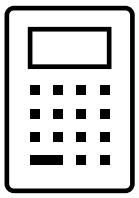
Surname:	Forename(s):

GCSE Mathematics – Higher Tier

Paper 2 – Calculator



Practice Set A

/40

Materials

- **Formulae Sheet** (on the next page)
- **Black** ink or ball-point pen
- Pencil
- Eraser
- Protractor
- Compass
- Tracing Paper
- **Calculator allowed**

Instructions

- Time allowed: **45 minutes.**
- The total mark for this paper is **40**.
- Show **all** of your working.
- Draw diagrams in pencil.
- Plot graphs in pencil.
- Diagrams are **not** accurately drawn, unless otherwise indicated.
- Cross through any work you don't want to be marked

Higher Tier Formulae Sheet

Perimeter, Area and Volume

Where a and b are the lengths of the parallel sides and h Is their perpendicular separation:

Area of a trapezium = ½ (a + b) h

Volume of a prism = area of cross section x length

Where r is the radius and d is the diameter:

Circumference of a circle = 2πr = πd

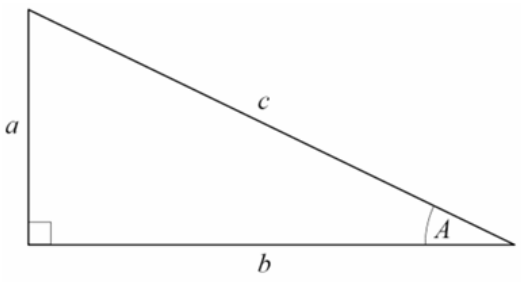
Area of a circle = πr^2

Quadratic Formula

The solution of $ax^2 + bx + c = 0$ where $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Pythagoras' Theorem and Trigonometry

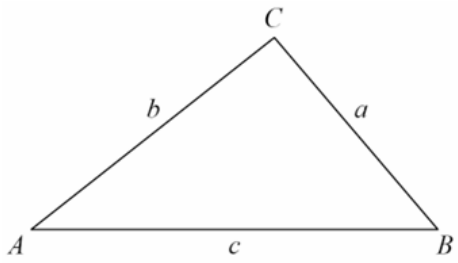


In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

$$\sin A = \frac{a}{c} \qquad \cos A = \frac{b}{c} \qquad \tan A = \frac{a}{b}$$



In any triangle ABC where a, b and c are the length of the sides:

$$\text{sine rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{cosine rule: } a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area of triangle } = \frac{1}{2} ab \sin C$$

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is number of times that the interest is compounded:

$$\text{Total accrued} = P\left(1 + \frac{r}{100}\right)^n$$

Probability

Where P (A) is the probability of outcome A

and P (B) is the probability of outcome B:

P (A or B) = P (A) + P (B) – P (A and B)

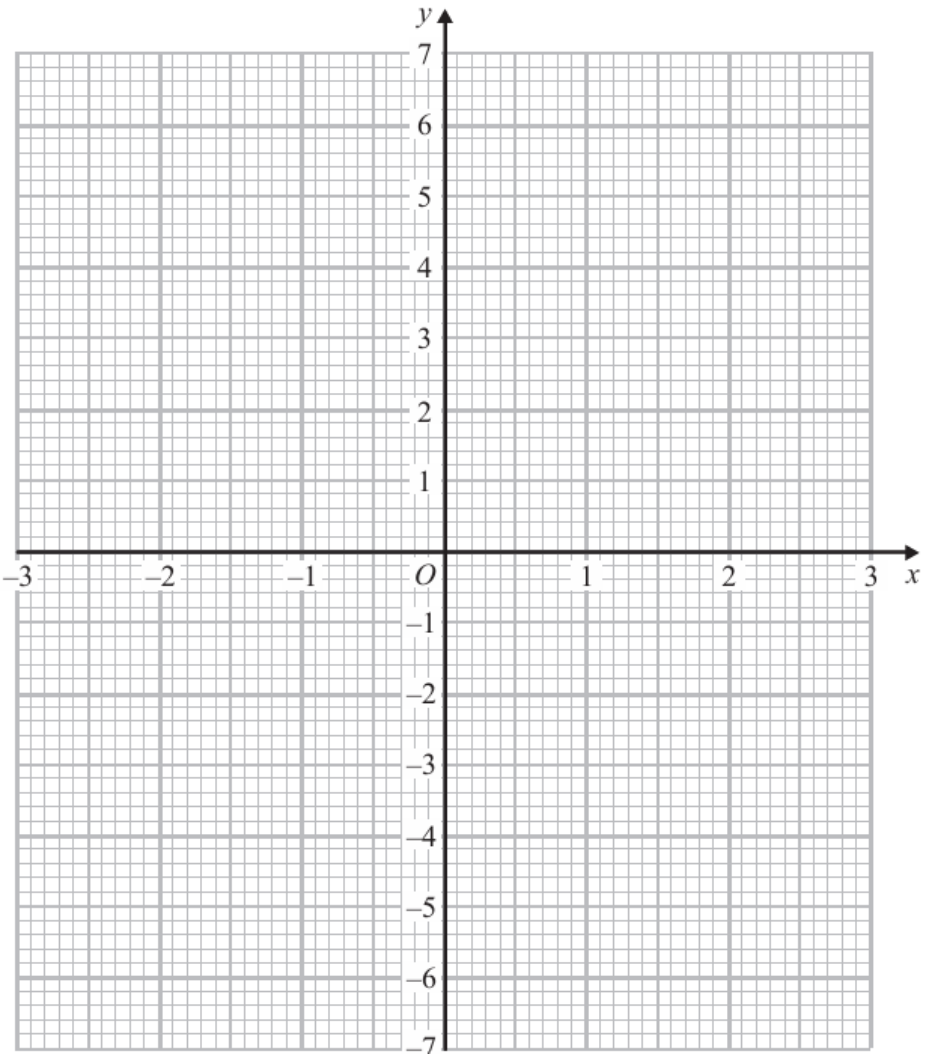
P (A and B) = P (A given B) P(B)

1 (a) Complete the table of values for $y = x^2 - x - 6$

x	-3	-2	-1	0	1	2	3
y							

(2)

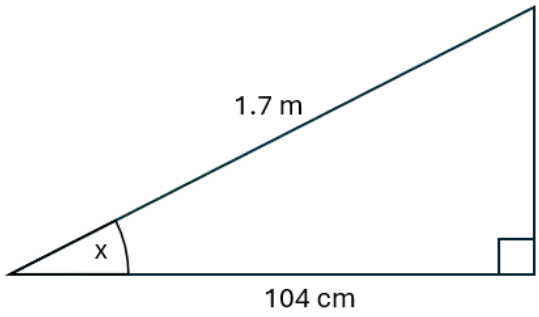
(b) On the grid, plot the graph of $y = x^2 - x - 6$ for values of x from -3 to 3.



(2)

(Total for question 1 is 4 marks)

2 Work out the size of angle x.
Give your answer to 1 decimal place.



_____ °

(Total for question 2 is 3 marks)

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3 Solve $x^2 - 3x - 28 = 0$

_____

(Total for question 3 is 3 marks)

4 A car travels from Town A to Town B, but stops at a petrol station part way through the journey.

The car leaves town A at 10:30AM and arrives at the petrol station at 11:30AM. The distance between town A and the petrol station is 55 miles.

The care then travels a further 66 miles from the petrol station to town B, at the same average speed as the first journey.

How long did it take for the car to travel from the petrol station to town B.

Give your answer in minutes.

_____ minutes

(Total for question 4 is 3 marks)

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5 (a) Work out an estimate for $\frac{3.14}{\sqrt[3]{7.78^2}} \times 6.409$

_____

(2)

(b) Is your answer an overestimate or underestimate?

Give reason for your answer.

_____

_____

(1)

(Total for question 5 is 3 marks)

6 Ryan bought a new van for £15,500.

The value, £V, of Ryan's van after n years is given by the formula

$$V = 15{,}500 \times (0.84)^n$$

(a) After how many years will the value of Ryan's van fall to less than half of it's original price.

_____years

(2)

(b) Liza invests £4500 into a savings account for one year.
The savings account pays interest at an annual rate of x%
After the one year, Liza pays tax on the interest at a rate of 20%
After paying tax, she gets £126

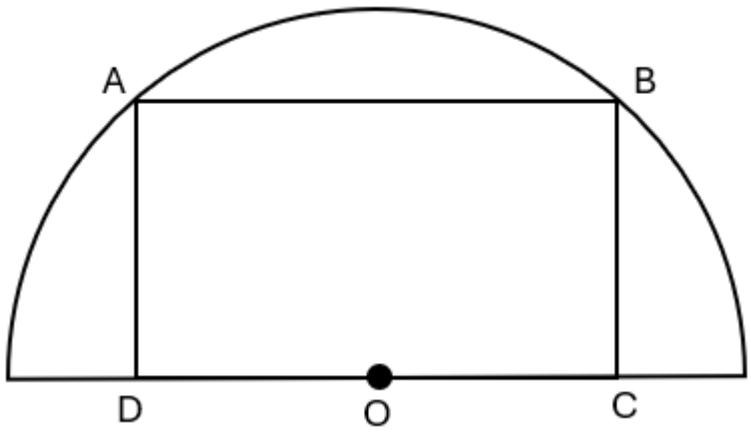
Work out the value of x.

x = _____

(3)

(Total for question 6 is 5 marks)

7 The points A, B, C and D lie on a semicircle with centre O.



AB = 20cm
BC = 6.5cm

Work out the perimeter of the semicircle.
Give your answer to 3 significant figures.

_____cm

(Total for question 7 is 4 marks)

8 Here are the first 5 terms of a quadratic sequence.

1 12 27 46 69

Find an expression, in terms of n, for the nth term of this sequence

_____

(Total for question 8 is 3 marks)

9 When a bias coin is flipped 3 times, the probability of landing 3 heads in a row is $\frac{8}{125}$

Work out the probability of flipping the coin 3 times and landing 3 tails in a row.

_____

(Total for question 9 is 2 marks)

10 y is directly proportional to m^2
when y = 8, m = 6
Work out y when m = 15

y = _____

(Total for question 10 is 4 marks)

11 In the diagram

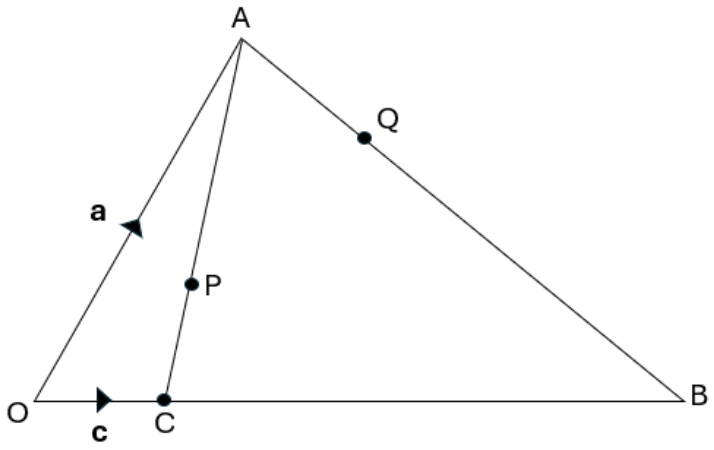
$\overrightarrow{OA}$ = a

$\overrightarrow{OC}$ = c

OC = $\frac{1}{8}$ BC

AP : PC = 3 : 1

AQ : QB = 1 : 3



(a) Show that $\overrightarrow{OP} = \frac{1}{4}$a + $\frac{3}{4}$c

(2)

(b) Is OPQ a straight line?

Give reason for your answer.

(4)

(Total for question 11 is 6 marks)

END OF TEST

TOTAL FOR THIS PAPER IS 40 MARKS