} \dfrac{x^2 - x - 2}{x^2 - 4} = \lim_{x\to\infty} \dfrac{x^2}{x^2} = \lim_{x\to\infty} 1 = 1$