Year 1 Pure Chapter 1: Indices – Exam Questions (Answers)

1) $\left(\frac{125x^6}{64}\right)^{\frac{1}{3}}$

$\frac{5x^2}{4}$

2) $\frac{\left(2x^{\frac{1}{2}}\right)^3}{4x^2}$

$\frac{8x^{3/2}}{4x^2}$

$2x^{-\frac{1}{2}}$

3) $\left(\frac{216x^6}{27y^3}\right)^{-2/3}$

$\left(\frac{6x^2}{3y}\right)^{-2}$

$\left(\frac{2x^2}{y}\right)^{-2}$

$\left(\frac{4x^4}{y^2}\right)^{-1}$

$\frac{y^2}{4x^4}$

4) 9^{3x+2}

$3^{2(3x+2)}$

3^{6x+4}

5) 8^{2x-5}

$2^{3(2x-5)}$

2^{6x-15}

6) a) $y = 2^x$

$4^x = 2^{2x}$

$= 2^x \times 2^x$

$= y \times y$

$= y^2$

b) $y^2 - 6y - 16 = 0$

$(y-8)(y+2) = 0$

$y = 8 \quad y = -2$

$8 = 2^x \qquad -2 = 2^x$

$x = 3 \qquad \times$

7) $2^{2x+1} - 5(2^x) - 12 = 0$

$2 \times 2^{2x} - 5(2^x) - 12 = 0$

$2(2^x)^2 - 5(2^x) - 12 = 0$

let $y = 2^x$

$2y^2 - 5y - 12 = 0$

$(2y + 3)(y - 4) = 0$

$y = -3/2 \quad y = 4$

$-3/2 = 2^x \quad 4 = 2^x$

$x \quad x = 2$

8) $8^{2x-5} = 2^{x+1}$

$2^{3(2x-5)} = 2^{x+1}$

$2^{6x-15} = 2^{x+1}$

$6x - 15 = x + 1$

$5x - 15 = 1$

$5x = 16$

$x = \frac{16}{5}$

9a) $x^2 - 9x + 8 = 0$

$(x - 8)(x - 1) = 0$

$x = 8 \quad x = 1$

b) $x = y^{3/2}$

$8 = y^{3/2} \quad 1 = y^{3/2}$

$64 = y^3 \quad y = 1$

$y = 4$

10) $8^{x+1} = 4^{3x-1}$

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

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

$3x + 3 = 6x - 2$

$3 = 3x - 2$

$5 = 3x$

$x = 5/3$