



## GCSE Foundation 02

*Number*

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103 minutes



100 marks

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*Powers and roots*

**Q1.** (a) Circle the **two** multiples of 7

6      10      16      21      25      27      32      35

(2)

(b) Circle the **two** factors of 30

6      10      16      21      25      27      32      35

(2)

(c) Circle the **two** square numbers.

6      10      16      21      25      27      32      35

(2)

(Total 6 marks)

**Q2.** In each part, circle the odd one out.

Give a reason for your answer.

(a) 75%       $\frac{3}{4}$       0.75      7.5

Reason .....

.....

(1)

(b)  $\frac{2}{6}$        $\frac{4}{10}$        $\frac{6}{18}$        $\frac{8}{24}$

Reason .....

.....

(1)

(c)  $\sqrt{64}$        $\sqrt{81}$        $\sqrt{125}$        $\sqrt{144}$

Reason .....

.....

(1)

(d) 11      13      15      17

Reason .....

.....

(1)

(Total 4 marks)

**Q3.** (a) Write the number one hundred thousand as a power of 10.

.....  
.....

Answer .....

(1)

(b) Work out the value of  $\frac{2^3 \times 5^2}{10}$

.....  
.....  
.....

Answer .....

(3)

(Total 4 marks)

**Q4.** (a) Write down **two** multiples of 5.

Answer..... and .....

(1)

(b) Write down **two** factors of 18.

Answer..... and .....

(1)

(c) Write down **two** square numbers that are greater than 10 but less than 50.

.....

Answer..... and .....

(2)

(Total 4 marks)

**Q5.** (a) Circle the number one thousand two hundred

120      1200      12 000      120 000      1 200 000

(1)

(b) Circle the number one hundred and twenty thousand

120      1200      12 000      120 000      1 200 000

(1)

(c) Circle the number which has the same value as one million.

$10^3$        $10^4$        $10^5$        $10^6$        $10^7$

(1)  
(Total 3 marks)

**Q6.** Anil, Ben, Chloe, Dave and Emma play a game.  
Here is some information about the number of points they score.

Anil scores 20 points.  
Ben scores 12 more points than Anil.  
Ben scores twice as many points as Chloe.  
Dave scores 11 fewer points than Ben.

The total number of points scored is 100.

How many points does Emma score?

.....  
.....  
.....  
.....

Answer .....

(Total 4 marks)

**Q7.** (a) Write down  $\sqrt{121}$

Answer .....

(1)

(b) Work out  $\frac{3}{5}$  of 45

.....  
.....  
.....

Answer .....

(2)

- (c) Work out 8% of 150

.....  
.....  
.....

Answer .....

(2)  
(Total 5 marks)

- Q8.** (a) (i) Write down a multiple of 6 that is greater than 20.

Answer .....

(1)

-

- (ii) Write down a factor of 20 that is less than 6.

Answer .....

(1)

- (b) Use these mathematical terms to complete the statements below.

cube      cube root      square      square root

10 is the ..... of 100

144 is the ..... of 12

5 is the ..... of 125

(3)

- (c) This is Ben's working for the calculation  $12 + 4 \times 10$

$$\begin{aligned} 12 + 4 &= 16 \\ 16 \times 10 &= 160 \\ \text{Answer} &= 160 \end{aligned}$$

Ben is wrong.

Work out the correct answer for the calculation.

.....  
.....

Answer .....

(1)  
(Total 6 marks)

**Q9.** (a) From this list of numbers

65            5            25            70            75            34

(i) Write down a multiple of 10.

Answer .....

(1)

(ii) Write down a factor of 35.

Answer .....

(1)

(iii) Write down a square number.

Answer .....

(1)

(iv) Write down three-quarters as a percentage.

Answer ..... %

(1)

(b) Work out  $70 \div (65 - 5 - 25) \times 75$

.....

.....

Answer .....

(2)

(Total 6 marks)

**Q10.** (a) Work out the value of  $\sqrt{25} \times \sqrt[3]{64}$

.....

.....

Answer .....

(2)

(b) (i) Write down the value of  $9^2$ .

Answer .....

(1)

(ii) Tick the box for the statement that is true.

The sum of the squares of two odd numbers is always odd

☐

The sum of the squares of two odd numbers is always even

☐

The sum of the squares of two odd numbers could be odd or even

☐

Give an example to justify your choice.

.....

.....

(2)  
(Total 5 marks)

**Q11.** (a) Work out  $7^4 \times 7^4$

Give your answer as a power of 7.

.....

Answer .....

(1)

(b) Work out  $6^4 \div 6^4$

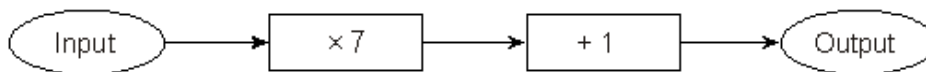
Give your answer as a whole number.

.....

Answer .....

(1)  
(Total 2 marks)

- Q12.** The diagram shows a number machine.  
All input numbers are positive whole numbers.



- (a) What is the smallest output number that is a square number?

.....

.....

.....

Answer .....

(2)

- (b) What is the smallest output number that is a prime number?

.....

.....

.....

Answer .....

(2)

(Total 4 marks)

- Q13.** Show that there are no square numbers between 9100 and 9200

.....

.....

.....

(Total 3 marks)

- Q14.** (a) Write down the square of 11.

Answer .....

(1)

- (b) Given that  $x = 12$

Write down the value of  $x^2$

Answer.....

(1)



(c) Given that  $y^3 = 125$

Write down the value of  $y$ .

Answer .....

(1)

(Total 3 marks)

**Q15.** Complete the following table.

Put a tick (✓) next to the statements that are right.  
Put a cross (✗) next to the statements that are wrong.

Statement	✓ or ✗
8 is a factor of 56	
8 is a square number	
8 million = 80 000	
20 is a multiple of 8	
When you divide a whole number by 8 the greatest possible remainder is 7	

(Total 3 marks)

**Q16.** The table shows a pattern for square numbers.

$1^2$	$3^2$	$5^2$	$7^2$	$9^2$	$11^2$
1		25			121

(a) Complete the table.

.....

(2)

- (b) Nathan, Tessa and Kim make some statements.

Tick the appropriate box for each statement.

Name	Statement	True	False
Nathan	The square of an odd number is always odd		
Tessa	The square of an odd number can end in a 3 or a 7		
Kim	The square of an odd number is always one more than a multiple of 4		

(3)

- (c) Here is another pattern.

$2^2 = 4$	and	$1 \times 3 = 3$
$4^2 = 16$	and	$3 \times 5 = 15$
$6^2 = 36$	and	$5 \times 7 = 35$
$8^2 = 64$	and	$7 \times 9 = 63$
$10^2 = 100$	and	$9 \times 11 = 99$

You are given that  $88^2 = 7744$

Write down the value of  $87 \times 89$

Answer .....

(1)

(Total 6 marks)

- Q17.** Here is a list of numbers.

3      4      6      8      9      12      18

- (a) Write down **four** different numbers from the list that add up to 30.

.....

.....

Answer ..... , ..... , ..... , .....

(1)

- (b) Write down **one** number in the list that is a multiple of 6.

Answer .....

(1)

- (c) Write down **all** the numbers in the list that are factors of 18.

.....

Answer .....

(2)

- (d) There are two square numbers in the list.

Work out the difference between them.

.....

Answer .....

(2)

(Total 6 marks)

- Q18.** (a) Two square numbers under 50 have a difference that is also a square number.

Which two square numbers are they?

.....

.....

Answer ..... and .....

(2)

- (b) Three consecutive square numbers have a total greater than 50 but less than 100.

Which three square numbers are they?

.....

.....

.....

.....

Answer ..... and ..... and .....

(2)

(Total 4 marks)

**Q19.** Glynn says that  $\sqrt{16+9}$  is the same as  $\sqrt{16} + \sqrt{9}$

Show that Glynn is wrong.

.....

.....

.....

(Total 2 marks)

**Q20.** Romana picks a number.



My number has 2 digits  
**and** is a factor of 36.

- (a) One number that she could pick is 36.  
Write down the other **two** numbers that Romana could pick.

.....

.....

.....

Answer ..... , ..... , .....36.....

(2)

- (b) Romana gives some more clues about the number.



If I add the digits in my number,  
I get a square number.

If I multiply the digits in my number,  
I get a cube number.

What number does Romana pick?  
 You **must** show your working.

.....

.....

.....

.....

Answer .....

(2)  
 (Total 4 marks)

**Q21.** (a) Write these decimals in order, smallest first.

0.4                  0.308                  0.35

Answer .....

(1)

(b) Write 15.2864 to 2 decimal places.

Answer .....

(1)

(c) Work out

(i)  $\frac{1}{12.5}$

.....

Answer .....

(1)

(ii)  $\frac{4.5}{0.6^2}$

.....

.....

Answer .....

(1)

(d) Hassan says



When you square a positive number the answer is **always** bigger than the original number.

For example

$$2.5^2 = 6.25 \quad \text{and} \quad 6.25 \text{ is bigger than } 2.5$$

Find an example to show that Hassan is wrong.  
You **must** show your working.

.....

.....

.....

(2)  
(Total 6 marks)

**Q22.** Work out the difference between the two square numbers in this list of numbers.

6    11    15    21    27    36    48    64

.....

.....

.....

Answer .....

(Total 2 marks)

**Q23.** Here is a list of numbers

6    8    11    15    25    28    30    33

From this list, write down

(a) a multiple of 7,

Answer .....

(1)

(b) the two factors of 24,

Answer .....

(2)

(c) a square number,

Answer .....

(1)

(d) a prime number.

Answer .....

(1)

**(Total 5 marks)**

