**GCSE Mathematics**

**Practice Tests: Set 15**

**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, calculator. 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 may 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 questions.**

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

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

**1** *G* = *c*2 – 4*c*

Find the value of *G* when *c* = –5

*G* = .......................................................

 **(Total for Question 1 is 2 marks)**

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**2**Solve 

 Show clear algebraic working.

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

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

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**3** Given that 150*x* = 1

(*a*)write down the value of *x*.

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

**(1)**

Given that 3–8 ÷ 3–6 = 3*n*

(*b*)find the value of *n*.

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

**(1)**

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

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**4** Solve the simultaneous equations

7*x* + 2*y* = 5.5

3*x* – 5*y* = 17

Show clear algebraic working.

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

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

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

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**5** (*a*)Factorise *x*2 – *x* – 42

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

**(2)**

(*b*)Solve the inequality 3*x* + 15 < 8*x* + 3

 Show clear algebraic working.

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

**(3)**

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

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**6** Expand and simplify (4*x* + 1)(*x* – 3)(5*x* + 6)

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

**(Total for Question 6 is 3 marks)**

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**7** The frequency table gives information about the ages of the 80 people in a train carriage.

|  |  |
| --- | --- |
| **Age (*a* years)** | **Frequency** |
| 0 < *a* ≤ 20 | 9 |
| 20 < *a* ≤ 30 | 19 |
| 30 < *a* ≤ 40 | 17 |
| 40 < *a* ≤ 50 | 18 |
| 50 < *a* ≤ 60 | 13 |
| 60 < *a* ≤ 70 | 4 |

(*a*)Complete the cumulative frequency table.

|  |  |
| --- | --- |
| **Age (*a* years)** | **Cumulative frequency** |
| 0 < *a* ≤ 20 |  |
| 0 < *a* ≤ 30 |  |
| 0 < *a* ≤ 40 |  |
| 0 < *a* ≤ 50 |  |
| 0 < *a* ≤ 60 |  |
| 0 < *a* ≤ 70 |  |

**(1)**

(*b*)On the grid, draw a cumulative frequency graph for your table.

**(2)**

(*c*)Use your graph to find an estimate for the median age of the people in the train carriage.

....................................................... years

**(2)**

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

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**8** Show that 

**(Total for Question 8 is 3 marks)**

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**9** The length of a book is 33.8 cm, correct to one decimal place.

(*a*)Write down the lower bound of the length of the book.

....................................................... cm

**(1)**

(*b*)Write down the upper bound of the length of the book.

....................................................... cm

**(1)**

**(Total for Question 9 is 2 marks)**

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**10**

*A*, *B*, *C*, *D* and *E* are points on a circle.

Angle *EAC* = 40°

(*a*)(i) Write down the size of angle *EBC*.

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

**(1)**

(ii) Give a reason for your answer.

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

**(1)**

(*b*)Find the size of angle *EDC*.

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

**(1)**

**(Total for Question 10 is 3 marks)**

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**11** (*a*)Complete the table of values for *y* = *x*3 – 2*x* + 3

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *x* | –3 | –2 | –1 | 0 | 1 | 2 | 3 |
| *y* | –4.5 |  |  | 3 |  | 3 |  |

**(2)**

(*b*)On the grid, draw the graph of *y* = *x*3 – 2*x* + 3 for −3 ≤ *x* ≤ 3

**(2)**

(*c*)By drawing a suitable straight line on the grid, find an estimate for the solution of

the equation 

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

**(2)**

**(Total for Question 11 is 6 marks)**

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**12** Given that *n* > 0

make *n* the subject of the formula *y* = 

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

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

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**13** *T* is inversely proportional to *m*2

*T* = 30 when *m* = 0.5

(*a*)Find a formula for *T* in terms of *m*.

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

**(3)**

(*b*)Work out the value of *T* when *m* = 0.1

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

**(1)**

**(Total for Question 13 is 4 marks)**

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**14** Using ruler and compasses only, construct the bisector of angle *ABC*.

You must show all your construction lines.

**(Total for Question 14 is 2 marks)**

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**15** Write 7 + 12*x* – 3*x*2 in the form *a* + *b*(*x* + *c*)2 where *a*, *b* and *c* are integers.

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

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**16** The functions f and g are defined as

f(*x*) = 5*x* – 7 and g(*x*) = 

(*a*)Find gf(2.6)

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

**(2)**

(*b*)Solve fg(*x*) = 2

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

**(3)**

(*c*) Find the inverse function g–1

g–1 = .......................................................

**(3)**

**(Total for Question 16 is 8 marks)**

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**17** The curve with equation *x*2 – *x* + *y*2 = 10 and the straight line with equation *x* – *y* = –4

intersect at the points *A* and *B*.

Work out the exact length of *AB*.

Show your working clearly and give your answer in the for  where *a* is an integer.

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

**(Total for Question 17 is 6 marks)**

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**18**

*B*, *D*, *E* and *F* are points on a circle.

*ABC* is the tangent to the circle at *B*.

Angle *EDF* = 40°

Angle *FBC* = 70°

Prove that the tangent *ABC* is parallel to *EF*.

Give a reason for each stage of your working.

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

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**19**

*OAN*, *OMB*, *APB* and *MPN* are straight lines.

*OA* : *AN* = 1 : 4

*OM* : *MB* = 1 : 1

** = 2**a** ** = 2**b**

By using a vector method, find the ratio *AP* : *PB*

Give your answer in its simplest form.

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

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

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**21** Given that *M* = 

 find the values of *n* for which *M* = 2

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

**(Total for Question 21 is 5 marks)**

**TOTAL FOR PAPER IS 80 MARKS**

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