**GCSE Mathematics**

**Practice Tests: Set 8**

**Paper 1H (Non-calculator)**

**Time: 1 hour 30 minutes**

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

**Instructions**

* Use **black** ink or ball-point pen.
* **Fill in the boxes** at the top of this page with your name,  
  centre number and candidate number.
* Answer **all** questions.
* Answer the questions in the spaces provided

– *there may be more space than you need*.

* **Calculators must not be used.**
* Diagrams are NOT accurately drawn, unless otherwise indicated.
* You must **show all your working out.**

**Information**

* The total mark for this paper is 80
* The marks for **each** question are shown in brackets  
  – *use this as a guide as to how much time to spend on each question*.

**Advice**

* Read each question carefully before you start to answer it.
* Keep an eye on the time.
* Try to answer every question.
* Check your answers if you have time at the end.

**Answer all TWENTY questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**1** (*a*)Write 8 × 104 as an ordinary number.

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

(**1**)

(*b*)Work out (3.5 × 105) ÷ (7 × 108)

Give your answer in standard form.

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

(**2**)

(**Total for Question 1 is 3 marks**)

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**2** (*a*)Simplify *y*5 × *y*9

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

(**1**)

(*b*)Simplify (2*m*3)4

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

(**2**)

(*c*)Solve 5(*x* + 3) = 3*x* − 4

Show clear algebraic working.

*x* = .......................................................

(**3**)

(**Total for Question 2 is 6 marks**)

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**3** Here is a Venn diagram.

|  |  |
| --- | --- |
| E |  |

Write down the numbers that are in the set

(i) *A*

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

(ii) **

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

(**2**)

(**Total for Question 3 is 2 marks**)

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**4** (*a*)Make *a* the subject of the formula *M* = *ac* – *bd*

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

(**2**)

(*b*)Solve the inequality 5*x* – 4 < 39

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

(**2**)

(*c*)Factorise fully 18*e*2 *f* 3 – 12*e*3 *f*

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

(**2**)

(**Total for Question 4 is 6 marks**)

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**5** (*a*)Factorise *x*2 + 2*x* − 24

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

(**2**)

(*b*) Hence, solve *x*2 + 2*x* – 24 = 0

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

(**1**)

(**Total for Question 5 is 3 marks**)

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**6**

**

*L*, *M* and *N* are points on a circle, centre *O*.

*QMT* is the tangent to the circle at *M*.

(*a*)(i) Find the size of angle *NOM*.

....................................................... °

(ii) Give a reason for your answer.

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

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

(**2**)

(*b*)(i) Find the size of angle *NMQ*.

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

(ii) Give a reason for your answer.

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

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(**2**)

(**Total for Question 6 is 4 marks**)

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**7** The cumulative frequency graph shows information about the length, in minutes, of each

of 80 films.



(*a*)Use the graph to find an estimate for the interquartile range.

....................................................... minutes

(**2**)

Clare says,

“More than 35% of these films are over 120 minutes long.”

(*b*)Is Clare correct?

Give a reason for your answer.

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

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

(**3**)

(**Total for Question 7 is 5 marks**)

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**8** Felix has 10 cards.

There are 5 red cards, 4 blue cards and 1 green card.

Felix takes at random one of the cards.

He does not replace the card.

Felix then takes at random a second card.

(*a*)Complete the probability tree diagram.



(**2**)

(*b*)Work out the probability that Felix takes at least one blue card and no green card.

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

(**3**)

(**Total for Question 8 is 5 marks**)

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**9** In the diagram below, *P* and *Q* are points on a circle with centre *O*.

**

*QT* is a tangent to the circle.

Angle *OPQ* = 18°

Work out the size of angle *PQT*.

Give a reason for each stage of your working.

....................................................... °

(**Total for Question 9 is 3 marks**)

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**10** The function f is such that

f (*x*) = 

(*a*)Find f (–7)

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

(**1**)

(*b*)Express the inverse function f –1 in the form f –1(*x*) = ...

f –1(*x*) = .......................................................

(**2**)

The function g is such that

g (*x*) = 

(*c*)Find fg (3)

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

(**2**)

(**Total for Question 10 is 5 marks**)

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**11  =** 2*n*

(*a*)Find the value of *n*.

*n* = .......................................................

(**2**)

(13–6)4 × 135 = 13*k*

(*b*)Find the value of *k*.

*k* = .......................................................

(**2**)

(**Total for Question 11 is 4 marks**)

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**12** The diagram shows two straight lines drawn on a grid.

**

(*a*)Write down the solution of the simultaneous equations

|  |  |
| --- | --- |
| 3*y* = | 2*x* + 6 |
| 4*x* + 3*y* = | 24 |

*x* = .......................................................

*y* = .......................................................

(**1**)

(*b*)Show, by shading on the grid, the region defined by all five of the inequalities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* ⩾ 0 | *y* ⩾ 0 | *x* + *y* ⩾ 4 | 3*y* ⩽ 2*x* + 6 | 4*x* + 3*y* ⩽ 24 |

Label the region **R**.

(**3**)

(**Total for Question 12 is 4 marks**)

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**13** The diagram shows parallelogram *ABCD*.

**

** =  ** = 

The point *B* has coordinates (5, 8)

(*a*)Work out the coordinates of the point *C*.

(..................... , .....................)

(**3**)

The point *E* has coordinates (63, 211)

(*b*)Use a vector method to prove that *ABE* is a straight line.

(**2**)

(**Total for Question 13 is 5 marks**)

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**14** *R* is proportional to *t*2

The graph shows the relationship between *R* and *t* for 0 ⩽ *t* ⩽ 4

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(*a*)Find a formula for *R* in terms of *t*.

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

(**3**)

Given also that *R* = 

(*b*)show that *t* is inversely proportional to ** for *t* > 0

(**2**)

(**Total for Question 14 is 5 marks**)

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**15** *A* = 35 × 5 × 73

*B* = 23 × 3 × 74

(*a*)(i) Find the Highest Common Factor (HCF) of *A* and *B*.

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

(ii) Find the Lowest Common Multiple (LCM) of *A* and *B*.

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

(**2**)

*A* = 35 × 5 × 73

*B* = 23 × 3 × 74

*C* = 2*p* × 5*q* × 7*r*

Given that

the HCF of *B* and *C* is 23 × 7

the LCM of *A* and *C* is 24 × 35 × 52 × 73

(*b*)find the value of *p*, the value of *q* and the value of *r*.

*p* = .......................................................

*q* = .......................................................

*r* = .......................................................

(**2**)

(**Total for Question 15 is 4 marks**)

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**16** Jack plays a game with two fair spinners, **A** and **B**.

Spinner **A** can land on the number 2 or 3 or 5 or 7.

Spinner **B** can land on the number 2 or 3 or 4 or 5 or 6.

Jack spins both spinners.

He wins the game if one spinner lands on an odd number **and** the other spinner lands on

an even number.

Jack plays the game twice.

Work out the probability that Jack wins the game both times.

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

(**Total for Question 16 is 4 marks**)

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**17** Express  as a single fraction in its simplest form.

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(**3**)

(**Total for Question 17 is 3 marks**)

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**18** (*a*)Show that 

Show your working clearly.

(**2**)

(*b*)Express  in the form *p* + **

where *p* and *q* are integers.

Show your working clearly.

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

(**2**)

(**Total for Question 18 is 4 marks**)

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**19** *ABC* is an isosceles triangle such that

*AB* = *AC*

*A* has coordinates (4, 37)

*B* and *C* lie on the line with equation 3*y* = 2*x* + 12

Find an equation of the line of symmetry of triangle *ABC*.

Give your answer in the form *px* + *qy* = *r* where *p*, *q* and *r* are integers.

Show clear algebraic working.

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

(**Total for Question 19 is 5 marks**)

**TOTAL FOR PAPER IS 80 MARKS**