Collingwood 12

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3.8a Problem: Solve for x: $\frac{x^2-2x+1}{x+5} = x - 2$.

3.8a Solution:

$$\frac{x^2 - 2x + 1}{x + 5} = x - 2$$
$$x^2 - 2x + 1 = (x - 2)(x + 5)$$
$$x^2 - 2x + 1 = x^2 + 3x - 10$$
$$-5x = -11$$
$$x = \frac{11}{5}$$

Therefore, $\boxed{x = \frac{11}{5}}$.

3.8b Problem: Solve for x: $\frac{x-3}{x+2} = 1$.

3.8b Solution:

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

Because $-3 \neq 2$, the derived equation is a contradiction and hence $\boxed{\text{there are no solutions}}$.

3.8c Problem: If $x = -2$, find ALL solutions of the equation $(x + 1)^2 + (y - 1)^2 = 10$.

3.8c Solution:

$$(x + 1)^2 + (y - 1)^2 = 10$$
$$(-2 + 1)^2 + (y - 1)^2 = 10$$
$$(y - 1)^2 = 9$$
$$y - 1 = \pm 3$$
$$y = \pm 3 + 1$$

Thus, solutions are $\boxed{(-2, -2) \text{ and } (-2, 4).}$

3.8d Problem: If $y = 3$, find ALL solutions of the equation $5(x + 1)^2 + 2(y - 1)^2 = 10$.

3.8d Solution:

$$5(x+1)^2 + 2(y-1)^2 = 10$$
$$5(x+1)^2 + 2(2)^2 = 10$$
$$5(x+1)^2 = 2$$
$$(x+1)^2 = \frac{2}{5}$$
$$x+1 = \pm\sqrt{\frac{2}{5}}$$
$$x = \frac{\pm\sqrt{10}}{5} - 1$$

Therefore, solutions are $\boxed{(\frac{\sqrt{10}}{5} - 1, 3) \text{ and } (\frac{-\sqrt{10}}{5} - 1, 3).}$