

1.  $16^{\frac{1}{5}} \times 2^x = 8^{\frac{3}{4}}$

Work out the exact value of  $x$ .

$$a^x \times a^y = a^{x+y}$$

$$(a^x)^y = a^{xy}$$

$$(2^4)^{\frac{1}{5}} \times 2^x = (2^3)^{\frac{3}{4}} \quad \textcircled{1}$$

$$2^{\frac{4}{5}} \times 2^x = 2^{\frac{9}{4}}$$

$$\frac{4}{5} + x = \frac{9}{4} \quad \textcircled{1} \quad x = \frac{9}{4} - \frac{4}{5} = \frac{29}{20} = 1.45$$

$\textcircled{1}$

$$x = 1.45.$$

(Total for Question is 3 marks)

2. Given that  $9^{-\frac{1}{2}} = 27^{\frac{1}{4}} \div 3^{x+1}$   
find the exact value of  $x$ .

$$\frac{(3^2)^{-\frac{1}{2}}}{3^{x+1}} = \frac{(3^3)^{\frac{1}{4}}}{3^{x+1}} \quad \textcircled{1}$$

$$\frac{3^{2 \times -\frac{1}{2}}}{3^{x+1}} = \frac{3^{3 \times \frac{1}{4}}}{3^{x+1}}$$

$$\frac{3^{-1}}{3^{x+1}} = \frac{3^{\frac{3}{4}}}{3^{x+1}} \quad \textcircled{1}$$

$$3^{x+1} \times 3^{-1} = 3^{\frac{3}{4}}$$

$a^x \times a^y = a^{x+y}$
$(a^x)^y = a^{xy}$
$\frac{a^x}{a^y} = a^{x-y}$

$$\frac{3^{x+1-1}}{3^{x+1}} = \frac{3^{\frac{3}{4}}}{3^{x+1}}$$

$$\frac{3^x}{3^{x+1}} = \frac{3^{\frac{3}{4}}}{3^{x+1}}$$

$$\therefore x = \frac{3}{4} \quad \textcircled{1}$$

$$x = \frac{3}{4}$$