

[C056/SQP105]

Intermediate 2
Mathematics

Specimen Question Paper 1
(Applications of Mathematics questions;
see note below)
Non-calculator Paper

NATIONAL
QUALIFICATIONS

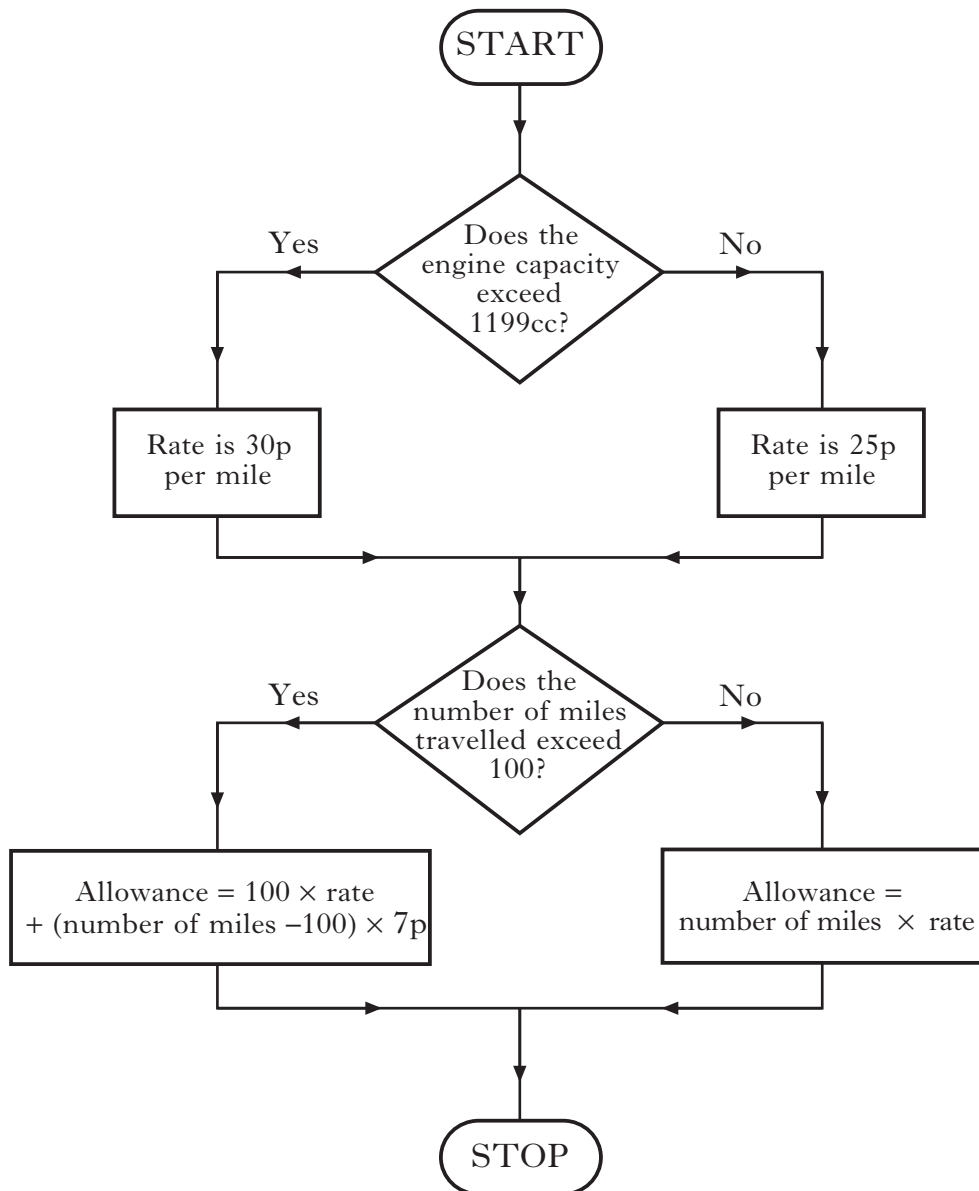
Intermediate 2 Mathematics—Commentary to accompany Specimen Question Paper 1

The attached questions constitute the Applications of Mathematics option for Intermediate 2 Mathematics. A Specimen Question Paper for component units Intermediate 2 Mathematics 1, Intermediate 2 Mathematics 2 and Intermediate 2 Mathematics 3 was issued to centres in December 1998. When the Applications of Mathematics option is followed then the attached Applications of Mathematics questions would be used in place of the Mathematics 3 questions 4 and 7.

When the Intermediate 2 Mathematics examinations become operational in the year 2000, two separate versions of the papers will be printed for each of Intermediate 2 Papers 1 and 2. One of these versions will contain questions pertaining to the component units Intermediate 2 Mathematics 1, Intermediate 2 Mathematics 2 and Intermediate 2 Mathematics 3; the second will contain questions pertaining to the component units Intermediate 2 Mathematics 1, Intermediate 2 Mathematics 2 and Intermediate 2 Applications of Mathematics.

4. The flowchart shown below gives instructions on how to calculate travelling expenses.

The total expenses claimed depends on the engine capacity of the car being used and the number of miles travelled.



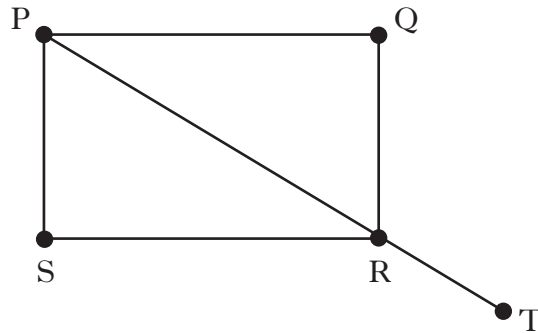
Use the flowchart to calculate the expenses which can be claimed for travelling 129 miles in a car with an engine capacity of 998 cc.

(4)

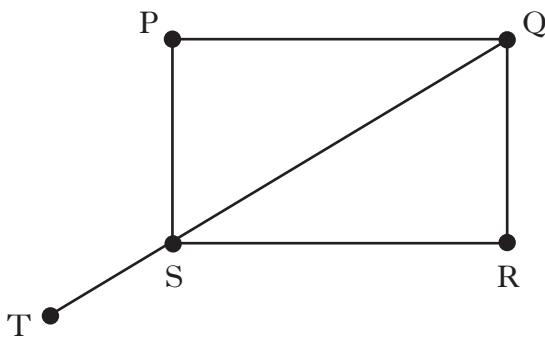
7. (a) A network is **traversable** if it can be drawn by going over every line once and only once without lifting your pencil.

The network shown opposite can be traversed by the route:

$P \rightarrow R \rightarrow S \rightarrow P \rightarrow Q \rightarrow R \rightarrow T$



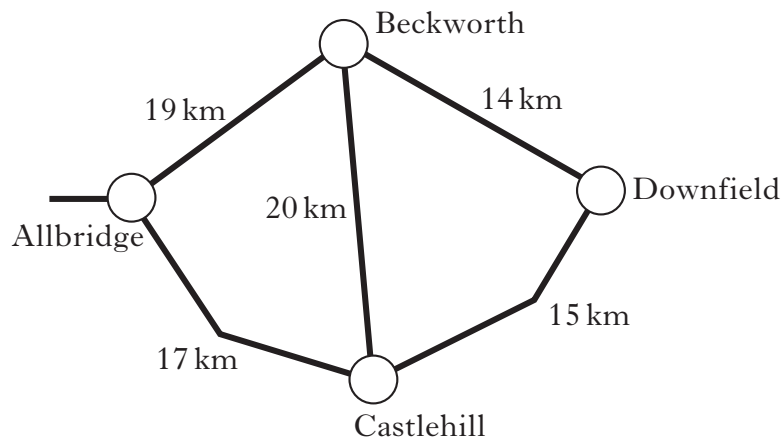
Write down a route by which the network below can be traversed.



(1)

- (b) A delivery van leaves its depot in Allbridge to make deliveries to Beckworth, Castlehill and Downfield.

The diagram shown below gives the distances between the depots.



- (i) Draw a tree diagram to show the possible delivery routes.

(2)

- (ii) Which is the shortest route?

(2)

[END OF QUESTIONS]

[C056/SQP105]

Intermediate 2
Mathematics

Specimen Marking Instructions Paper 1
(Applications of Mathematics questions)
Non-calculator Paper

NATIONAL
QUALIFICATIONS

Mathematics Intermediate 2 (Paper 1) Applications of Mathematics questions

Qu	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4	<ul style="list-style-type: none"> •¹ interpret: identify rate per mile •² interpret: identify relevant formula •³ process: start to evaluate formula •⁴ process: calculate expenses 	<ul style="list-style-type: none"> •¹ 25p •² use of relevant formula •³ 100×25 $+ 29 \times 7p$ •⁴ £27.03
7 (a)	<ul style="list-style-type: none"> • interpret/communicate: state route <p data-bbox="193 1066 300 1104">(b) (i)</p> <ul style="list-style-type: none"> •¹ strategy: start to draw tree diagram •² strategy: complete diagram correctly <div data-bbox="311 1344 821 1601" style="text-align: center;"> <pre> graph LR A --- B A --- C B --- C B --- D C --- B C --- D C --- D D --- B D --- B </pre> </div> <ul style="list-style-type: none"> (ii) <ul style="list-style-type: none"> • strategy: calculate distance for each route • communicate: identify shortest route 	<ul style="list-style-type: none"> • $Q \rightarrow S \rightarrow R \rightarrow Q \rightarrow P \rightarrow S \rightarrow T$ •¹ 4 branches of tree •² completed tree diagram • evidence of calculations • $A \rightarrow C \rightarrow D \rightarrow B$

[END OF MARKING INSTRUCTIONS]

[C056/SQP105]

Intermediate 2
Mathematics

Specimen Question Paper 2
(Applications of Mathematics questions;
see note below)

NATIONAL
QUALIFICATIONS

Intermediate 2 Mathematics—Commentary to accompany Specimen Question Paper 2

The attached questions constitute the Applications of Mathematics option for Intermediate 2 Mathematics. A Specimen Question Paper for component units Intermediate 2 Mathematics 1, Intermediate 2 Mathematics 2 and Intermediate 2 Mathematics 3 was issued to centres in December 1998. When the Applications of Mathematics option is followed then the attached Applications of Mathematics questions would be used in place of the Mathematics 3 questions 6, 9, 11 and 12.

When the Intermediate 2 Mathematics examinations become operational in the year 2000, two separate versions of the papers will be printed for each of Intermediate 2 Papers 1 and 2. One of these versions will contain questions pertaining to the component units Intermediate 2 Mathematics 1, Intermediate 2 Mathematics 2 and Intermediate 2 Mathematics 3; the second will contain questions pertaining to the component units Intermediate 2 Mathematics 1, Intermediate 2 Mathematics 2 and Intermediate 2 Applications of Mathematics.

6. The income tax rates are shown in the table below.

10% on the first £1500 of taxable income
23% on the next £26 500 of taxable income
40% on taxable income over £28 000

Jenny White earns £16 620 per year.

Her annual tax allowances total £5220.

Calculate Jenny's annual salary after tax has been deducted.

(5)

9. A metal bar expands when it is heated.

The new length, L centimetres, of the metal bar is given by the formula

$$L = B(1 + kt)$$

where B centimetres is the length of the bar before heating

t °C is the rise in temperature

k depends on the type of metal.

- (a) Calculate L when $B = 20$, $t = 15$ and $k = 0.002$.

(3)

- (b) Find B when $L = 53$, $t = 20$ and $k = 0.003$.

(2)

11. A record was kept of the number of packets of crisps sold each day in a school shop. The results are shown below.

Number of packets	Number of days
20 – 44	2
45 – 69	3
70 – 94	4
95 – 119	7
120 – 144	10
145 – 169	3
170 – 194	1

Calculate the mean number of packets sold.

(4)

12. Jim Grant borrows £3000 over 24 months with personal loan protection.

MONTHLY REPAYMENT TABLE					
		36 months		24 months	
Amount	W	W/o	W	W/o	
£2000	£80.63	£71.40	£109.62	£98.98	
£3000	£115.06	£102.46	£158.93	£143.97	
£5000	£187.73	£167.56	£261.09	£236.83	
£10 000	£375.48	£335.13	£522.16	£473.65	

W = With personal loan protection

W/o = Without personal loan protection

Use the loan repayment table shown above to calculate how much his loan will cost.

(3)

[END OF QUESTIONS]

[C056/SQP105]

Intermediate 2
Mathematics
Specimen Marking Instructions Paper 2
(Applications of Mathematics questions)

NATIONAL
QUALIFICATIONS

Mathematics Intermediate 2 (Paper 2) Applications of Mathematics questions

Qu	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6	<ul style="list-style-type: none"> •¹ process: calculate taxable income •² strategy: know how to calculate lower rate of tax •³ strategy: know how to calculate middle rate of tax •⁴ process: calculate tax at lower and middle rate •⁵ process: calculate total amount of tax due 	<ul style="list-style-type: none"> •¹ £11 400 •² $0.1 \times \text{£}1500$ •³ $0.23 \times \text{£}(11\,400 - 1500)$ •⁴ £150 and £2277 •⁵ £2427
9 (a)	<ul style="list-style-type: none"> •¹ process: substitute into formula •² process: start evaluation •³ process: complete evaluation 	<ul style="list-style-type: none"> •¹ $20(1 + 0.002 \times 15)$ •² 1.03 •³ 20.6
(b)	<ul style="list-style-type: none"> •¹ process: substitute into formula •² process: calculate B 	<ul style="list-style-type: none"> •¹ $53 = B(1 + 20 \times 0.003)$ •² 50

Qu	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
11	<ul style="list-style-type: none"> •¹ process: calculate midpoints of intervals •² process: multiply midpoints by frequency •³ process: find totals •⁴ process: calculate mean 	<ul style="list-style-type: none"> •¹ 32, 57, 82, 107, 132, 157, 182 •² 64, 171, 328, 749, 1320, 471, 182 •³ 3285 and 30 •⁴ 109.5
12	<ul style="list-style-type: none"> •¹ interpret: identify monthly repayment •² process: calculate total repayment •³ process: calculate cost of loan 	<ul style="list-style-type: none"> •¹ £158.93 •² £3814.32 •³ £814.32

[END OF MARKING INSTRUCTIONS]

