Factorisation: Exercise 14.4

Find and correct the errors in the following mathematical statements.

Q.1. $4(x - 5) = 4x - 5$

Sol. **Given:** $4(x - 5) = 4x - 5$

By taking LHS,

$= 4(x-5)$

$= 4x-20 \neq$ RHS

So, correct statement: $4(x - 5) = 4x-20$

Q.2. $x\,(3x + 2) = 3x^2 + 2$

Sol. **Given:** $x\,(3x + 2) = 3x^2 + 2$

By taking LHS,

$= x\,(3x + 2)$

$= 3x^2 + 2x \neq$ RHS

So, correct statement: $x(3x + 2) = 3x^2 + 2x$

Q.3. $2x + 3y = 5xy$

Sol. **Given:** $2x + 3y = 5xy$

By taking LHS,

$= 2x + 3y \neq$ RHS

Correct statement: $2x + 3y = 2x + 3y$

Q.4. $x + 2x + 3x = 5x$

Sol. **Given:** $x + 2x + 3x = 5x$

BY taking LHS,

$= x + 2x + 3x$

$= 6x \neq$ RHS

Correct statement: $x + 2x + 3x = 6x$

Q.5 $5y + 2y + y - 7y = 0$

Sol. **Given:** $5y + 2y + y - 7y = 0$

By taking LHS

$= 5y + 2y + y - 7y$

$= 8y - 7y$

$= y \neq$ RHS

So, correct statement: $5y + 2y + y - 7y = y$

Q.6 $3x + 2x = 5x^2$

Sol. **Given:** $3x + 2x = 5x^2$

By taking LHS,

$= 3x + 2x$

$= 5x \neq$ RHS

So, correct statement: $3x + 2x = 5x$

Q.7 $(2x)^2 + 4(2x) + 7 = 2x^2 + 8x + 7$

***Sol.* Given:** $(2x)^2 + 4(2x) + 7 = 2x^2 + 8x + 7$

BBY taking LHS,

$= (2x)^2 + 4(2x) + 7$

$= 4x^2 + 8x + 7 \neq$ RHS

So, correct statement: $(2x)^2 + 4(2x) + 7 = 4x^2 + 8x + 7$

Q.8 $(2x)^2 + 5x = 4x + 5x = 9x$

***Sol.* Given:** $(2x)^2 + 5x = 4x + 5x = 9x$

By taking LHS,

$= (2x)^2 + 5x$

$= 4x^2 + 5x \neq$ RHS

So, correct statement: $(2x)^2 + 5x = 4x^2 + 5x$

Q.9 $(3x + 2)^2 = 3x^2 + 6x + 4$

***Sol.* Given:** $(3x + 2)^2 = 3x^2 + 6x + 4$

By taking LHS,

$= (3x + 2)^2$

Since, $(a + b)^2 = a^2 + 2ab + b^2$

$= 9x^2 + 12x + 4 \neq$ RHS

So, correct statement: $(3x + 2)^2 = 9x^2 + 12x + 4$

Q.10 Substituting x = −3 in

(a) $x^2 + 5x + 4$ gives $(-3)^2 + 5(-3) + 4 = 9 + 2 + 4 = 15$

(b) $x^2 - 5x + 4$ gives $(-3)^2 - 5(-3) + 4 = 9 - 15 + 4 = -2$

(c) $x^2 + 5x$ gives $(-3)^2 + 5(-3) = -9 - 15 = -24$

***Sol.* (a) Given:** $x^2 + 5x + 4$ gives $(-3)^2 + 5(-3) + 4 = 9 + 2 + 4 = 15$

By taking LHS = $x^2 + 5x + 4$

Now substituting x = -3,

$x^2 + 5x + 4 = (-3)^2 + 5(-3) + 4$

$= 9 - 15 + 4$

$= -2 \neq$ RHS

So, correct statement: $x^2 + 5x + 4$ gives $(-3)^2 + 5(-3) + 4 = 9 - 15 + 4 = -2$

(b) Given: $x^2 - 5x + 4$ gives $(-3)^2 - 5(-3) + 4 = 9 - 15 + 4 = -2$

By taking LHS,

$= x^2 - 5x + 4$

Now substituting x = -3,

$= (-3)^2 - 5(-3) + 4$

$= 9 + 15 + 4$

$= 28 \neq$ RHS

So, correct statement: $x^2 - 5x + 4$ gives $(-3)^2 - 5(-3) + 4 = 9 + 15 + 4 = 28$

(c) Given: $x^2 + 5x$ gives $(-3)^2 + 5(-3) = -9 - 15 = -24$

By taking LHS,

$= x^2 + 5x$

Now substituting x = -3,

$= (-3)^2 + 5(-3)$

$= 9 - 15$

$= -6 \neq$ RHS
So, correct statement: $x^2 + 5x$ gives $(-3)^2 + 5(-3) = 9 - 15 = -6$

Q.11 $(y - 3)^2 = y^2 - 9$

Sol. **Given:** $(y - 3)^2 = y^2 - 9$
By taking LHS,
$= (y - 3)^2$
$= y^2 - 6y + 9 \neq$ RHS
So, correct statement: $(y - 3)^2 = y^2 - 6y + 9$

Q.12 $(z + 5)^2 = z^2 + 25$

Sol. **Given:** $(z + 5)^2 = z^2 + 25$
By taking LHS,
$= (z + 5)^2$
$= z^2 + 10z + 25 \neq$ RHS
So, correct statement: $(z + 5)^2 = z^2 + 10z + 25$

Q.13 $(2a + 3b)(a - b) = 2a^2 - 3b^2$

Sol. **Given:** $(2a + 3b)(a - b) = 2a^2 - 3b^2$
By taking LHS,
$= (2a + 3b)(a - b)$
$= 2a^2 - 2ab + 3ab - 3b^2$
$= 2a^2 + ab - 3b^2 \neq$ RHS
So, correct statement: $(2a + 3b)(a - b) = 2a^2 + ab - 3b^2$

Q.14 $(a + 4)(a + 2) = a^2 + 8$

Sol. **Given:** $(a + 4)(a + 2) = a^2 + 8$
By taking LHS,
$= (a + 4)(a + 2)$
$= a^2 + 2a + 4a + 8$
$= a^2 + 6a + 8 \neq$ RHS
So, correct statement: $(a + 4)(a + 2) = a^2 + 6a + 8$

Q.15 $(a - 4)(a - 2) = a^2 - 8$

Sol. By taking LHS,
$= (a - 4)(a - 2)$
$= a^2 - 2a - 4a + 8$
$= a^2 - 6a + 8 \neq$ RHS
So, correct statement: $(a - 4)(a - 2) = a^2 - 6a + 8$

Q.16 $\frac{3x^2}{3x^2} = 0$

Sol. Given: $\frac{3x^2}{3x^2} = 0$

By taking LHS,

$= \frac{3x^2}{3x^2}$

$= 1 \neq$ RHS

So, correct statement: $\frac{3x^2}{3x^2} = 1$

Q.17 $\frac{3x^2 + 1}{3x^2} = 1 + 1 = 2$

Sol. **Given:** $\frac{3x^2 + 1}{3x^2} = 1 + 1 = 2$

By taking LHS,

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

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

$= 1 + \frac{1}{3x^2} \neq$ RHS

So, correct statement: $\frac{3x^2 + 1}{3x^2} = 1 + \frac{1}{3x^2}$

Q.18 $\frac{3x}{3x+2} = \frac{1}{2}$

Sol. **Given:** $\frac{3x}{3x+2} = \frac{1}{2}$

By taking LHS,

$= \frac{3x}{3x+2} \neq$ RHS

So, correct statement: $\frac{3x}{3x+2} = \frac{3x}{3x+2}$

Q.19 $\frac{3}{4x+3}=\frac{1}{4x}$

Sol. Given: $\frac{3}{4x+3}=\frac{1}{4x}$

By taking LHS,

$=\frac{3}{4x+3} \neq$ RHS

So, correct statement: $\frac{3}{4x+3}=\frac{3}{4x+3}$

Q.20 $\frac{4x+5}{4x}=5$

Sol. **Given:** $\frac{4x+5}{4x}=5$

By taking LHS,

$=\frac{4x+5}{4x}$

$=\frac{4x}{4x}+\frac{5}{4x}$

$=1+\frac{5}{4x} \neq$ RHS

So, correct statement: $\frac{4x+5}{4x}=1+\frac{5}{4x}$

Q.21 $\frac{7x+5}{5}=7x$

Sol. **Given:** $\frac{7x+5}{5}=7x$

By taking LHS,

$=\frac{7x+5}{5}$

$=\frac{7x}{5}+\frac{5}{5}$

$=\frac{7x}{5}+1 \neq$ RHS

So, correct statement: $\frac{7x+5}{5}=\frac{7x}{5}+1$