

Standard Form Questions with Indices

1.

(a) $x = 9 \times 10^{2m}$ where m is an integer.

Find, in standard form, an expression for \sqrt{x}

.....
(2)

(b) $y = 9 \times 10^{2n}$ where n is an integer.

Find, in standard form, an expression for $y^{\frac{3}{2}}$

Give your answer as simply as possible.

.....
(3)

(Total for Question 18 is 5 marks)

2.

$y = 16 \times 10^{8k}$ where k is an integer.

Find an expression, in terms of k , for $y^{\frac{5}{4}}$
Give your answer in standard form.

.....
(Total for Question 25 is 3 marks)

3.

$m = 8 \times 10^{9n}$ where n is an integer.

Express $m^{\frac{1}{3}}$ in standard form.

Give your answer, in terms of n , as simply as possible.

.....
(Total for Question 22 is 3 marks)

Answers

1.

18	(a)		3×10^m	2	B2 B1 for $3 \times \sqrt{10^{2m}}$ or 3×10^{km} where $k \neq 1$ or $a \times 10^m$ where $a \neq 3$
	(b)	$\left((9)^{\frac{3}{2}} = \right) 27$ or 2.7		3	B1
		27×10^{3n} oe			M1
			$2.7 \times 10^{3n+1}$		A1
Total 5 marks					

2.

25		32 or 3.2 or 10^{10k} 32×10^{10k} $3.2 \times 10^{10k+1}$		3	M1 M1 A1
			$3.2 \times 10^{10k+1}$		
Total 3 marks					

3.

22		e.g. $\left(\frac{1}{8 \times 10^{9n}} \right)^{\frac{1}{3}}$ or $(2 \times 10^{3n})^{-1}$ or $\frac{1}{\sqrt[3]{8 \times 10^{9n}}}$ or $(\sqrt[3]{8 \times 10^{9n}})^{-1}$ or $(8^{\frac{-1}{3}} \times 10^{\frac{-9n}{3}})$ or $\left[\frac{1}{8^{\frac{1}{3}}} \text{ and } \frac{1}{(10^{9n})^{\frac{1}{3}}} \right]$ or $[2^{-1} \text{ and } (10^{3n})^{-1}]$ oe			M1 Correct first stage.
		e.g. $\frac{1}{2 \times 10^{3n}}$ or 0.5×10^{-3n} oe or $\left[8^{\frac{-1}{3}} = 0.5 \text{ and } (10^{9n})^{\frac{-1}{3}} = 10^{-3n} \right]$ oe			M1 For dealing with $8^{-\frac{1}{3}}$ (shown as $\frac{1}{2}$ or 0.5) and $(10^{9n})^{-\frac{1}{3}}$ shown as 10^{-3n}
			$5 \times 10^{-3n-1}$	3	A1 $5 \times 10^{-(3n+1)}$
Total 3 marks					