AQA

Please write clearly, in block capitals.

Centre number ☐☐☐☐☐   Candidate number ☐☐☐☐

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
MATHEMATICS

H

Higher Tier   Paper 1   Non-Calculator

Exam Date   Morning   Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

• mathematical instruments.

You must **not** use a calculator.

Instructions

• Use black ink or black ball-point pen. Draw diagrams in pencil.
• Answer **all** questions.
• You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
• Do all rough work in this book. Cross through any work you do not want to be marked.

Information

• The marks for questions are shown in brackets.
• The maximum mark for this paper is 80.
• You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

• In all calculations, show clearly how you work out your answer.

8300/1H

Answer **all** questions in the spaces provided.

1   Expand $x(x + 3)$

Circle your answer.

[1 mark]

$$2x + 3 \qquad\qquad x^2 + 3 \qquad\qquad x^2 + 3x \qquad\qquad 3x^2$$

2   Which of these has the greatest value?

Circle your answer.

[1 mark]

$$6.15 \times 10^4 \qquad\qquad 61\ 499 \qquad\qquad 6.2 \times 10^3 \qquad\qquad 61.6 \times 10^3$$

3 What is 0.12 as a fraction of 0.8?

Circle your answer.

[1 mark]

$$\frac{3}{20} \qquad \frac{2}{3} \qquad \frac{20}{3} \qquad \frac{3}{2}$$

4 The base of a pyramid has n sides.

Circle the expression for the number of faces of the pyramid.
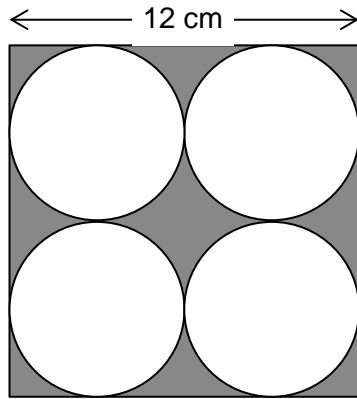
[1 mark]

$$2n \qquad n - 1 \qquad n \qquad n + 1$$

Turn over for the next question

5 Four identical circles just fit inside a square as shown.

← 12 cm →

Not drawn accurately

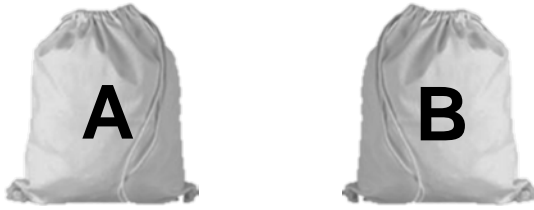Work out the area of the shaded section.

Give your answer in terms of π.

[4 marks]

Answer _____ cm^2

6 Bag A contains 10 blue balls and 20 red balls.

Bag B contains 8 blue balls and 12 red balls.

A ball is chosen at random from each bag.

Jo says,

"It is more likely that a blue ball is chosen from Bag A than Bag B because there are more blue balls in Bag A."

Is she correct?

You **must** show your working.

[3 marks]

Turn over for the next question

7 (a) Rob is going to drive 130 miles from Hull to Liverpool.

There are road works for 25 miles of the journey.

He assumes his average speed will be

      50 mph where there are road works

      70 mph for the rest of the journey.

Using his assumptions, work out his journey time.

[4 marks]

Answer _____

7 (b) Rob's assumptions about his average speeds are too high.

How does this affect his journey time?

[1 mark]

8 Jack works out the answer to $\dfrac{\sqrt{98.5} - 12.1}{-0.8}$

He says the answer is negative.

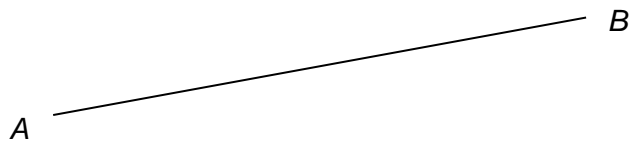Is he correct?

You **must** show your working.

[2 marks]

9 Use a ruler and a pair of compasses in this question.

Construct the perpendicular bisector of *AB*.

[2 marks]

B

A

10 Here are the instructions on a bottle of fruit squash.

> To make fizzy juice
> mix 2 parts fruit squash
> with 7 parts lemonade

Tom has 80 ml of fruit squash.

He also has 210 ml of lemonade.

What is the **maximum** amount of fizzy juice he can make?

[3 marks]

Answer _____ ml

11 A ball is dropped from a height of 50 metres.

After each bounce, the ball reaches 20% of its previous height.

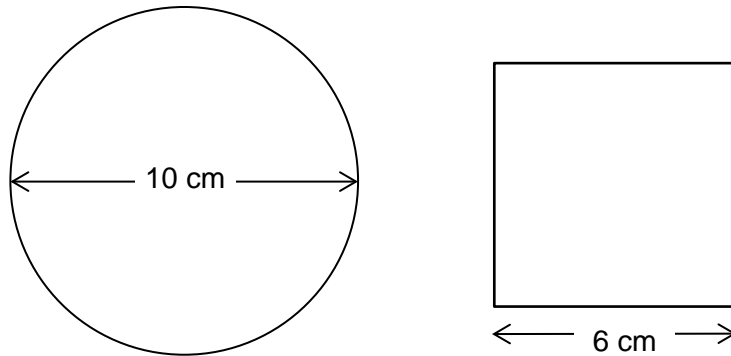How high does it reach after the second bounce?

[2 marks]

Answer _____ metres

12 A circle has diameter 10 cm

A square has side length 6 cm

Not drawn accurately

10 cm

6 cm

Use Pythagoras' theorem to show that the square will fit inside the circle without touching the edge of the circle.

[3 marks]

13 What percentage of a distribution is covered by the inter-quartile range?

Circle your answer.

[1 mark]

25%   37.5%   50%   75%

14 Which of these values **cannot** be the cosine of an angle?

Circle your answer.

[1 mark]

−0.5   0   0.5   1.5

15 A motor racing circuit has length $5\frac{5}{6}$ miles.

A straight section of the circuit has length $1\frac{3}{4}$ miles.

What fraction of the circuit is the straight section?
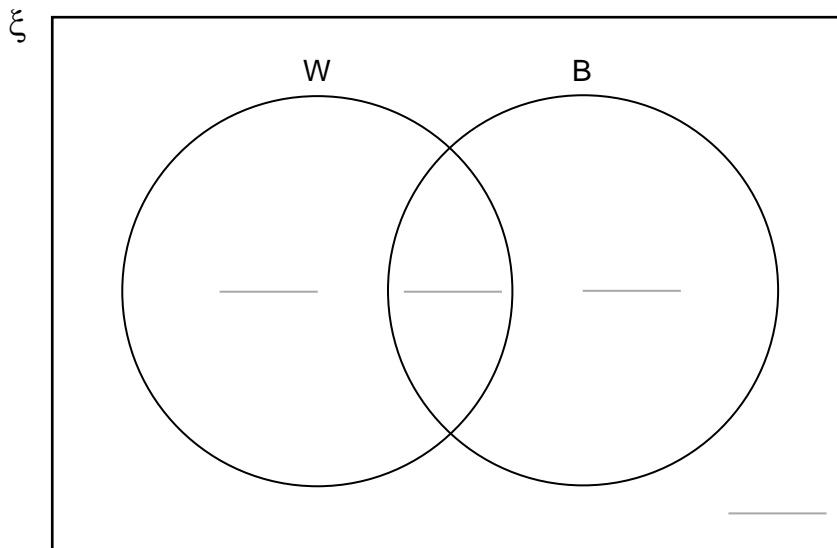
Give your answer in its simplest form.

[3 marks]

Answer _____

16 In the Venn diagram

ξ = 100 farms

W = farms that grow wheat

B = farms that grow barley

70 farms grow **only** wheat or **only** barley.

$\frac{4}{5}$ of these 70 farms grow **only** wheat.

The number of farms that grow wheat is three times the number that grow barley.

Complete the Venn diagram.

[5 marks]

Turn over for the next question

17 $(3x + 1)(x - 2) + ax + b \equiv 3x^2 + 8x - 5$

Work out the values of a and b.

[4 marks]

_____

_____

_____
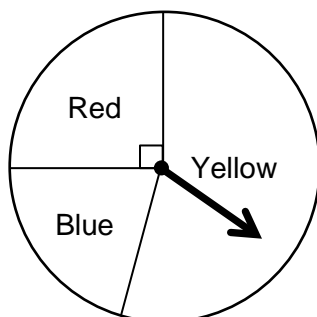
_____

_____

_____

_____

$a =$ _____

$b =$ _____

18   In a game, a fair spinner has three sections.

Not drawn accurately

18 (a)   Joe uses this method to work out the probability of getting two reds from two spins.

He writes,

There are three colours, so the probability of the spinner landing on red is $\frac{1}{3}$

$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$, *so the probability is* $\frac{2}{3}$

Make **two** criticisms of Joe's method.

[2 marks]

Criticism 1 _____

_____

_____

Criticism 2 _____

_____

_____

18 (b)   The probability of getting two blues from two spins is $\frac{1}{25}$

Work out the angle of the blue sector.

[3 marks]

_____

_____

_____

_____

_____

Answer _____ degrees

19 Show that $\dfrac{2x+1}{3} + \dfrac{5x-2}{2}$ simplifies to $\dfrac{19x-4}{6}$

[2 marks]

20 A circle has equation $x^2 + y^2 = \dfrac{1}{4}$
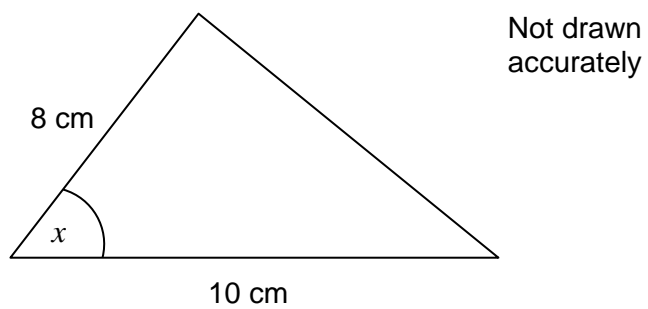
Circle the length of its radius.

[1 mark]

$\dfrac{1}{16}$ $\qquad\qquad$ $\dfrac{1}{8}$ $\qquad\qquad$ $\dfrac{1}{4}$ $\qquad\qquad$ $\dfrac{1}{2}$

21 Which expression gives the area, in cm^2, of this triangle?

Not drawn
accurately

8 cm

x

10 cm

Circle your answer.

[1 mark]

80 sin x 40 sin x 80 cos x 40 cos x

22 Express 0.1$\overset{\bullet}{5}$ as a fraction in its simplest form.

[3 marks]

Answer

23 Ellie bought a scarf and a dress.

The scarf cost £4

She sold both items for a total of £26

She made

100% profit on the cost of the scarf

30% profit on the total cost.

Work out her percentage profit on the cost of the dress.

[5 marks]

Answer _____ %

24 Work out $\sqrt[3]{8} \times 5^{-2}$

Give your answer as a decimal.

[3 marks]

Answer _____

Turn over for the next question

Version 1.0

25   A sequence of numbers is formed by the iterative process $a_{n+1} = (a_n)^2 - a_n$

25 (a)   Describe the sequence of numbers when $a_1 = 1$

Show working to justify your answer.

[1 mark]

25 (b)   Describe the sequence of numbers when $a_1 = -1$

Show working to justify your answer.

[2 marks]

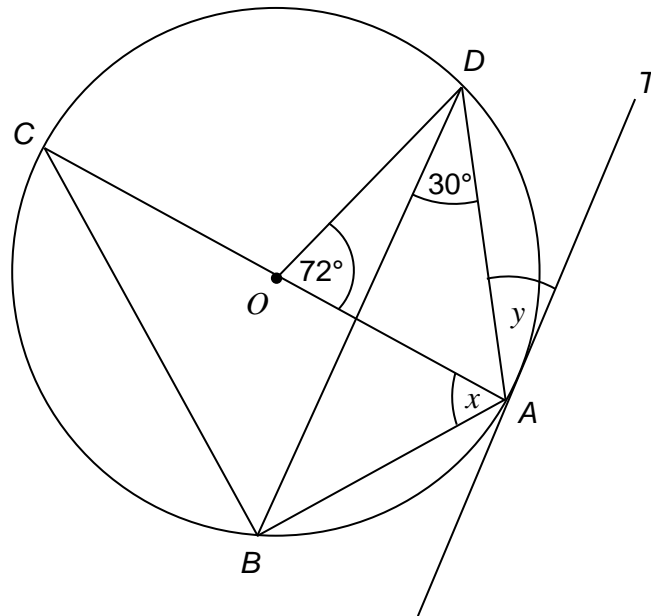**25 (c)**   Work out the value of a_2 when $a_1 = 1 - \sqrt{2}$

[2 marks]

Answer _____

26 *A*, *B*, *C* and *D* are points on a circle, centre *O*.

AC is a diameter of the circle.

AT is a tangent to the circle.

Not drawn
accurately

Work out the size of angle *x* and the size of angle *y*.

[4 marks]

x = _____ degrees   *y* = _____ degrees

Turn over ▶

27   Write $\sqrt{12} + \dfrac{15}{\sqrt{3}}$ in the form $a\sqrt{b}$ where a and b are prime numbers.

[3 marks]

Answer _____

28 Solve $5x - y = 5$

$2y - x^2 = 11$

You **must** show your working.

Do **not** use trial and improvement.

[6 marks]

Answer

END OF QUESTIONS

There are no questions printed on this page

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