

## Revision 2 Unit 1 – 4 (Brief solutions)

1. Simplify  $\frac{32^x \cdot 8^y}{16^{x-y}}$  Ans:  $2^{x+7y}$

$$\frac{2^{5x} \cdot 2^{3y}}{2^{4(x-y)}} = \frac{2^{5x} \cdot 2^{3y}}{2^{4x} \cdot 2^{-4y}} = 2^x \cdot 2^{7y}$$

2. Solve  $9^{2x} = \frac{1}{\sqrt{3}}$  Ans:  $x = -\frac{1}{8}$

Method 1:

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

$$3^{4x} = 3^{-\frac{1}{2}} \quad \therefore 4x = -\frac{1}{2}$$

Method 2:

$$2x \log 9 = \log \frac{1}{\sqrt{3}}$$

$$x = \frac{\log \frac{1}{\sqrt{3}}}{2 \log 9} = -0.125$$

3. Factorize  $16x^2y + 8xy^2 - 4xy$  Ans:  $4xy(4x + 2y - 1)$

4. Factorize  $x^2 + 13x + 42$  Ans:  $(x + 6)(x + 7)$

5. Factorize  $12x^2 + 31x + 20$  Ans:  $(3x + 4)(4x + 5)$

6. Factorize  $25x^2 - 16$  Ans:  $(5x + 4)(5x - 4)$

$$25x^2 - 16 = (5x)^2 - 4^2$$

7. Solve  $4(x-1)^2 = (x+1)^2$  Ans:  $x = \frac{1}{3}$  or  $3$

$$4(x^2 - 2x + 1) = (x^2 + 2x + 1)$$

$$3x^2 - 10x + 3 = 0$$

$$(3x - 1)(x - 3) = 0$$

8. Solve  $x^2 - x - 1 = 0$ , leave the answer in surd forms. Ans:  $x = \frac{1 \pm \sqrt{5}}{2}$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-1)}}{2(1)}$$

9. If  $\sqrt{4x - y^2} + 2y = 4$ , then  $x =$  Ans:  $x = \frac{5y^2 - 16y + 16}{4}$

$$\sqrt{4x - y^2} + 2y = 4$$

$$4x - y^2 = (4 - 2y)^2 = 4^2 - 2(4)(2y) + (2y)^2$$

$$4x = 16 - 16y + 4y^2 + y^2$$

10. Solve  $h = H - \frac{U^2}{4g}$ . If  $g=3, h=4, H=7$ , then  $U =$  Ans:  $U = \pm 6$

$$\frac{U^2}{4g} = H - h$$

$$U^2 = 4g(H - h)$$

$$U = \pm \sqrt{4g(H - h)} = \pm \sqrt{4 \cdot 3(7 - 4)} = \pm \sqrt{36}$$

11. (a) Use factor theorem to show that  $(x+2)$  is a factor of  $f(x) = x^3 - 2x^2 - 5x + 6$ .

When  $x = -2$ ,  $f(-2) = (-2)^3 - 2(-2)^2 - 5(-2) + 6 = -8 - 8 + 10 + 6 = 0$

By factor theorem,

$\therefore x+2$  is a factor of  $f(x)$ .

Ans: (a)  $f(-2) = 0$

(b) Hence solve the equation  $f(x) = x^3 - 2x^2 - 5x + 6 = 0$  completely.

$$\begin{array}{r} x^2 - 4x + 3 \\ x + 2 \overline{) x^3 - 2x^2 - 5x + 6} \\ \underline{x^3 + 2x^2} \phantom{+ 6} \\ -4x^2 - 5x \phantom{+ 6} \\ \underline{-4x^2 - 8x} \phantom{+ 6} \\ 3x + 6 \\ \underline{3x + 6} \\ 0 \end{array}$$

$$f(x) = x^3 - 2x^2 - 5x + 6 = 0$$

$$(x + 2)(x^2 - 4x + 3) = 0$$

$$(x + 2)(x - 3)(x - 1) = 0$$

Ans: (b)  $x = -2$  or  $3$  or  $1$