**EXAMINATIONS COUNCIL OF SWAZILAND**

**JUNIOR CERTIFICATE EXAMINATION**

**Additional Mathematics** **519**

 **October/November 2013**

 **2 hours 30 Minutes**

**Additional materials:** Answer Booklet/paper

 Geometrical instruments

 Mathematical tables (optional)

 Electronic calculators

 Graph paper (2 sheet)

**READ THESE INSTRUCTIONS FIRST**

If you have been given an Answer Booklet, follow the instructions on the cover of the Booklet.

Write in dark blue or black pen.

You may use soft pencil for any diagrams or graphs.

Do **not** use highlighters, glue or correction fluid.

Answer **all** questions.

All working must be clearly shown. It should be done on the same sheet as the rest of the answer.

Marks will be given for working which shows that you know how to solve the problem even if you get the answer wrong.

Electronic calculators may be used.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures.

Give answers in degrees to one decimal place.

For π, use 3.14 or the value given in the specific question.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 100.

This document consists of **9** printed pages and **3** blank pages.

**1** **(a)** Factorise fully.

 **(i)** 8m2 – 2 [2]

 **(ii)** *x*2 – 5*x* – 14 [2]

 **(b)** You are given the formula .

 **(i)** Find *A* when *h* = 180 and *m* = 20. [2]

 **(ii)** Make *h* the subject of the formula. [3]

**(iii)** Find *h* when *A* = 3 and *m* = 600 [2]

**2 (a)** A =  , B = .

 Find

 **(i)** 2A, [1]

 **(ii)** BA, [2]

 **(iii)** (A − B)2. [3]

 **(b)** C = 

 Find matrix D such that C + D =  [2]

**3 (a)** Solve the following equations.

 **(i)** [2]

 **(ii)**  [3]

 **(b)** The perimeter of the triangle is 10 cm.

 NOT TO SCALE

2+3*x*

*x*

 5 – 2*x*

Find the value of *x* [3]

 **(c)** Solve the simultaneous equation

4*x* + 2*y* = 5

3*x* + 6*y* = 6 [3]

**4 (a)** You are given that f(*x*) = 5*x* – 5.

 Find

1. f(1), [1]
2. f(− 4), [2]
3. *x* if f(*x*) = 100. [2]

 **(b)** For a particular function the domain and the range are as follows:

|  |  |
| --- | --- |
| Domain | Range |
| 1 | 0 |
| 2 | 2 |
| 3 | 4 |
| 4 | 6 |
| 5 | *r* |
| ... | ... |
| *m* | *y* |

 **(i)** Find the value of *r.* [1]

 **(ii)** Express *y* in terms of *m.* [2]

 **(c)** Solve the following inequalities

 (i) 3*x* – 3 < 5*x* – 7, [2]

 (ii) 17 > 6 −. [3]

**5 (a)** A hollow circular cylinder has a thin metal rod inside.

The rod makes an angle of 68º to the base of the cylinder.

The height of the cylinder is 15 cm.

15 cm

68º

 Calculate the radius of the cylinder. [3]

 **(b)** ABC is a triangle.

 R is a point on AC such that CR = RB = 5 cm.

 Angle BRC = 126º and angle ABR = 90º.

 NOT TO SCALE

A

B

R

C

126º

5 cm

5 cm

. Calculate

**(i)** the length BC, [4]

 **(ii)** the length AC, [4]

 **(iii)** the area of triangle ABC. [4]

**6** Sipho has two bags.

Bag A contains 2 green marbles and 1 yellow marble.

Bag B contains 3 green marbles and 2 yellow marbles.

 **(a)** What is the probability of selecting a yellow marble from Bag B? [1]

 **(b)** Two marbles are selected at random, one from each bag.

 This information is shown in the tree diagram.

G

Y

G

Y

G

Y

Probability

GG

GY

YG

YY





















Outcomes

Bag B

Bag A

 Find the probability of selecting

 **(i)** two greens marbles, [1]

 **(ii)** at least one yellow marble, [1]

 **(iii)** one of each colour. [2]

**7** **Answer the whole of this question on a sheet of graph paper.**

The table shows some of the values which satisfy the equation *y* = *x*2 – 5*x* + 4, for values of *x* from −1 to 6.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *x* | −1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| *y* = *x*2 – 5*x* + 4 | 10 | 4 | 0 | −2 | −2 | 0 | *p* | 10 |

 **(a)** Calculate the value of *p*. [1]

 **(b)** Using a scale of 2cm to represent 1 unit on the *x*-axis and 1 cm to

Represent 1 unit on the *y*-axis, plot the points and draw the graph

of *y* = *x*2 – 5*x* + 4. [3]

 **(c)** Write down the equation of the line of symmetry for the graph. [2]

 **(d)** Use your graph to find

 **(i)** the values of *x* when *y* = 7, [2]

 **(ii)** the minimum value of *y*. [1]

**8 Answer the whole of this question on a sheet of graph paper.**

 The table shows scores obtained by learners in a quiz.

|  |  |  |
| --- | --- | --- |
| Scores | Number of learners (frequency) | Cumulative frequency |
| 2 | 2 | 2 |
| 3 | 3 | 5 |
| 4 | 7 |  |
| 5 | 16 |  |
| 6 | 8 | 36 |
| 7 | 3 |  |
| 8 | 1 |  |

 **(a) (i)** How many learners wrote the quiz? [2]

 **(ii)** Write down the modal score. [1]

 **(iii)** Find the number of learners who got 6 or more marks. [2]

 **(b)** Copy and complete the cumulative frequency table for this data. [2]

**(c)** Using a scale of 2 cm to represent 1 mark on the horizontal axis and 1 cm

to represent 2 learners on the vertical axis, draw a cumulative frequency

 curve. [3]

**9 (a)** Point S has coordinates (2, 1), point T has coordinates (5, 3) and point V has

coordinates (3, 7).

 Find

 **(i)** $\vec{ST}$ [2]

 **(ii)** $\vec{VT}$ [2]

 **(iii)** Point N lies on the line ST.

 The length of the line SN is twice that of TN.

 Find the coordinates of N. [2]

 **(b)** You are given that *c* =  , *d* = , *e* =  and *h* = .

Calculate

**(i)** *u* given that *c* + 2*u* = *d*, [4]

 **(ii)** | *e* |, [3]

 **(iii)** | *e* – *h* |. [4]