

## Exercise 7.7

1. Find the value of  $x$  in each of these equations:

(i)  $2^x = 32$

(ii)  $16^x = 64$

(iii)  $25^x = 125$

(iv)  $3^x = \frac{1}{27}$

log No = power  
BASE

(i)  $x = \log_2 32 = 5$

(ii)  $x = \log_{16} 64 = \frac{3}{2}$

(iii)  $x = \log_{25} 125 = \frac{3}{2}$

(iv)  $x = \log_3 \frac{1}{27} = -3$

3. Find the value of  $x$  in each of these equations:

(CALCULATOR METHOD)

(i)  $2^x = \frac{\sqrt{2}}{2}$

(ii)  $25^x = \frac{125}{\sqrt{5}}$

(iii)  $\frac{1}{8^x} = \sqrt{2}$

(iv)  $7^x = \frac{1}{\sqrt[3]{7}}$

power = log No.  
BASE

(i)  $x = \log_2 \frac{\sqrt{2}}{2} = -\frac{1}{2}$

(ii)  $x = \log_{25} \frac{125}{\sqrt{5}} = \frac{5}{4}$

(iii)  $\frac{1}{8^x} = \sqrt{2} \Rightarrow 8^x = \frac{1}{\sqrt{2}}$   
 $x = \log_8 \frac{1}{\sqrt{2}} = -\frac{1}{6}$

(iv)  $x = \log_7 \frac{1}{\sqrt[3]{7}} = -\frac{1}{3}$

3. Find the value of  $x$  in each of these equations:

(OLD WAY)

(i)  $2^x = \frac{\sqrt{2}}{2}$

(ii)  $25^x = \frac{125}{\sqrt{5}}$

(iii)  $\frac{1}{8^x} = \sqrt{2}$

(iv)  $7^x = \frac{1}{\sqrt[3]{7}}$

rewrite in terms of base 2	$2^x = \frac{\sqrt{2}}{2} = \frac{2^{\frac{1}{2}}}{2} = 2^{-\frac{1}{2}}$ $\Rightarrow x = -\frac{1}{2}$
rewrite in terms of base 5	$25^x = \frac{125}{\sqrt{5}}$ $(5^2)^x = \frac{5^3}{5^{\frac{1}{2}}} = 5^{5/2}$ $\Rightarrow 2x = 5/2 \quad \Rightarrow x = 5/4$
Write in terms of Base 2	$\frac{1}{8^x} = \sqrt{2} \quad \Rightarrow 8^{-x} = \sqrt{2}$ $(2^3)^{-x} = 2^{\frac{1}{2}} \Rightarrow 2^{-3x} = 2^{\frac{1}{2}}$ $\Rightarrow -3x = \frac{1}{2} \quad \Rightarrow x = -\frac{1}{6}$
Write in terms of base 7	$7^x = \frac{1}{\sqrt[3]{7}} = \frac{1}{7^{\frac{1}{3}}} = 7^{-\frac{1}{3}}$ $x = -\frac{1}{3}$