

Mathematics Entrance Examination

14 May 2019

- 1. You have 1 hour and 10 minutes for the exam.**
- 2. Answer all questions.**
- 3. No calculators are allowed.**
- 4. Write your answers in the spaces below the questions. Answers with no evidence of calculations will not score any marks. Workings and answers written on any other page will not be marked.**

Please note additional requirements:

- a) You are not allowed to leave during the first 30 minutes or the last 15 minutes of the examination.
- b) If you are left handed or ambidextrous with left hand preference you should inform the invigilator before the start of the exam so that seating arrangements can fit your requirements.
- c) You are not allowed to talk, to whisper, to turn around or to look at another candidate's examination, all of which are offences and you will be penalized. If you commit this offence you will be given a single written warning; after which if you commit a further offence, you will be reported to an assessment board without a right of appeal or refund of the exam administration fee.
- d) No scrap paper may be used. All work must be written in the exam booklet.
- e) You can use non-erasable blue or black pen only. Any answers written in pencil may not be marked.
- f) You cannot use whiteout/correction fluid. If you use this material to correct any of your answers they may not be marked. If you make a mistake, you should simply draw a line through the mistake with pen and continue.
- g) You cannot borrow another student's stationery or materials.
- h) If your pen runs out of ink, you may request a replacement from the invigilator. No other stationery or materials may be provided for you by the invigilator.
- i) If you are found to have any unauthorized exam related materials during the examination this will constitute an offence and you will be disqualified from the exam without a right to claim the reimbursement of the exam administration fee.
- j) If you are caught cheating in the examination, you will be disqualified from the exam without a right to claim the reimbursement of the exam administration fee.
- k) Failure to show contents of your pockets or any other containers to the invigilators will be considered as an offence and you will be disqualified from the exam with no right of appeal or refund of the fee.
- l) All mobile phones and other electronic devices must be switched off and left at a place indicated by the invigilators. If you are found to have a mobile phone or other electronic device (switched on or off) on you during the exam, this will be considered as unauthorised examination materials and you will be disqualified from the exam without a right of appeal or refund of the fee.

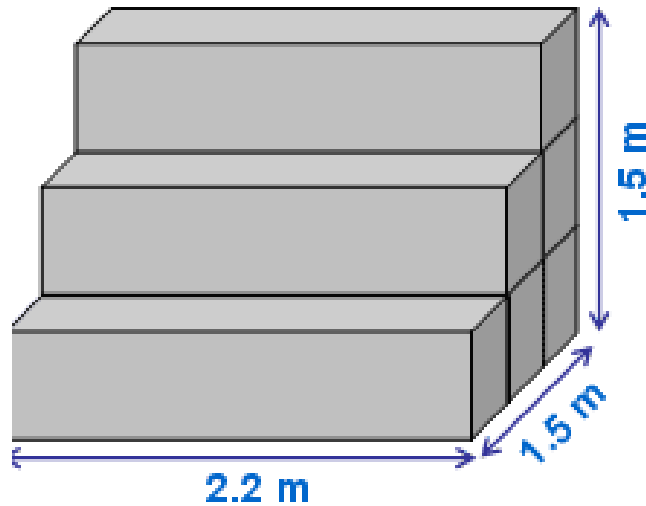
Applicant ID:

All questions on this paper must be answered.

Write the answers in the space below each question.

Show **ALL** working for each question.

1a) Find the volume of the shape below.



.....

(4 marks)

b) Find the surface area of the shape

.....

(6 marks)

Total for page: 10 marks

2. p is an even number

q is an odd number

Tick the correct box for each part

a) is $3(p + q)$ an odd number, an even number or could it be either?

☐

odd

☐

even

☐

could be either

(1 mark)

3. When a jug of water is $\frac{1}{5}$ full it weighs 250grams



When the same jug is $\frac{4}{5}$ full of water it weighs 550 grams



How much does the jug weigh when it is empty?

.....grams

(3 marks)

Total for page: 4 marks

4. The small wheel on a 'penny farthing' has a radius of 0.20m

The large wheel has a radius of 0.50m.

How many complete turns does each wheel turn in 1 kilometre?

Use 3.14 as π .

Round your answers to the nearest 10.



Small wheel.....

(3 marks)

Large wheel.....

(3 marks)

Total for page: 6 marks

5.a) using trial and improvement find the dimensions of a rectangle whose perimeter is 29cm and area is 47.5cm^2

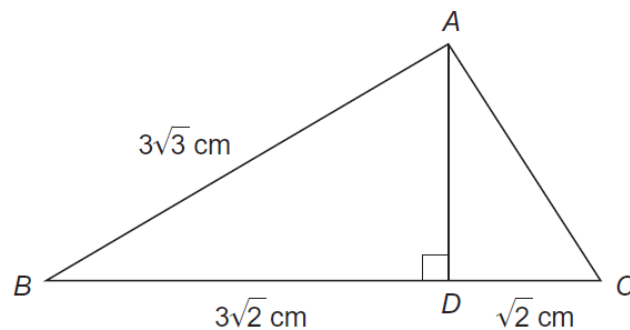


.....

(3 marks)

b) ABC is a triangle
 AD is perpendicular to BC

$AB = 3\sqrt{3}\text{cm}$, $BD = 3\sqrt{2}\text{cm}$, $DC = \sqrt{2}\text{cm}$



Not drawn
 accurately

Work out the area of triangle ABC

Give your answer in the form $a\sqrt{2}$ where a is an integer

.....

(6 marks)

Total for page: 9 marks

6. y is inversely proportional to x .

$y = 21$ when $x = 10$

a) Find y when $x = 15$

.....

(2 marks)

b) Make y the subject of the formula $T = \frac{w(1-y)}{y}$

.....

(3 marks)

Total 5 marks

7. An alligator is measured from its head to its tail. The head of the alligator is 100cm shorter than its body.

The body of the alligator is 160 cm shorter than its tail.

The length of the tail is the same length as the total length of the head and the body.

How long is the alligator?



.....

Total for page: 5 marks

8. Last year Ana paid \$245 to insure her car.

This year she paid \$858.

Work out the percentage increase in the cost of the insurance.

Give your answer to the nearest whole percent.

.....

(3 marks)

9. Given that $884 \div 34 = 26$ work out

a) $8.84 \div 340$

.....

(2 marks)

b) $884 \div (3.4 \times 2.6)$

.....

(3 marks)

Total for page: 8 marks

10.

a) Solve $\frac{5x}{8} > 2$

.....

(1 mark)

b) Factorise $6x^2 + 5x - 1$

.....

(2 marks)

c) Expand and simplify $3b + 1 - 4(b - 2)$

.....

(2 marks)

Total for page: 5 marks

11. On the grid below draw

a) the straight line $y = -2x$

(2 marks)

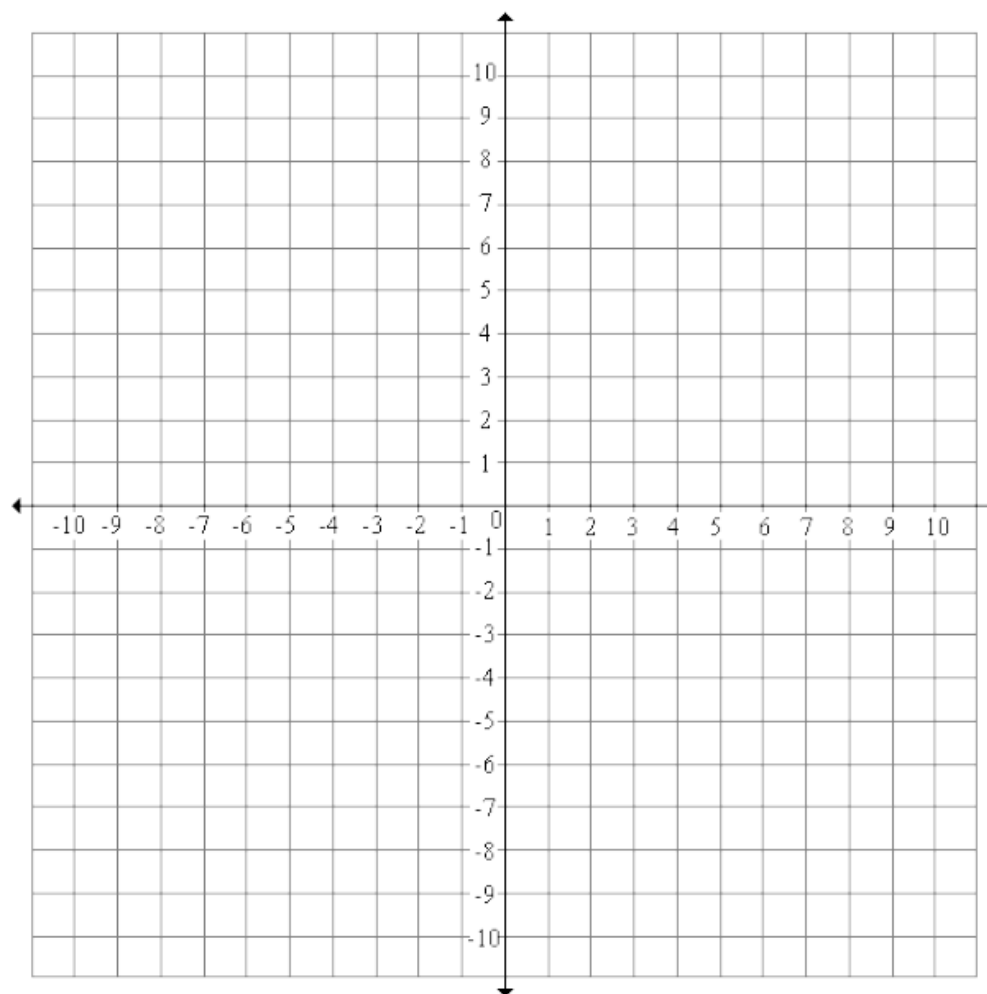
b) the curve $y = 4x^2 - 3$

(2 marks)

c) **Using the graph** find the points of intersection

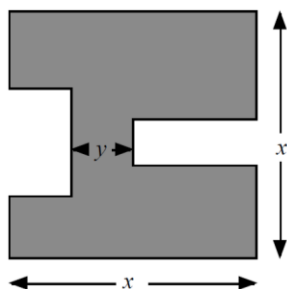
(.....) and (.....)

(2 marks for each correct pair)



Total for page: 8 marks

12. The diagram shows a square of side length x with two rectangles cut out of it.



Find the perimeter of the shaded shape in terms of x and y

.....

(4 marks)

13. There are seven numbers in a sequence.

The difference between a term and the next one in the sequence is always the same amount.

The middle term of the sequence is m .

Find in terms of m the sum of the seven numbers.

You must show all your workings

.....

(2 marks)

Total marks for page: 6 marks

14. A group of ducks are swimming on a pond



At 2:00pm, $\frac{1}{5}$ of the ducks flew away.

At 3:00pm, $\frac{1}{8}$ of the remaining ducks flew away.

At 4:00pm, 3 times as many ducks as had flown away at 2:00 flew away, leaving 28 ducks on the pond.

How many ducks were there on the pond originally (at 2:00pm)?

.....

Total for page :4 marks

Leave this page blank

Do not use this page for workings

Any workings on this page will not be counted.