Exercise 14.4

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Find and correct the errors in the following mathematical statements.

1. **4(x – 5) = 4x – 5**

Solution:
4(x- 5) = 4x – 20 ≠ 4x – 5 = RHS

The correct statement is 4(x - 5)= 4x – 20

2. **x(3x + 2) = $3x^2$ + 2**

Solution:

LHS = x(3x + 2) = $3x^2$ +2x ≠ $3x^2$ + 2 = RHS

The correct solution is x(3x + 2) = $3x^2$ + 2x

3. **2x + 3y = 5xy**

Solution:

LHS = 2x + 3y ≠ R. H. S

The correct statement is 2 x + 3 y = 2 x + 3 y

4. **x + 2x + 3x = 5x**

Solution:

LHS = x + 2x + 3x = 6x ≠ RHS

The correct statement is x + 2x + 3x = 6x

5. **5y + 2y + y – 7y = 0**

Solution:

LHS = 5y + 2y + y – 7y = y ≠ RHS

The correct statement is 5y + 2y + y – 7y = y

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

Solution:
LHS = $3x + 2x = 5x \neq$ RHS

The correct statement is $3x + 2x = 5x$

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

Solution:
LHS = $(2x)^2 + 4(2x) + 7 = 4x^2 + 8x + 7 \neq$ RHS

The correct statement is $(2x)^2 + 4(2x) + 7 = 4x^2 + 8x + 7$

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

Solution:
LHS = $(2x)^2 + 5x = 4x^2 + 5x \neq 9x$ = RHS

The correct statement is $(2x)^2 + 5x = 4x^2 + 5x$

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

Solution:
LHS = $(3x + 2)^2 = (3x)^2 + 2^2 + 2 \times 2 \times 3x = 9x^2 + 4 + 12x \neq$ RHS

The correct statement is $(3x + 2)^2 = 9x^2 + 4 + 12x$

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

Solution:
(a) Substituting $x = -3$ in $x^2 + 5x + 4$, we have

$x^2 + 5x + 4 = (-3)^2 + 5(-3) + 4 = 9 - 15 + 4 = -2$. This is the correct answer.

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

$x^2 - 5x + 4 = (-3)^2 - 5(-3) + 4 = 9 + 15 + 4 = 28$. This is the correct answer

(c) Substituting $x = -3$ in $x^2 + 5x$

$x^2 + 5x = (-3)^2 + 5(-3) = 9 - 15 = -6$. This is the correct answer

11. $(y – 3)^2 = y^2 – 9$

Solution:

LHS = $(y – 3)^2$, which is similar to $(a – b)^2$ identity, where $(a – b)^2 = a^2 + b^2 - 2ab$.

$(y – 3)^2 = y^2 + (3)^2 – 2y \times 3 = y^2 + 9 – 6y \neq y^2 – 9$ = RHS

The correct statement is $(y – 3)^2 = y^2 + 9 – 6y$

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

Solution:

LHS = $(z + 5)^2$, which is similar to $(a – b)^2$ identity, where $(a + b)^2 = a^2 + b^2 + 2ab$.

$(z + 5)^2 = z^2 + 5^2 + 2\times5 \times z = z^2 + 25 + 10z \neq z^2 + 25$ = RHS

The correct statement is $(z + 5)^2 = z^2 + 25 + 10z$

13. $(2a + 3b) (a – b) = 2a^2 – 3b^2$

Solution:
LHS = $(2a + 3b) (a – b) = 2a (a – b) + 3b (a – b)$
$= 2a^2 – 2ab + 3ab – 3b^2$
$= 2a^2 + ab – 3b^2$
$\neq 2a^2 – 3b^2$ = RHS

The correct statement is $(2a + 3b) (a – b) = 2a^2 + ab – 3b^2$

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

Solution:

LHS = $(a + 4) (a + 2) = a(a + 2) + 4(a + 2)$
$= a^2 + 2a + 4a + 8$
$= a^2 + 6a + 8$
$\neq a^2 + 8$ = RHS

The correct statement is $(a + 4) (a + 2) = a^2 + 6a + 8$

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

Solution:

LHS = $(a - 4)(a - 2) = a(a - 2) - 4(a - 2)$
$= a^2 - 2a - 4a + 8$
$= a^2 - 6a + 8$
$\neq a^2 - 8$ = RHS

The correct statement is $(a - 4)(a - 2) = a^2 - 6a + 8$

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

Solution:

LHS = $\frac{3x^2}{3x^2} = 1 \neq 0$ = RHS

The correct statement is $\frac{3x^2}{3x^2} = 1$

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

Solution:

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

The correct statement is $\frac{3x^2+1}{3x^2} = 1 + \frac{1}{3x^2}$

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

Solution:

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

The correct statement is $\frac{3x}{3x+2} = \frac{3x}{3x+2}$

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

Solution:

LHS = $\frac{3}{4x+3} \neq \frac{1}{4x}$

The correct statement is $\frac{3}{4x+3} = \frac{3}{4x+3}$

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

Solution:

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

The correct statement is $\frac{4x+5}{4x}$ = 1 + $\frac{5}{4x}$

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

Solution:

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

The correct statement is $\frac{7x+5}{5} = \frac{7x}{5} + 1$