Name: .....

Form: .....

Teacher's Initials: ... ...

ALLEYN'S SCHOOL

MATHEMATICS

YEAR 9

Paper 1

Non-Calculator

Time allowed 1 hour 15 minutes

Calculators **MAY NOT** be used where necessary.

Show your working as there may be marks given for working out.

There are **14 questions** on the paper. If you cannot answer a question, leave it and go on to the next question.
The numbers in square brackets [ ] indicate the marks available for each question.

YEAR 9 NON-CALCULATOR EXAM PAPER

1 Simplify the following:

(i) $3 \times 6a$

$18a$

(ii) $28b \div 7$

$4b$

(iii) $2c \times 5c$

$10c^2$

(iv) $\frac{12d^2}{3d}$

$4d$

(v) $\frac{22e}{11e^3}$ $2e^{-2}$

[8]

2 Solve the following:

(i) $12f = 48$

$f = 4$

(ii) $2g + 5 = 11$

$2g = 6$

$g = 3$

(iii) $6h - 7 = 5$

$6h = 12$

$h = 2$

(iv) $23 - 4j = 11$

$23 = 11 + 4j$

$12 = 4j$

$j = 3$

(v) $6 - 5k = 10$

$6 = 10 + 5k$

$-4 = 5k$

$k = -4/5$ or -0.8

(vi) $3 + 2m = 7 - m$

$3 + 3m = 7$

$3m = 4$

$m = 4/3$

$= 1\frac{1}{3}$

[9]

3 Expand and simplify:

(i) $3(2n-5)$

$6n-15$

(ii) $4p(2p+5)$

$8p^2+20p$

(iii) $2(3q-4)-(5-2q)$

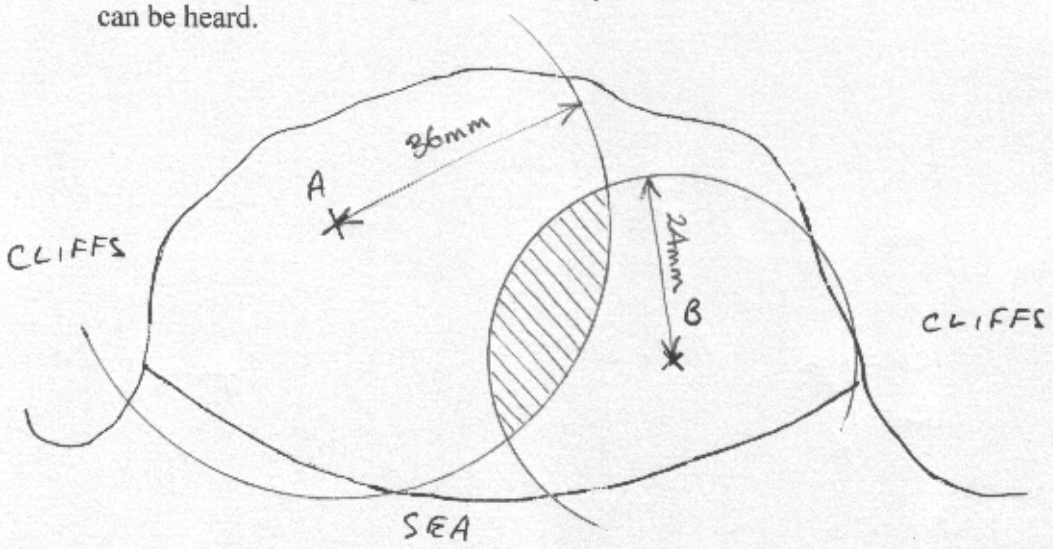
$6q-8-5+2q$

$=8q-13$

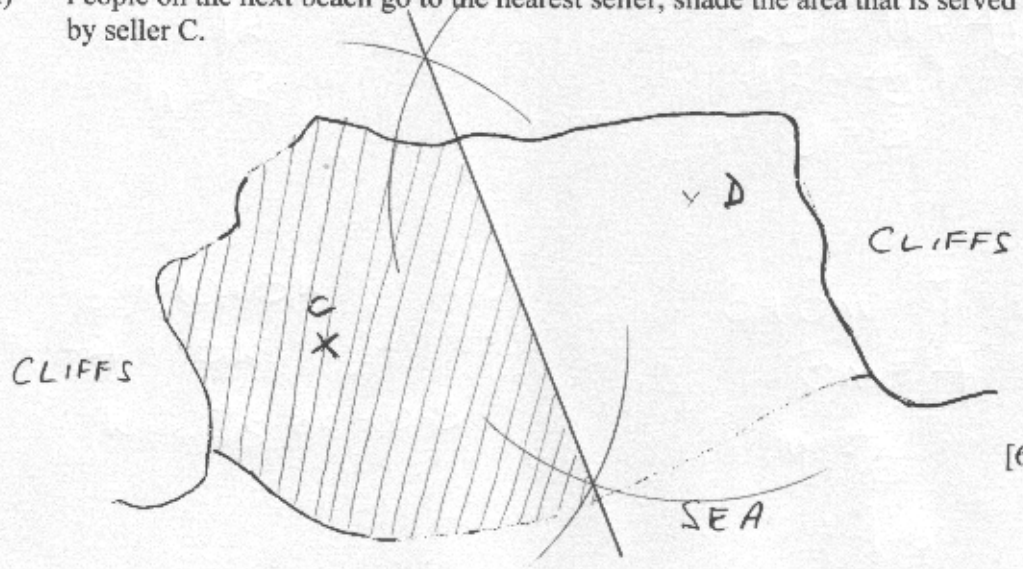
[6]

4 In the diagram below: A and B are 2 ice cream sellers on a beach. They are 200m apart.

(i) The loud speaker of seller A can be heard up to 150m away; the loudspeaker of seller B can be heard up to 100m away. Shade the area where both sellers can be heard.



(ii) People on the next beach go to the nearest seller, shade the area that is served by seller C.



[6]

5 Write the following in standard form:

(i) 3 640 000

3.64×10^6

(ii) 620.4

6.204×10^2

(iii) 0.000 379

3.79×10^{-4}

Write the following in ordinary numbers:

(iv) 7.26×10^3

7260

(v) 4.3×10^{-5}

0.000043

[7]

6 Evaluate the following, giving your answers in standard form:

(i) $(4.1\times10^8)\times(2\times10^4)$

8.2×10^{12}

(ii) $(7.3\times10^4)\times(3\times10^{-2})$

$21.9 \times 10^2 = 2.19 \times 10^3$

(iii) $(8.4\times10^2)\div(4\times10^4)$

2.1×10^{-2}

(iv) $(4.5\times10^{-2})\div(5\times10^{-5})$

0.9×10^3

$= 9 \times 10^2$

[9]

7 Write down the next two numbers in these sequences and also the generating formula (the formula for the nth term):

(i) 7, 11, 15, 19, 23, 27 nth term: $4n + 3$

(ii) 25, 18, 11, 4, -3, -10 nth term: $-7n + 32$

(iii) 0, 3, 8, 15, 24, 35 nth term $n^2 - 1$

(iv) 2, 6, 12, 20, 30, 42 nth term $n^2 + n$

[14]

8 In the following make x the subject of the formula:

(i) $y = 5x + 2$

$y - 2 = 5x$

$\frac{y-2}{5} = x$ {or $x = \frac{y}{5} - \frac{2}{5}$}

(ii) $y = 7 - 3x$

$y + 3x = 7$

$3x = 7 - y$

$x = \frac{7-y}{3}$

(iii) $y = \sqrt{\frac{w}{x+3}}$

$y^2 = \frac{w}{x+3}$

$y^2(x+3) = w$

$x + 3 = \frac{w}{y^2}$

$x = \frac{w}{y^2} - 3$

[7]

9 Factorise the following:

(i) $6s + 9$

$3(s+3)$

(ii) $12t^2 - 8t$

$4t(3t - 2)$

Expand:

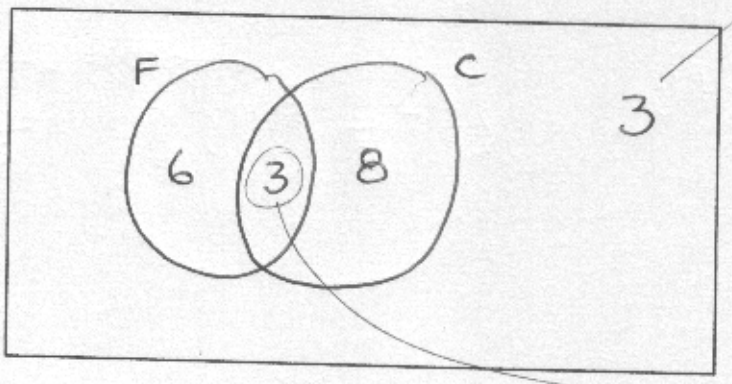
(iii) $(w+3)(w-4)$

$w^2 - 4w + 3w - 12$

$w^2 - w - 12$

[5]

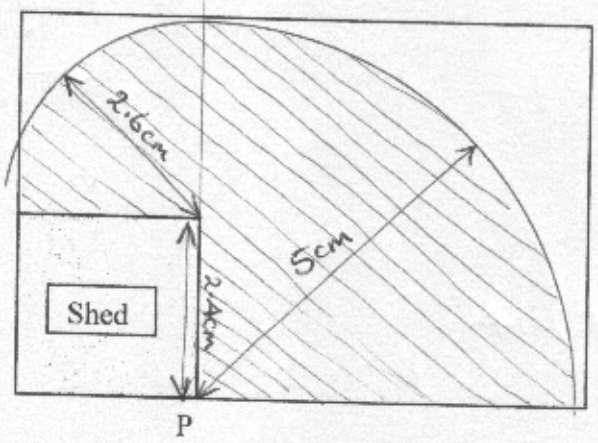
10 (i) In a class of 20 pupils: 9 play the flute, 11 sing in the choir and 3 do neither. Illustrate this in a Venn Diagram.



(ii) How many sing and play the flute? 3

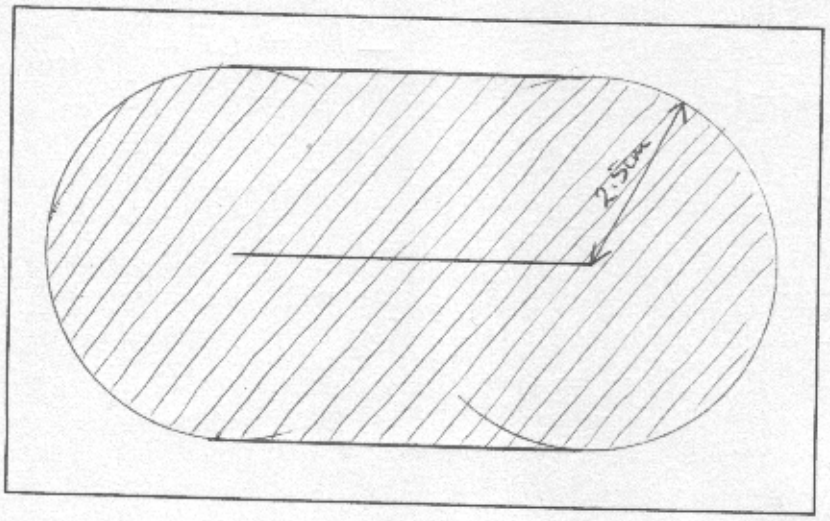
[4]

11 A goat is tethered at P (the corner of the shed) on a 10 m rope. Shade the area it can graze.



1cm = 2m

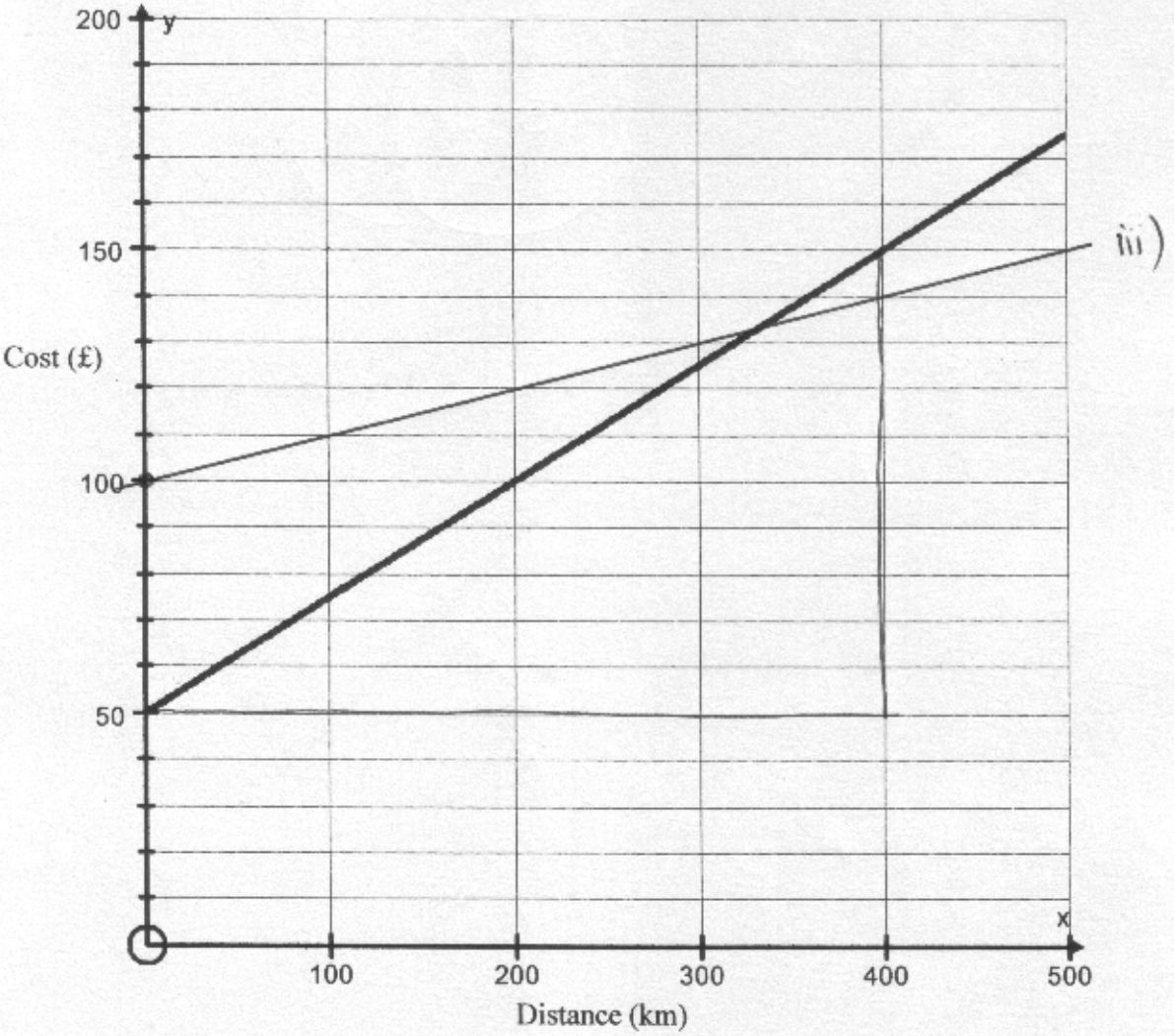
Another goat is tied to a straight 10m rail by a 5m long rope such that it can move up and down the rail. The rail is in the middle of a field. Shade the area it can graze.



1cm = 2m

[6]

12 A car hire firm uses this graph to calculate the cost of hiring out a vehicle. The charge is made up of a deposit and a rate per km.



(i) What is the cost per km?

100km cost £100

£1 per km.

(ii) How much is the deposit?

£50.

(iii) Another company charges £100 deposit and then 10p per km. Draw a line on the graph to represent this company's charges.

13 Solve: [8]

$2x - y = 11$ ①
$4x + 3y = 7$ ②

① × 3 $6x - 3y = 33$

Add $10x = 40$
$x = 4$

In ① $8 - y = 11$
$y = -3$

OR.

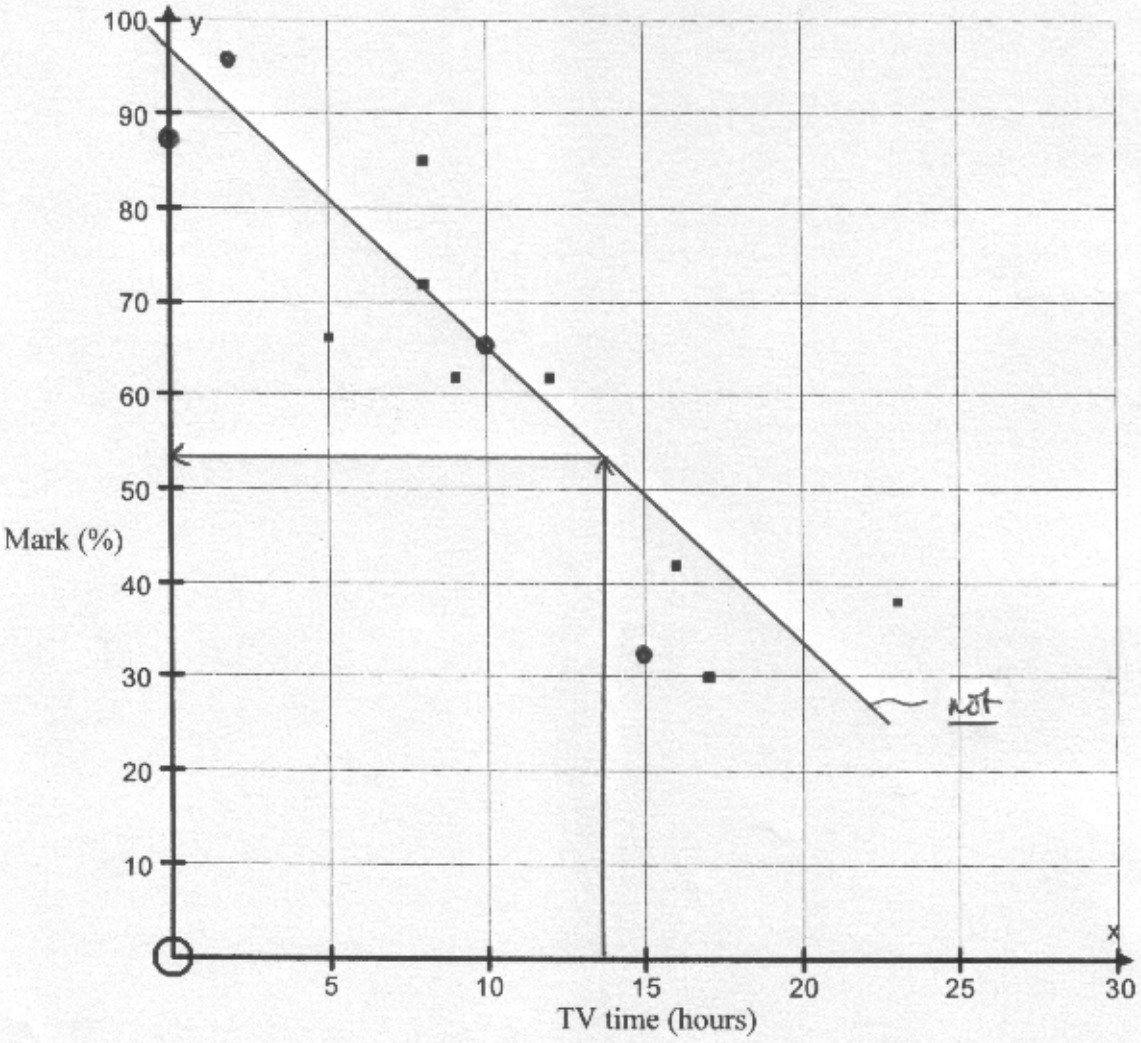
② $4x + 3y = 7$
① × 2 $4x - 2y = 22$
Subtract $5y = -15$
$y = -3$
In ① $2x - (-3) = 11$
$2x = 8$
$x = 4$

$x =$ 4
$y =$ −3

[5]

PTO FOR LAST QUESTION

14 This scatter graph represents the amount of TV watched by a group of 13-year-old students during the week prior to an important exam.



Here are the results of 4 more students:

TV time	10	0	15	2
Mark	65	88	32	96

(i) Add these to the graph.

(ii) Draw a line of best fit.

(iii) Describe the relationship between amount of TV and test marks.
The more time spent watching TV, the lower the mark
or weak negative correlation

(iv) Sophie spends 13 Hours in front of her TV. About how many marks should she expect to get in the test?
53-56 depending on your line

[6]