N54 Index Laws

OCR

8 (a) Evaluate.

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(i) $\sqrt{121}$

(a)(i)[1]

(ii) 4⁻²

(ii)[1]

(b) Work out.

$$(9-3\times2)^2$$

(b)[2

(c) Fill in the power.

5 = 125

[1]

(i)
$$\sqrt{121}$$
 _ \times _ = [2]

- (a)(i)

(b) Work out.

(c) Fill in the power.

$$5 = 125$$
 $5 \times 5 \times 5 = 125$ [1

Created b	y W Neil
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3	a	Round	7874 to
-			

(i) the nearest hundred,

(ii) 1 significant figure.

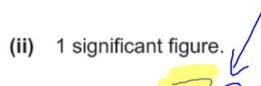
(b) Find the value of x.

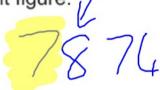
$$3^5 \times 3^2 = 3^x$$

(b)
$$x = \dots [1]$$









(b) Find the value of x.

$$3^5 \times 3^2 = 3^x$$

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20 (a) Show that $a^5 \times (a^3)^2$ can be expressed as a^{11} .

[2]

NI8

20 (a) Show that $a^5 \times (a^3)^2$ can be expressed as a^{11} .

[2]

N/8

$$\left(a^{3}\right)^{2}$$
 ... mult indices a

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(b) Write $\frac{1}{125} \times 25^9$ as a power of 5. NS4H

.....[3]

(b) Write
$$\frac{1}{125} \times 25^9$$
 as a power of 5.

N54H

$$\frac{1}{125} = 125$$
 $(5^3)^{-1}$
 $= 5^{-3}$

$$\frac{9}{25}$$

$$(5^{2})$$

$$5^{18}$$

$$5^{3}$$

$$15^{3}$$

7	(a) Write down the value of $\sqrt[3]{27}$.		Video created by Will Neill
•	N19		
		(a)	[1]
	(b) Work out 7 ² . N19		
		(b)	[2]
	(c) Write 6^{-1} as a fraction.		
	N54		
		(c)	[1]

7 (a) Write down the value of $\sqrt[3]{27}$.

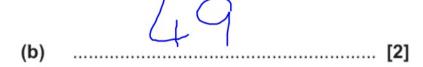
N19

$$\frac{3}{3} \times \frac{3}{3} = \frac{27}{3}$$

(b) Work out 7^2 .

N19

7×7



(c) Write 6^{-1} as a fraction.

N54



(b)	There are two errors in Sam's method for finding the value of $64^{\frac{-2}{3}}$ shown below.
	Find the cube root of 64 and then multiply by 2. The cube root of 64 is 4 and then $4 \times 2 = 8$. The negative power makes the answer negative so answer equals -8.
	Describe these errors and then give the correct value of $64^{-\frac{2}{3}}$.
	Correct value[3]

				-2	
(b)	There are two errors	in Sam's method	for finding the	value of 64 3	shown below.

NS4 Find the cube re

Find the cube root of 64 and then multiply by 2.

The cube root of 64 is 4 and then $4 \times 2 = 8$.

The negative power makes the answer negative so answer equals -8.

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17 Show that $\frac{\sqrt[3]{81}}{3}$ can be written as $3^{\frac{1}{3}}$.

17 Show that $\frac{\sqrt[3]{81}}{3}$ can be written as $3^{\frac{1}{3}}$.

NS4

$$\frac{4}{3} = \frac{1}{3}$$
 $\frac{4}{3} = \frac{1}{3}$
 $\frac{1}{3} - \frac{1}{3}$
 $\frac{1}{3} - \frac{1}{3}$

$$=3^{1/3}$$

(b) Work out.

 $NS4 16^{-\frac{3}{4}}$

(b)[3]

(b) Work out.

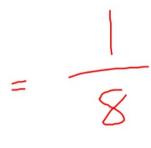
N54

$$16^{-\frac{3}{4}}$$

(1b) %

4 16





(b)

.....[3]

2 x2x2x2 = 16

	Created	by	W	Neill
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12	Carol says	that	64	$\frac{1}{2} =$	$\frac{1}{32}$
12	Caror says	ınaı	04		32

NS4H Explain her error and give the correct value of $64^{-\frac{1}{2}}$ in the form $\frac{p}{q}$.

.....

......[3

12 Carol says that $64^{-\frac{1}{2}} = \frac{1}{32}$.

NS44 Explain her error and give the correct value of $64^{-\frac{1}{2}}$ in the form $\frac{p}{q}$.

64 = 1/2 = 2/64 = 2

Carol: 64 by 2. She did not = 8/

Created	by	W	Nei	
created	Dy	VV	INE	ı

(b) Write $\frac{1}{125} \times 25^9$ as a power of 5.

(b)[3]

(b) Write
$$\frac{1}{125} \times 25^9$$
 as a power of 5.

N54H

$$\frac{1}{125} = 125$$
 $(5^3)^{-1}$
 $= 5^{-3}$

$$\frac{9}{25}$$

$$(5^{2})$$

$$5^{18}$$

$$5^{3}$$

$$15^{3}$$

Video	created	by	Will	Neill
		-,		

1 Work out.

(a) $\sqrt[3]{64} \times 2^{-1}$

N54

(a) [2]

(b) $4.3 \times 10^5 + 3.8 \times 10^4$ Give your answer in standard form.

N48

(b)[3]

1 Work out.

(a)
$$\sqrt[3]{64} \times 2^{-1}$$

4 X /2

N54

$$3\sqrt{64} = 4$$
 $2^{-1} = \frac{1}{2}$

(a) [2

(b) $4.3 \times 10^5 + 3.8 \times 10^4$ Give your answer in standard form.

N48

50000

(p) (7-68 × 10

Edexcel

20	(a)	Write	$\frac{3^5 \times 3^4}{3^2}$	as a power of 3
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(2)

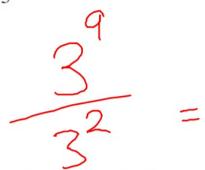
(b) Write down the value of 12°

(1)

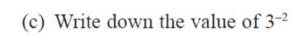
(c) Write down the value of 3^{-2}

(1)

20 (a) Write
$$\frac{3^5 \times 3^4}{3^2}$$
 as a power of 3



(b) Write down the value of 12°



$$\frac{1}{3}$$
 = $\frac{1}{9}$

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22 (a) Work out
$$\frac{2}{5} + \frac{1}{4}$$

(b) Write down the value of 2^{-3}

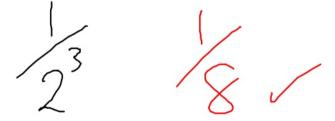
(1)

(Total for Question 22 is 3 marks)

22 (a) Work out
$$\frac{2}{5} + \frac{1}{4}$$

$$\frac{8}{20} + \frac{5}{20} = \frac{13}{20}$$

(b) Write down the value of 2^{-3}



(1)

(Total for Question 22 is 3 marks)

	Video created by W Neill
(a) Write down the value of 25°	
N54	
	(1)

Video created by W Neill 12 (a) Write down the value of 25° N54

Video created by W Neill

(b) Find the value of $49^{-\frac{1}{2}}$

N54

///

(2)

(b) Find the value of $49^{-\frac{1}{2}}$

N54

$$\frac{1}{49}$$
 = $\frac{1}{2\sqrt{49}}$ = $\frac{1}{7}$ = $\frac{1}{7}$ (2)

Video created by W Neill (c) Find the value of $64^{\frac{2}{3}}$ N54

Video created by W Neill

1 /

(c) Find the value of $64^{\frac{2}{3}}$

N54

$$= 3 64$$

$$= 4$$

(2)

Video created by W Neill

Given that $n^{\frac{2}{3}} = 8$ and n > 0

(c) work out the value of n. Give your answer in the form $a\sqrt{b}$ where a and b are integers.

N54 A12/13

.....

Given that
$$n^{\frac{2}{3}} = 8$$
 and $n > 0$

2/2

(c) work out the value of n. Give your answer in the form $a\sqrt{b}$ where a and b are integers.

N54 A12/13

$$N = 8$$
 $3\sqrt{n} = 8$
 $3\sqrt{n} = 8$
 $1 = 8$
 $1 = 8$

Video	created	by	W	Neil	I
		-,	•		٠

12 (a) Find the value of $81^{-\frac{1}{2}}$

(2)

(b) Find the value of $\left(\frac{64}{125}\right)^{\frac{2}{3}}$

(2)

(Total for Question 12 is 4 marks)

12 (a) Find the value of $81^{-\frac{1}{2}}$

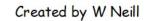
$$=\frac{1}{9}=\frac{1}{9}$$

(b) Find the value of $\left(\frac{64}{125}\right)^{\frac{2}{3}}$

$$\left(3\sqrt{\frac{64}{125}}\right)^2 = \frac{16}{25}$$

(Total for Question 12 is 4 marks)

10 (a) Write down the value of $100^{\frac{1}{2}}$	Created by W Neill
(b) Find the value of $125^{\frac{2}{3}}$	(1)
	(2)
	(Total for Question 10 is 3 marks)



10 (a) Write down the value of $100^{\frac{1}{2}}$



(b) Find the value of $125^{\frac{2}{3}}$

$$3\sqrt{125}$$
 5^2

25

(Total for Question 10 is 3 marks)

Video created by W Neill

9 (a) Write down the value of $36^{\frac{1}{2}}$ NS4

 $2\sqrt{36} = 6$

(1)

(b) Write down the value of 23°

(1)

Video Created by W Neill

14 (a) Work out the value of $\left(\frac{16}{81}\right)^{\frac{3}{4}}$

N54

(2)

14 (a) Work out the value of

$$\left(\frac{16}{81}\right)^{\frac{3}{4}}$$

N54

$$\begin{pmatrix} 2 \\ \hline 3 \end{pmatrix} = \begin{pmatrix} 8 \\ \hline 2 \end{pmatrix}$$

Video Created by W Neill

$$3^a = \frac{1}{9} \qquad \qquad 3^b = 9\sqrt{3} \qquad \qquad 3^c = \frac{1}{\sqrt{3}}$$

(b) Work out the value of a + b + c

N54

(2)

(Total for Question 14 is 4 marks)

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$$3^a = \frac{1}{9}$$

$$3^b = 9\sqrt{3}$$

$$3^a = \frac{1}{9} \qquad \qquad 3^b = 9\sqrt{3} \qquad \qquad 3^c = \frac{1}{\sqrt{3}}$$

(b) Work out the value of a + b + c

$$a+b+c$$

N54

$$\frac{2}{2} = 9$$
 $a = -2$

$$\begin{array}{c}
c \\
= 9\sqrt{3} \\
= 9(3^{1/2}) \\
= 9(3^{1/2}) \\
3 \times 3^{1/2} \\
3 \times 3^{1/2} \\
3 \times 3^{1/2}
\end{array}$$

$$\begin{array}{c}
(3^{1/2}) \\
-2 + 2^{1/2} - 1/2 \\
= 0
\end{array}$$

$$\begin{array}{c}
3^{1/2} \\
= 0
\end{array}$$

$$\begin{array}{c}
(2)
\end{array}$$

(Total for Question 14 is 4 marks)

AQA

				Video created by W Neill
24 (b) NS4	Work out	³ √16	as a power of 2	[2 marks]
				Answer

Video created by W Neill

24 (b) Work out $\sqrt[3]{16}$ as a power of 2

NS4

 $\frac{1}{3} = \frac{3}{16}$

[2 marks]

$$16...2x2x2x2$$
= 2^4

16

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

2 4/3

2/3

Answer

			Video created by W Neill
6 N54 N39	Work out the value of	$\left(\sqrt{3}\right)^2 \times \left(\sqrt{2}\right)^2$	[2 marks]
	Answer	r	

Video created by W Neill

Work out the value of $\left(\sqrt{3}\right)^2 \times \left(\sqrt{2}\right)^2$

[2 marks]

N61

J3 XJ3 = 3

V2 X J2 = 2

Answer __

= 6

30 (a) N54	Work out the value of $81^{-\frac{1}{4}}$	Video created by W Neill
	Answer	

30 (a) N54	Work out the value of	$81^{-\frac{1}{4}}$ (81)	Video created by W Neill [2 marks]
3:	X3X3X3=81 Answe	$\frac{4\sqrt{1}}{81} = \frac{1}{3}$ where $\frac{1}{3}$	

30 (b) N54	Write 16×8^{2x} as a power of 2 in terms of x .	Video created by W Neill [3 marks]
	Answer	

	\	ideo created by W Neill
30 (b)	Write 16×8^{2x} as a power of 2 in terms of x .	[3 marks
N54	16 X 8	[5 marks
	$\frac{4}{2} \times \left(2^{3}\right)^{2}$	
	$\frac{4}{2} + \frac{6x}{2}$	
	Answer	

 $y = p \times q^{x-1}$ where p and q are numbers.

N54

y = 10 when x = 1

A6

y = 0.3125 when x = 6

Work out the value of y when x = 3

[5 marks]

Answer

$$y = p \times q^{x-1}$$

where p and q are numbers.

N54

$$y = 10$$
 when $x = 1$

A6

$$y = 0.3125$$
 when $x = 6$

Work out the value of y when x = 3

$$0.03125 = 9$$

$$y = 10 \times \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

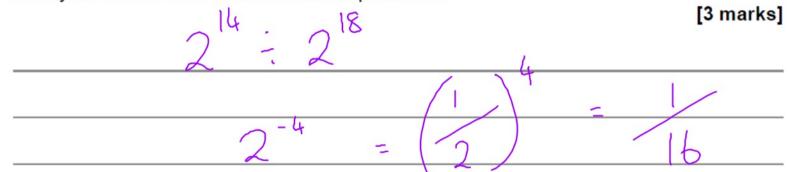
$$y = 2.5$$

(a)	Work out the value of $2^{14} \div \left(2^9\right)^2$	Video created by W Neill
N54	Give your answer as a fraction in its simplest form.	[3 marks]
	Answer	

Video created	by	W	Nei	
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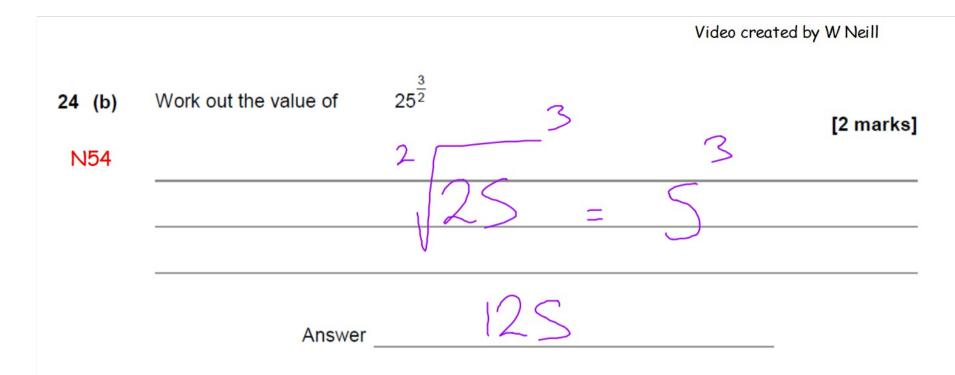
24 (a) Work out the value of $2^{14} \div \left(2^9\right)^2$

N54 Give your answer as a fraction in its simplest form.



Answer _____

(a)	Work out the value of $2^{14} \div \left(2^9\right)^2$	Video created by W Neill
N54	Give your answer as a fraction in its simplest form.	[3 marks]
	Answer	



17 N54	Work out the exact value of	$\left(\frac{3}{4}\right)^{-3}$	[2 marks]
	Answer		_

Work out the exact value of $\left(\frac{3}{4}\right)^{-1}$

N54

(4) = $\frac{64}{27}$

[2 marks]

Answer

The point $\left(3, \frac{1}{64}\right)$ lies on the curve $y = k^x$ where k is a constant.

N54 Show that the point $\left(\frac{1}{2}, \frac{1}{2}\right)$ lies on the curve.

[3 marks]

The point $\left(3, \frac{1}{64}\right)$ lies on the curve $y = k^x$ where k is a constant.

N54

Show that the point $\left(\frac{1}{2}, \frac{1}{2}\right)$ lies on the curve.

y = K 3 $\frac{1}{64} = K$ $3\sqrt{\frac{1}{64}} = K$

1/4 = K

 $y = \frac{1}{4}$ $\frac{1}{2} = \frac{1}{4}$ $\frac{1}{2} = \frac{1}{4}$ $\frac{1}{2} = \frac{1}{4}$

[3 marks]