

Answer on Question #59133 – Math – Algebra

Question

1. Simplify  $(\sqrt{3} - 1)^3$

Solution

$$\frac{\sqrt{3} - 1}{3} = \frac{\sqrt{3}}{3} - \frac{1}{3} = \frac{1}{\sqrt{3}} - \frac{1}{3}$$

**Answer:**  $\frac{1}{\sqrt{3}} - \frac{1}{3}$ .

Question

2. Simplify

$$4(2n+1) - 2n+2$$

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$$2n+1 - 2n$$

Solution

$$\frac{4(2n + 1) - 2n + 2}{2n + 1 - 2n} = \frac{8n + 4 - 2n + 2}{1} = 6n + 6 = 6(n + 1).$$

**Answer:**  $6(n + 1)$ .

Question

3. Given that  $\log_2 x + \log_3 81 = 1$

Solution

$$\log_2 x + \log_3 81 = 1$$

$$\log_3 81 = \log_3(3^4) = 4$$

$$\log_2 x = 1 - 4 = -3$$

$$x = 2^{-3} = \frac{1}{8}$$

**Answer:**  $x = \frac{1}{8}$ .

Question

4. Factorize  $6x^2 - xy - y^2 - 2x + y$

Solution

$$6x^2 - xy - y^2 - 2x + y.$$

We have quadratic polynomial on x and y, so

$$6x^2 - xy - y^2 - 2x + y = (ax + by + c)(dx + ey + f)$$

$$ad = 6; be = -1; ae + bd = -1; cf = 0; af + cd = -2; bf + ce = 1.$$

Let  $c = 0$ .

$$af = -2; bf = 1 \rightarrow \frac{a}{b} = -2 \rightarrow a = -2b$$

Let  $b = 1$ :

$$a = -2; d = -\frac{6}{2} = -3; e = -1; f = 1.$$

Thus,

$$6x^2 - xy - y^2 - 2x + y = (y - 2x)(1 - 3x - y).$$

**Answer:**  $(y - 2x)(1 - 3x - y)$ .