

Scoil Mhuire V- Problem Set 3 - For _____

[Answers on A4 sheets, stapled.]

1. Evaluate the following:

(i) $\frac{18y^7}{3y^2}$ (ii) $(-x^2)(3x^4)$ (iii) $(2x^2y)(3x^4y^2)$ (iv) $(-x^2)(3x^{-1})$ (v) $-5x^9(3x^7)$

(vi) $(x^2)^4$ (vii) $\frac{6x^3}{2x}$ (viii) $(2p^2)^3$ (ix) $(3x^{-1})(5x^2)$ (x) $(9y^4z^3)(2x^3z^4)$

2. Factorise the following

(i) $25x^2 - 16y^2$ (ii) $a^3 - a^2b - ab^2 + b^3$ (iii) $x^4 - x$ (iv) $3x^2 - 16x + 5$ (v) $27x^3 - 8y^3$

3. Simplify the following algebraic expressions:

(i) $\frac{3x^2 - 16x + 5}{x^2 - 6x + 5}$ (ii) $\frac{1 + \frac{3}{3x}}{2 - \frac{4}{2x}}$ (iii) $\sqrt{4x^2 - 12x + 9}$

4. Factorise the following quadratics: (i) $4x^2 + 31x + 21$ (ii) $5x^2 - 42x - 27$ (iii) $5x^2 - 42x - 27$

5. Write down a quadratic equation that has roots of -1 and 4 in the form of $ax^2 + bx + c = 0$ where $a, b, c \in \mathbb{Z}$.

6. Solve the following equation leaving your answers in surd form $x^2 - 6x - 1 = 0$

7. A quadratic function has roots of 4 and -3. It also contains the point (0, -24). Write down the function in the form of $ax^2 + bx + c = 0$, where $a, b, c \in \mathbb{Z}$.

8. The volume of a cuboid is $V(x) = 6x^3 + 4x^2 - 2x$. If the height is given by x , find

(i) an expression for the width and the length of the cuboid.

(ii) for what integral value of x is the volume equal to 60 cm^3 . (Trial and Error)

9. The function $f(x) = 2x^2 + 8x - 2$ can be expressed as $a(x+b)^2 + c$, where $a, b, c \in \mathbb{Z}$

(i) Using the method of completing the square, find the values of a, b and c .

(ii) Hence, find the co-ordinates of the local minimum of the curve.

(iii) Solve the equation $f(x) = 0$, writing your answers in surd form.

10. Solve the following system of equations:

$$x + 2y = 5$$

$$x^2 + y^2 = 5$$