

Delta 2

Unit 1 Review (Non-Calculator)

Factors and Powers

How well did you do:

Factors and Powers	Score = $\frac{\quad}{40}$	
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<i>Topics/skills which need to be revisited:</i>	<i>Questions from the review:</i>	<i>Further Practice from Delta 2:</i>
• Writing numbers as product of prime factors • Using prime factors to find HCF and LCM of two numbers • Writing products of primes in index form • HCF/LCM in real-life	• 1 • 2 • 2b • 3	• P13 Q3 • P13 Q4,5 • P13 Q1,2 • P16 Q2 (enrichment)
• Using laws of indices to write numerical statements as a single power • Understand what positive powers mean • Understand what negative powers mean • Understand what the power of zero means • Quoting the rules of indices in their general algebraic format	• 4 • 12a • 12b • 5 • 11	• P14 Q2-4 • P6 Q3 • P6 Q3 • P6 Q3 • P14 Q5
• Understand the prefixes mega, giga • Know how to change from, e.g. nanometres into metres	• 7a • 7b-d	• P15 Q1 • P15 Q2-4
• Using laws of indices to simplify numerical expressions, allowing a difficult calculation to be done easily without a calculator • Round to a given number of significant figures • Estimate the answer to calculations by rounding to 1 significant figure	• 6,8 • 9 • 10	• P15 Q9,10 • P16 Q2,3 • P16 Q4,5

1 Given that $45 = 3 \times 3 \times 5$, write each of these as a product of its prime factors.

a 90

.....

b 450

.....

(2 marks)

2 Find

a the HCF of 210 and 225

.....

b the LCM of 210 and 225, leaving your answer in index form

.....

(6 marks)

3 To answer the following question would you find the HCF or LCM?

Two wires with lengths of 448 cm and 616 cm are to be cut into pieces of all the same length without remainder. Find the greatest possible length of the pieces.

.....
(1 mark)

4 Write each of these as a single power

a $8^7 \times 8^4$

.....

b $8^7 \div 8^4$

.....

c $(8^7)^4$

.....
(3 marks)

5 Complete this statement: "Any number to the power zero ="

(1 mark)

6 Write each calculation as a single power

a $\frac{5^7 \times 5^2}{5^6}$

.....

b $16 \times 32 \times 2^3$

.....
(4 marks)

7 a Complete the four missing entries in the table

Prefix	Letter	Power	Number
giga		10^9	
	M		1000000

Use the following information to help answer parts b, c and d:

Prefix	Letter	Power	Number
tera	T	10^{12}	1 000 000 000 000
kilo	k	10^3	1000
deci	d	10^{-1}	0.1
centi	c	10^{-2}	0.01
milli	m	10^{-3}	0.001
micro	μ	10^{-6}	0.000 001
nano	n	10^{-9}	0.000 000 001
pico	p	10^{-12}	0.000 000 000 001

b A watt is a unit of power. Convert 4.2 kW (kilowatts) into watts.

.....W

c How many times bigger is a millimetre than a micrometre?

.....

d A nasty virus has width 15 nanometres.

Write down a *calculation* to convert 15 nanometres into metres.

.....
(6 marks)

8 Work out $\frac{(3 \times 4)^2}{2^2 \times 3}$

.....
(2 marks)

9 Round these numbers to the degree stated in brackets.

a 427.5 (to 3 significant figures)

.....

b 5.86 (to 2 significant figures)

.....

c 1 568 341 (to 4 significant figures)

.....

(3 marks)

10 Estimate the answers to these calculations by rounding each number to 1 sig. fig.

a
$$\frac{167.8 \times 24}{38}$$

.....

b
$$\frac{68^2}{9.5} - 11.7^2$$

.....

(6 marks)

11 In Unit 1 you discovered four general rules for indices. Here is one of them:

$$p^a \times p^b = p^{a+b}$$

Can you write two more general rules in the style of the one above?
(questions 4 and 5 may help jog your memory)

.....

.....

(2 marks)

12 a

i If I **multiply** 42 by 10^6 will the answer be **bigger** or **smaller** than the original number 42 ?

.....

ii **How many times** bigger/smaller will it be ?

.....

b If I **multiply** 42 by 10^{-6} will the answer be **bigger** or **smaller** than the original number 42 ?

.....

c If I **divide** 42 by 10^{-2} will the answer be **bigger** or **smaller** than the original number 42 ?

.....

(4 marks)

[End of Review]