***GCSE TestBank***

This document contains test questions assessing the statements of the National Curriculum Programmes of Study as referenced in the **Kangaroo Maths** Stage 9 scheme of work, and their prerequisites.

The questions are arranged in the same order as the units of the **Kangaroo Maths** Stage 9 scheme of work.

The vast majority of questions are very closely modeled on the AQA Specimen Papers published in June 2015. A small number of questions are modeled on specimen papers from other exam boards.

Questions are coded as follows:

|  |  |
| --- | --- |
| FC | Foundation paper, calculator allowed |
| FHC | Foundation and higher papers, calculator allowed |
| HC | Higher paper, calculator allowed |
| FN | Foundation paper, calculator not allowed |
| FHN | Foundation and higher papers, calculator not allowed |
| HN | Higher paper, calculator not allowed |

**1**  Which of these numbers is one less than multiple of 7?

Circle your answer.

**[FC, 1 mark]**

|  |  |  |  |
| --- | --- | --- | --- |
| 15 | 57 | 27 | 35 |

**2**  Which of these numbers has **exactly two** factors?

Circle your answer.

**[FC, 1 mark]**

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| --- | --- | --- | --- |
| 6 | 7 | 8 | 9 |

**3** Kathy earns £10.50 per hour.

She works for

21 hours each week

46 weeks each year

She pays income tax if she earns more than £10 000 per year.

Does Kathy pay tax?

You must show your working.

**[FC, 2 marks]**

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**4**  Which of these is a cube number?

Circle your answer.

**[FC, 1 mark]**

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| --- | --- | --- | --- |
| 16 | 33 | 64 | 300 |

**4 a)** Use your calculator to work out

Write down your full calculator display.

**[FHC, 1 mark]**

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| --- | --- | --- |
|  | | |
|  | | |
| Answer |  |  |

**4** **b)** Use approximations to check that your answer to part (a) is sensible.

You **must** show your working.

**[FHC, 2 marks]**

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**6** Work out the cube root of eight million.

Circle your answer.

**[FHC, 1 mark]**

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| --- | --- | --- | --- |
| 20 | 200 | 2000 | 20000 |

**7** Circle the decimal that is closest in value to .

**[FHC, 1 mark]**

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| 0.7 | 0.77 | 0.78 | 0.8 |

**8**  Written as the product of its prime factors 560 = 24 × 5 × 7

**8 a)** Write 450 as the product of its prime factors

**[HC, 2 marks]**

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| Answer |  |  |

**8 b)** Work out the value of the highest common factor of 560 and 450.

**[HC, 1 mark]**

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|  | | |
| Answer |  |  |

**9** The *n*th term of a sequence is 2*n* + 2*n* – 1

Work out the 10th term of the sequence.

**[HC, 1 mark]**

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| Answer |  |  |

**10**  Is this statement true or false?

If *x*2 = 9, the only value that *x* can be is 3

Tick a box.

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| --- | --- | --- | --- |
|  | True |  | False |

Give a reason for your answer.

**[FN, 1 mark]**

|  |  |
| --- | --- |
| Reason |  |
|  | |
|  | |

**11**  Here are some properties of numbers:

A Square

B Triangular

C Prime

D Odd

E Even

**11 a)** Which **two** properties does the number 10 have?

Circle the correct letters

**[FN, 1 mark]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |

**11** **b)** Can a number have **all** of the properties?

Tick a box

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| --- | --- | --- | --- | --- | --- |
|  | Yes |  | No |  | Cannot tell |

Give a reason for your answer.

**[FN, 1 mark]**

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**11** **c)** Write down a number with **three** of the properties.

State which properties it has

**[FN, 2 marks]**

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|  | | | |
| Number |  |  | |
| Properties | \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_ | |  |

**12 a)** Work out 1.9 × 0.003

**[FN, 1 mark]**

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| Answer |  |  |

**12 b)** Write 3.45 × 10-2 as an ordinary number

**[FN, 1 mark]**

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| Answer |  |  |

**12 c)** Write 567 000 in standard form

**[FN, 1 mark]**

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| Answer |  |  |

**13**  Work out

Give your answer as a mixed number in its simplest form.

**[FHN, 3 marks]**

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| Answer |  |  |

**14**  Simplify 45 × 47

Circle the answer.

**[HN, 1 mark]**

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| --- | --- | --- | --- |
| 1635 | 412 | 1612 | 435 |

**15**  *a* × 105 + *a* × 103 = 181800 where *a* is a number

Work out *a* × 104

Give your answer in standard form.

**[HN, 2 mark]**

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| Answer |  |  |

**16**  Which shape is congruent to shape **A**?

**[FC, 1 mark]**

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| --- | --- |
| **A** | |
| |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | |  |  |  |  | |  |  |  |  | | |
| **W** | **X** |
| |  |  |  | | --- | --- | --- | |  |  |  | |  |  |  | |  |  |  | |  |  |  | | |  |  |  | | --- | --- | --- | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |
| **Y** | **Z** |
| |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | |  |  |  |  | |  |  |  |  | | |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |

**17** Which shape has diagonals that do **not** bisect each other?

Circle the correct letter.

**[FC, 1 mark]**

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **B** | **C** | **D** |
|  |  |  |  |

**18**  Here is some information about a triangle:

It has one line of symmetry

Its sides are whole number lengths

It has a perimeter of 13 cm

Sketch a diagram of a possible triangle.

Label each side with its length.

**[FC, 2 marks]**

**19** Use ruler and compasses to answer this question.

Point *X* is

* the same distance from lines *AB* and *AC*
* 5 cm from point *A*

*B*

*A*

*C*

Show the position of point *X* on the diagram

**[FHC, 3 marks]**

**20** Which of these is **not** the net of a cuboid?

Circle the correct letter.

**[FN, 1 mark]**

|  |  |
| --- | --- |
| **A** | **B** |
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| **C** | **D** |
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**21**  Shape *M* is a square.

A rectangle is cut from *M* to form shape *N*.

*Not drawn accurately*

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Which one of these statements is true?

Tick a box.

**[FN, 1 mark]**

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| --- | --- |
| The perimeter of M is **longer than** the perimeter of N |  |
|  |  |
| The perimeter of M is the **same as** the perimeter of N |  |
|  |  |
| The perimeter of M is **shorter than** the perimeter of N |  |
|  |  |
| It is not possible to tell which perimeter is longer |  |

**22 a)** Write an expression for the total cost, in pence, of

*c* cups of coffee at 180p each

and

*t* cups of tea at 150p each

**[FC, 1 mark]**

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| Answer |  |  |

**22 b)** Simplify *a* + *b* × *b* + *a*

**[FC, 1 mark]**

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|  | | |
| Answer |  |  |

**23**  Simplify 7*b* – (3*b* – 2)

Circle your answer

**[FN, 1 mark]**

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| --- | --- | --- | --- |
| 4*b* – 2 | 2*b* | 4*b* + 2 | 6*b* |

**24**  Here are four expressions.

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| --- | --- | --- | --- |
| *x* + *y* | *y* – *x* | *xy* |  |

When *x* = -9 and *y* = 3 which expression has the greatest value?

You **must** show your working.

**[FN, 3 mark]**

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| Answer |  |  |

**25**  Factorise *x*2 + 9*x* + 14

**[FHN, 2 marks]**

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| Answer |  |  |

**26**  *ABEH* is a rectangle

*BCDE* is a square

*EFGH* is a square

The three shapes are joined to make an L-shape.

*Not drawn accurately*

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| *A* |  |  | *B* | |  |  |  |  | *C* |  |  |
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|  |  |  |  |  |  |  |  |  | (*x* + 2) cm | | |
|  |  |  |  |  |  |  |  |  |  |  |  |
| *H* |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | *E* |  |  |  |  | *D* |  |  |
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| *G* | 4 cm | | | *F* |  |  |  |  |  |  |  |

Show that the total area of the L-shape, in cm2, is *x*2 + 8*x* + 28

**[FHN, 4 marks]**

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**27**  How many centimetres are there in 2.9 metres?

Circle your answer

**[FN, 1 mark]**

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| 290 | 29 | 0.29 | 0.29 |

**28** The table shows the ratio of instructors to children needed for two activities

|  |  |
| --- | --- |
|  | **instructors : children** |
| **Kayaking** | 1 : 5 |
| **Swimming** | 1 : 8 |

**28 a)** There are 6 instructors at a swimming pool.

What is the greatest number of children that can go swimming?

**[FN, 1 mark]**

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|  | | |
| Answer |  |  |

**28 b)** A group of 32 children want to go kayaking.

What is the smallest number of instructors needed?

**[FN, 1 mark]**

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| Answer |  |  |

**29**  Solve 2*x* + 9 < 5*x* – 3

**[FHN, 2 marks]**

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| Answer |  |  |

**30**  Ellie wants to buy a new bike for £499.

She has already saved £120.

Each week

her pay is £90

she saves 20% of this pay.

How many **more** weeks must Ellie save?

**[FN, 4 marks]**

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| Answer |  | weeks |

**31**  Work out 61% of 300

**[FN, 2 marks]**

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| Answer |  |  |

**32**  The diagram shows a semicircle of radius 10 cm

10 cm

Work out the area of the semicircle.

Give your answer in terms of π.

**[FN, 2 marks]**

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| Answer |  | cm2 |

**33** The *n*th term of a sequence is 4*n* – 1

The *n*th term of a different sequence is 3*n* + 2

Work out three numbers that are

in both sequences

and

less than 100

**[FHN, 3 marks]**

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| Answer | \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ |  |

**34**  A cycling club has 225 members.

48% are men.

36% are women.

The rest are children.

Work out the number of children in the club.

**[FC, 3 marks]**

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| Answer |  |  |

**35**  Copper costs £3.20 per kilogram.

Tin costs £1.40 per kilogram.

Bronze is made using copper and tin in the ratio 9 : 1.

Work out the cost of the metal needed when making 45 kilograms of bronze.

**[FHN, 4 marks]**

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| Answer £ |  |  |

**36** Which sequence is quadratic?

Circle your answer

**[FHC, 1 mark]**

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| --- | --- |
| 1 1 2 3 | 2 4 8 14 |
| 2 4 6 8 | 100 50 25 12.5 |

**37**  Chris rides a bike 200 metres in 9.6 seconds.

Bradley says

“Chris could ride a bike 10 000 metres in 8 minutes.”

Tick a box to show whether this time for Chris to ride a bike 10 000 metres is likely to be accurate.

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| --- | --- |
| No, the time will be longer |  |
|  |  |
| Yes, the time will be 8 minutes |  |
|  |  |
| No, the time will be shorter |  |

Give working and a reason to support your answer

**[FC, 3 mark]**

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**38**  In a sale, the original price of a jacket was reduced by .

The sale price of the jacket is £63.

Work out the original price of the jacket.

**[FC, 3 marks]**

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| Answer £ |  |  |

**39**  63 boys, 54 girls and 113 adults are members of a club.

20 more children join the club.

The number of girls is **now** 24% of the total number of club members.

How many of the 20 children were **boys**?

**[FC, 4 marks]**

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| Answer |  |  |

**40**  The mass of 50 cm3 of aluminium is 135 grams.

Work out the mass of 80 cm3 of aluminium.

**[FC, 2 marks]**

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| Answer |  | grams |

**41**  Two-stroke fuel is made by mixing petrol and oil.

Three bottles contain two-stroke fuel. The different mixtures are

**A** petrol : oil = 40 : 1

**B** oil =

**C** oil = 0.04%

Which bottle has the smallest proportion of oil?

You **must** show your working.

**[FC, 3 marks]**

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| Answer |  |  |

**42**  Mr Harrison drives to work for five days each week.

Each day he drives a total of 28.6 miles

His car travels 35.2 miles per gallon of petrol

Petrol costs 107.9 pence per litre

Mr Harrison discovers that a weekly bus ticket would cost him £23.65

Use 1 gallon = 4.5 litres

Is it cheaper for Mr Harrison to use his car or the bus to travel to work?

You **must** show your working.

**[FC, 5 marks]**

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| Answer |  |  |

**43** A company analyses its workforce and realises that

number of men : number of women = 3 : 5

There are 38 more women than men.

Work out the total number of people on the workforce.

**[FHC, 3 marks]**

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| Answer |  |  |

**44** Two types of eagle live in the UK.

The ratio of golden eagles to white-tailed eagles is 10 : 1.

**44 a)** What fraction of the eagles in the UK are golden eagles?

**[FC, 1 mark]**

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| Answer |  |  |

**44 b)** In the UK there are 880 golden eagles.

How many eagles are there altogether in the UK?

**[FC, 2 marks]**

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| Answer |  |  |

**45** 80 boys and 100 girls were asked if they cycled to school

Altogether of the pupils said yes.

of the girls said yes.

What fraction of the boys said yes?

**[FHC, 4 marks]**

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| Answer |  |  |

**46** *y* is inversely proportional to *x*.

Which graph shows this?

Circle the correct letter.

**[FHC, 1 mark]**

|  |  |
| --- | --- |
| **A** | **B** |
|  |  |
| **C** | **D** |
|  |  |

**47**  Triangle PQR is a right-angled triangle.

*M* is the midpoint of *PQ*.

*Not drawn accurately*

*P*

*Q*

*R*

*M*

8 cm

12 cm

Work out the length *PM*.

**[FC, 3 marks]**

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| Answer |  |  |