

$$\begin{aligned}
 1. \quad \frac{x}{x+9} + \frac{3x+27}{x^2+18x+81} &= \frac{x}{x+9} + \frac{3(x+9)}{(x+9)(x+9)} \quad , x \neq -9 \\
 &= \frac{x}{x+9} + \frac{3}{x+9} \\
 &= \frac{x+3}{x+9} \quad , x \neq -9
 \end{aligned}$$

$$\begin{aligned}
 b) \quad \frac{x+5}{x^2-16} + \frac{x}{x-4} &= \frac{x+5}{(x+4)(x-4)} + \frac{x}{x-4} \\
 &= \frac{x+5}{(x+4)(x-4)} + \frac{x}{x-4} \left( \frac{x+4}{x+4} \right) \quad , x \neq \{-4, 4\} \\
 &= \frac{x+5}{(x+4)(x-4)} + \frac{x(x+4)}{(x-4)(x+4)} \\
 &= \frac{x+5 + x^2 + 4x}{(x+4)(x-4)} \\
 &= \frac{x^2 + 5x + 5}{(x+4)(x-4)} \quad , x \neq \{-4, 4\}
 \end{aligned}$$

$$\begin{aligned}
 c) \quad \frac{a^2-1}{a^2+a-2} \div \frac{2a+2}{6a^2+12a} &= \frac{(a+1)(a-1)}{(a+2)(a-1)} \div \frac{2(a+1)}{6a(a+2)} \quad , a \neq \{-2, 0, 1\} \\
 &= \frac{(a+1)(a-1)}{(a+2)(a-1)} \times \frac{6a(a+2)}{2(a+1)} \\
 &= 3a \quad , x \neq \{-2, 0, 1\}
 \end{aligned}$$

$$2. a) \frac{c^2-4}{c^2+c-6} = \frac{(c+2)(c-2)}{(c+3)(c-2)}, \quad c \neq \{-3, 2\} \Rightarrow \frac{c+2}{c+3}, \quad c \neq \{3, 2\}$$

$$b) \frac{a^3b + 4a^2b - ab - 4b}{a^2-1} = \frac{b(a^3+4a^2-a-4)}{(a+1)(a-1)}, \quad a \neq \{-1, 1\}$$

$$= \frac{b(a^2(a+4) - 1(a+4))}{(a+1)(a-1)}$$

$$= \frac{b(a+4)(a^2-1)}{(a+1)(a-1)}$$

$$= \frac{b(a+4)(a+1)(a-1)}{(a+1)(a-1)}$$

$$= b(a+4), \quad a \neq \{-1, 1\}$$

$$c) \frac{6ab - 15a + 12b - 30}{6b - 15} = \frac{3a(2b-5) + 6(2b-5)}{3(2b-5)}, \quad b \neq \{5/2\}$$

$$= \frac{(2b-5)(3a+6)}{3(2b-5)}$$

$$= \frac{3a+6}{3}$$

$$= a+2, \quad b \neq \{5/2\}$$

$$d) \frac{(x-1)^2-9}{x-4} = \frac{((x-1)+3)((x-1)-3)}{x-4}, \quad x \neq 4$$

$$= \frac{(x+2)(x-4)}{(x-4)}$$

$$= x+2, \quad x \neq 4$$

3. ABCD Area =  $6x^2 + 17x + 5$   $6 \times 5 = 30 = m \times n$   
 $6x^2 + 2x + 15x + 5$   $17 = m + n$   
 $2x(3x+1) + 5(3x+1)$   $5, 2$   
 $(3x+1)(2x+5)$

BEFC Area =  $8x^2 + 14x - 15$   $-120 = m \times n$   
 $8x^2 + 20x - 6x - 15$   $14 = m + n$   
 $4x(2x+5) - 3(2x+5)$   $20, -6$   
 $(2x+5)(4x-3)$

Since they have  $2x+5$  in common, this must be the side they have in common.

$\therefore m \overline{BC} = 2x+5$

4 square: area =  $x^2$   
 rectangle area =  $(2x-8)(x-3) = 2x^2 - 14x + 24$

$x^2 = 2x^2 - 14x + 24$   
 $0 = x^2 - 14x + 24$

①  $x = \frac{-(-14) \pm \sqrt{(-14)^2 - 4(1)(24)}}{2(1)}$   
 $x = \frac{14 \pm \sqrt{196 - 96}}{2}$   
 $x = \frac{14 \pm \sqrt{100}}{2}$   
 $x = \frac{14 \pm 10}{2}$

a)  $x = \frac{14+10}{2}$  b)  $x = \frac{14-10}{2}$   
 $x = 12$   $x = 2$  reject

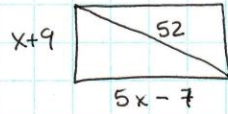
②  $0 = x^2 - 14x + 24$   
 $0 = (x-2)(x-12)$   
 $x-2=0$  or  $x-12=0$   
 $x=2$   $x=12$   
 reject

Rectangle:  $2x-8 = 2(12)-8$   
 $= 24-8$   
 $= 16 \text{ cm}$

$x-3 = 12-3$   
 $= 9 \text{ cm}$

$\therefore 16 \text{ cm by } 9 \text{ cm}$

5. Rectangle : Area =  $5x^2 + 38x - 63$        $m \times n = -315$   
 $5x^2 + 45x - 7x - 63$        $m+n = 38$   
 $5x(x+9) - 7(x+9)$        $+45, -7$   
 $(x+9)(5x-7)$



$$(x+9)^2 + (5x-7)^2 = 52^2$$

$$x^2 + 18x + 81 + 25x^2 - 70x + 49 = 2704$$

$$26x^2 - 52x + 130 = 2704$$

$$26x^2 - 52x - 2574 = 0$$

①  $26(x^2 - 2x - 99) = 0$

$$x^2 - 2x - 99 = 0$$

$$(x-11)(x+9) = 0$$

$$x-11=0 \quad , \quad x+9=0$$

$$x=11 \quad , \quad x=-9$$

②  $x = \frac{52 \pm \sqrt{52^2 - 4(26)(-2574)}}{2(26)}$

$$x = \frac{52 \pm \sqrt{270400}}{52}$$

$$x = \frac{52 \pm 520}{52}$$

$$x = \frac{52+520}{52}$$

$$x = 11$$

$$x = \frac{52-520}{52}$$

$$x = -9$$



$$\therefore 5(11) - 7 = 11+9$$

$$= 48 = 20$$

$$P = 2(20) + 2(48)$$

$$= 40 + 96$$

$$= 136 \text{ cm}$$