EXERCISES – ALGEBRA

Name: _____

1. Expand and Simplify where possible:

   (a) $5x - 4(2x - 3) + 6x - 8$

   (b) $(5 - 4x)(2x + 3)$

   (c) $(2x - 5)^2$

2. Simplify

   (a) $\dfrac{8ab^2}{9c} \times \dfrac{3ac}{4abc}$

   (b) $\dfrac{x}{x+3} - \dfrac{x-4}{x}$

3. Factorise:

   (a) $4A^2 - 9Y^2$

   (b) $6x^2 - 7x - 3$

4. Solve the following equations:-

   (a) $3x + 10 = 11x - 2$

   (b) $\dfrac{x}{3} - \dfrac{x-5}{2} = 6$

   (c) $x^2 - 10x + 5 = 0$

   – by completing the square!

5. Make "**x**" the subject of the following:

(a) $v = u - ax$

(b) $b = \dfrac{a+x}{x}$

6. Solve for all possible values of **x** :-

Graph your sol^n. on the number line.

(a) $9 - 5x > 13$

$\xrightarrow{\hspace{3cm}} +X$

(b) $|6 - 3x| = x$

$\xrightarrow{\hspace{3cm}} +X$

7. Solve simultaneously:
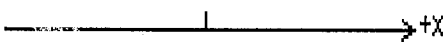
$2x + y - 6 = 0$ and $y = x^2 - 3x$
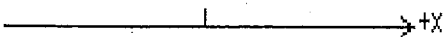
EXERCISES – ALGEBRA

Name: **SOLUTIONS**

1. Expand and Simplify where possible:

    (a) $5x - 4(2x - 3) + 6x - 8$

    $5x - 8x + 12 + 6x - 8$ ✓

    $= 3x + 4$ ✓

    (b) $(5 - 4x)(2x + 3)$

    $10x + 15 - 8x^2 - 12x$ ✓

    $= 15 - 2x - 8x^2 = -8x^2 - 2x + 15$

    $-8x^2 + 2x - 15$

    (c) $(2x - 5)^2$

    $4x^2 - 20x + 25$ ✓

2. Simplify

    (a) $\dfrac{8ab^2}{3\,9q} \times \dfrac{9aq}{44c} = \dfrac{2ab}{3\,c}$ ✗

    (b) $\dfrac{x}{x+3} - \dfrac{x-4}{x}$

    $\dfrac{x^2 - x^2 + x + 12}{x(x+3)} = \dfrac{x+12}{x(x+3)}$ ✓

3. Factorise:

    (a) $4A^2 - 9Y^2$

    $(2A - 3Y)(2A + 3Y)$ ✓

    (b) $6x^2 - 7x - 3$

    $\begin{matrix} 3x \\ 2x \end{matrix} \diagdown {}_{-3}^{1} = (3x + 1)(2x - 3)$ ✓

4. Solve the following equations:-

    (a) $3x + 10 = 11x - 2$

    $11x - 3x = 10 + 2$

    $8x = 12$ ✓

    $x = \dfrac{12}{8} = \dfrac{3}{2} = 1\tfrac{1}{2}$ ✓

    (b) $\dfrac{x}{3} - \dfrac{x-5}{2} = 6$ ⟵ *Need more practice!*

    $\dfrac{x}{3} - \dfrac{x-5}{2} - 6 = 0$ $-x + 21$

    $\dfrac{2x - 3x + 5 - 36}{6} = 0$ $\Rightarrow \quad x = -21$

    (c) $x^2 - 10x + 5 = 0$

    – by completing the square!

    $x^2 - 10x = -5$

    $x^2 - 10x + (-5)^2 = -5 + (-5)^2$

    $(x - 5)^2 = 20$ ✓

    $x - 5 = \pm\sqrt{20}$

    $x = \pm\sqrt{20} + 5 = \underline{5 \pm 2\sqrt{5}}$

5. Make "x" the subject of the following:

(a) $v = u - ax$

$v + ax = u$

$ax = u - v$ ✓

$x = \dfrac{u-v}{a}$ ✓
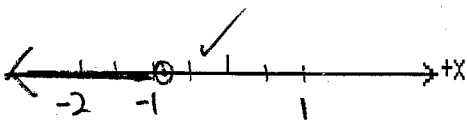
(b) $b = \dfrac{a+x}{x}$

$bx = a + x$

$bx - x = a$ ✓

$x(b-1) = a$

$x = \dfrac{a}{b-1}$ ✓

6. Solve for all possible values of **x** :-
Graph your sol^n. on the number line.

(a) $9 - 5x > 13$ $-5x > 13 - 9$ ✓

$5x < 9 - 13$

$x < -\dfrac{4}{5}$ ✓

(b) $|6 - 3x| = x$

Solve

$6 - 3x = x$ or $-(6 - 3x) = x$
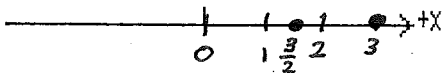
$4x = 6$ then test for x.

$x = \dfrac{3}{2}$ $-6 + 3x = x$

                          $2x = 6$

Both results are true. $x = 3$.

7. The sides of a rectangle are measured to be 12cm by 7cm (to the nearest cm).

(a) What is the absolute error for the length of the longest side.

(b) What is the relative error of its Perimeter based on the inaccuracies of the above measurements.

8. Solve simultaneously:

①   ②
$2x + y - 6 = 0$ and $y = x^2 - 3x$

Sub ② into ①

$2x + x^2 - 3x - 6 = 0$ ✓

$x^2 - x - 6 = 0$

$(x-3)(x+2) = 0$ ✓

$\boxed{x = 3, -2}$ ✓

Sub 3 into ② as x

$y = 9 - 9$ ✓

$= 0$

Sub -2 into ② as x

$y = 4 + 6$

$= 10$ ✓

∴ $x = 3, -2$

$y = 0, 10$ ✓