Question 1

Candidate 1

1. David took out a personal loan for £3000 on 1 July 2025.
He will start making repayments on 1 July 2026.
The effective rates of interest for the personal loan are as follows:

Dates	Interest rate
1 July 2025 to 30 September 2025	7.3% per year
1 October 2025 to 28 February 2026	7.9% per year
1 March 2026 to 30 June 2026	0.67% per month

Calculate the accumulated balance of David's loan on 30 June 2026. 3

~~Data~~ to

$100+7.3=107.3 \div 100=1.073$
$100+7.9=107.9 \div 100=1.079$

$3000 \times 1.073^{\frac{3}{12}} \times 1.079^{\frac{3}{12}} \times 1.0067^{3}$

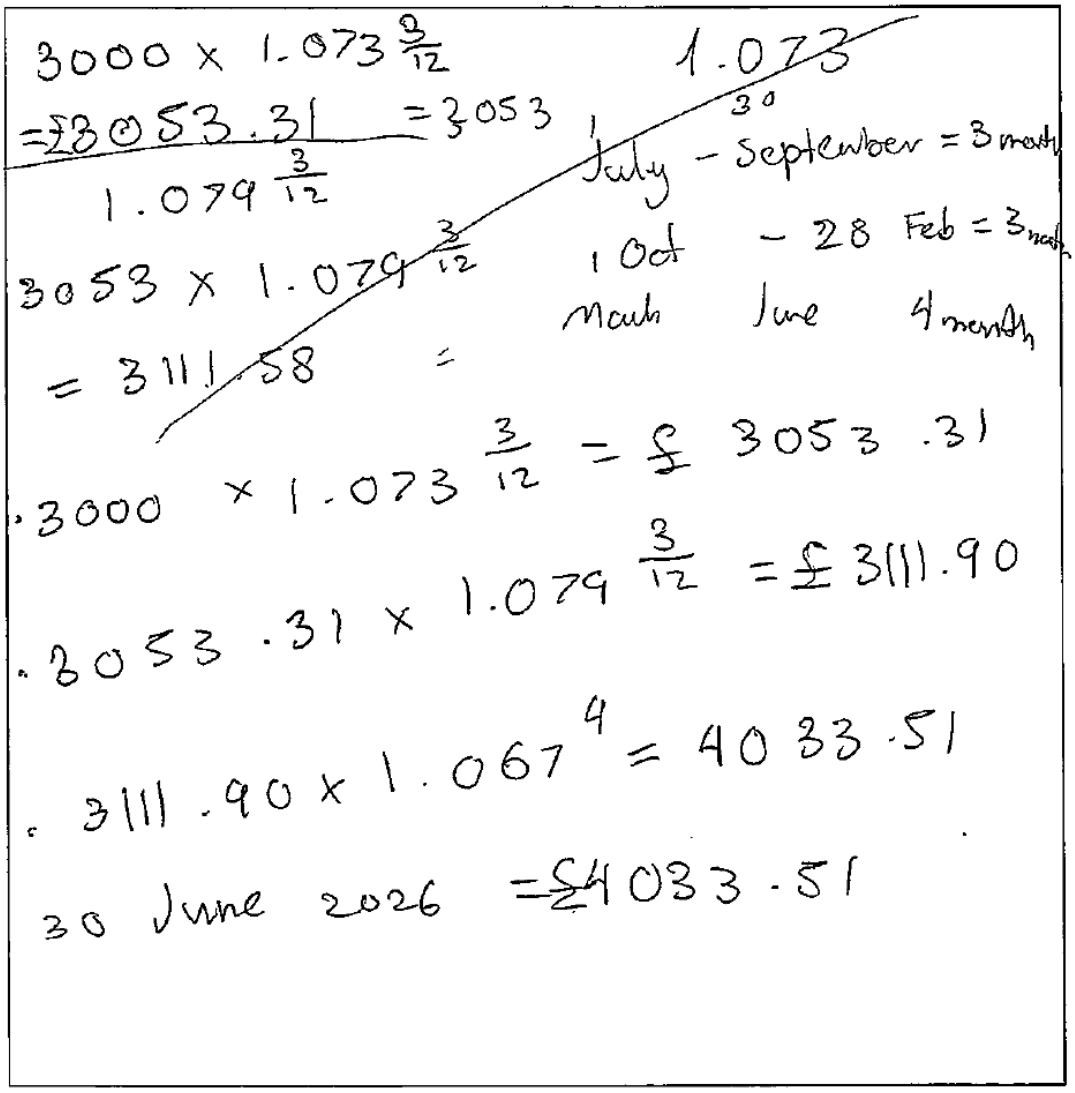
$= £3215.37$

Candidate 2

1. David took out a personal loan for £3000 on 1 July 2025.
He will start making repayments on 1 July 2026.
The effective rates of interest for the personal loan are as follows:

Dates	Interest rate
1 July 2025 to 30 September 2025	7.3% per year
1 October 2025 to 28 February 2026	7.9% per year
1 March 2026 to 30 June 2026	0.67% per month

Calculate the accumulated balance of David's loan on 30 June 2026. 3



Question

Candidate 3

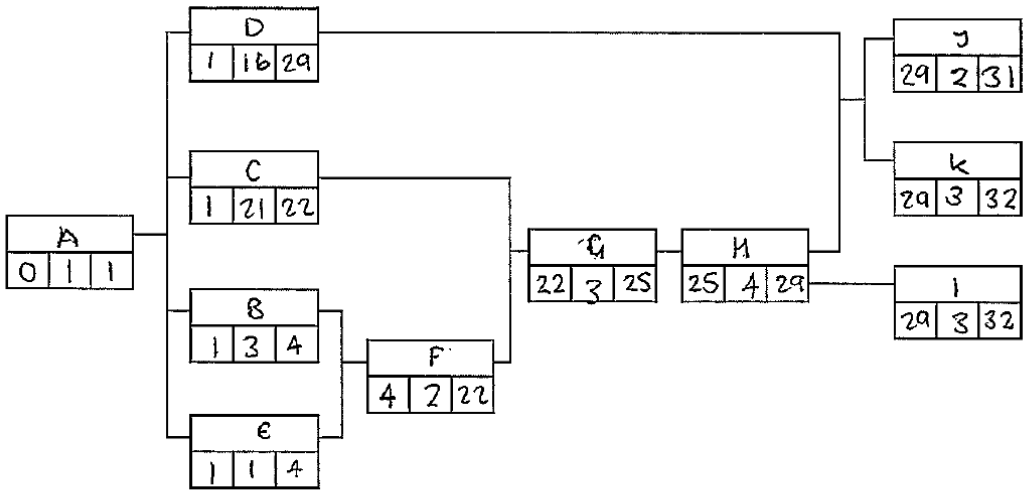
2. A company is repairing a house after a flood.

The table shows the list of tasks required to complete the house repairs, the time required for each task, and the order in which the tasks are to be completed.

Task	Description	Preceding task(s)	Duration (days)
A	Electrical safety tests	None	1
B	Remove damaged kitchen	A	3
C	Dry out house	A	21
D	Order and deliver new kitchen and bathroom	A	16
E	Remove damaged bathroom	A	1
F	Remove damaged floors	B, E	2
G	Replace the floors	C, F	3
H	Plaster the walls	G	4
I	Paint and decorate walls	H	3
J	Reinstate bathroom	D, H	2
K	Reinstate kitchen	D, H	3

(a) Complete the PERT chart showing the duration, the earliest start time and the latest completion time for each task. 5

(An additional diagram, if required, can be found on *page 20*.)



(c) State the float time to reinstate the bathroom (Task J). 1

0 hours of float time.

Candidate 4

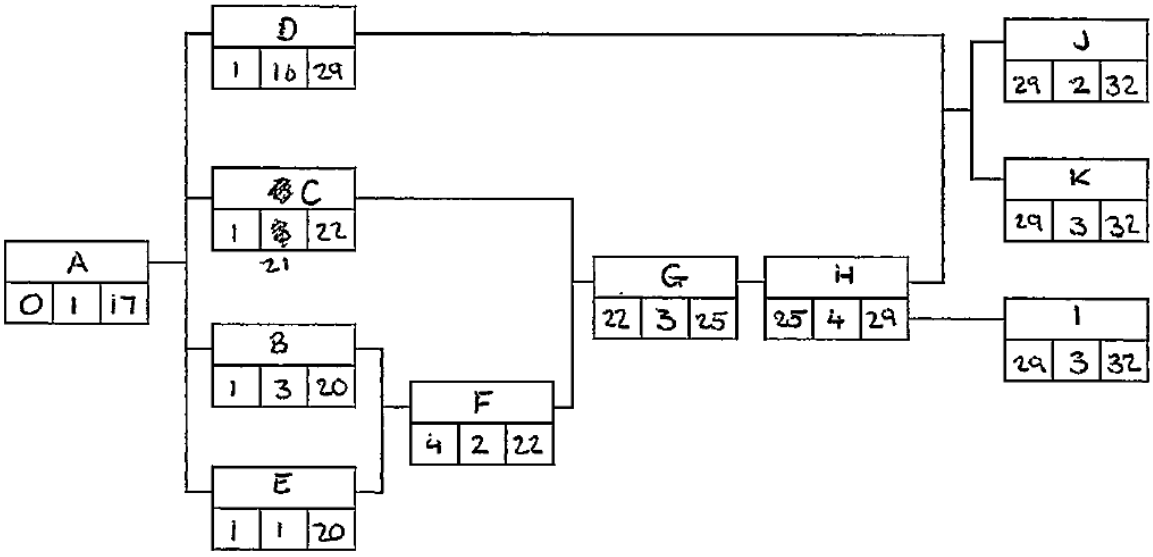
2. A company is repairing a house after a flood.

The table shows the list of tasks required to complete the house repairs, the time required for each task, and the order in which the tasks are to be completed.

Task	Description	Preceding task(s)	Duration (days)
A	Electrical safety tests	None	1
B	Remove damaged kitchen	A	3
C	Dry out house	A	21
D	Order and deliver new kitchen and bathroom	A	16
E	Remove damaged bathroom	A	1
F	Remove damaged floors	B, E	2
G	Replace the floors	C, F	3
H	Plaster the walls	G	4
I	Paint and decorate walls	H	3
J	Reinstate bathroom	D, H	2
K	Reinstate kitchen	D, H	3

(a) Complete the PERT chart showing the duration, the earliest start time and the latest completion time for each task. 5

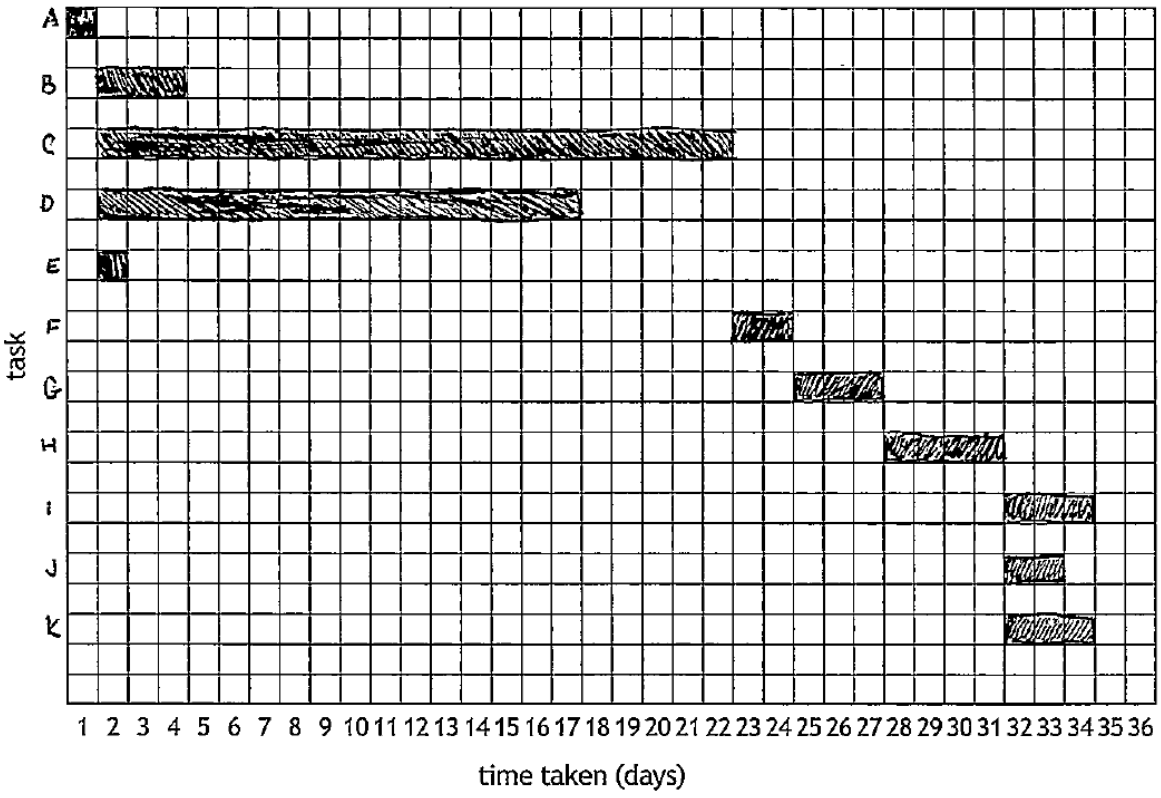
(An additional diagram, if required, can be found on *page 20*.)



2. (continued)

(b) Construct a Gantt chart, without float times, for the house repairs. 3

(An additional grid, if required, can be found on *page 20*.)



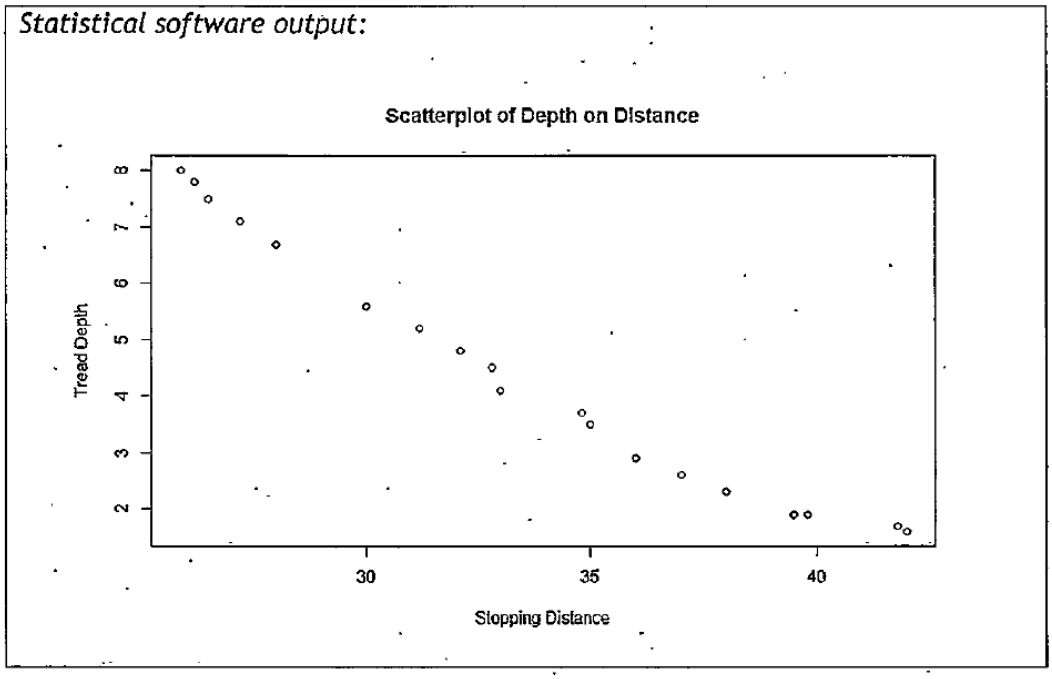
Question 3

Candidate 5

Question 3

(a)

Statistical software output:



(b) (i)

Statistical software output:

```
t = -24.771, df = 17, p-value = 8.839e-15
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 -0.9948849 -0.9642455
sample estimates:
      cor
-0.9864292
```

Answer:

-0.9864292

(ii)

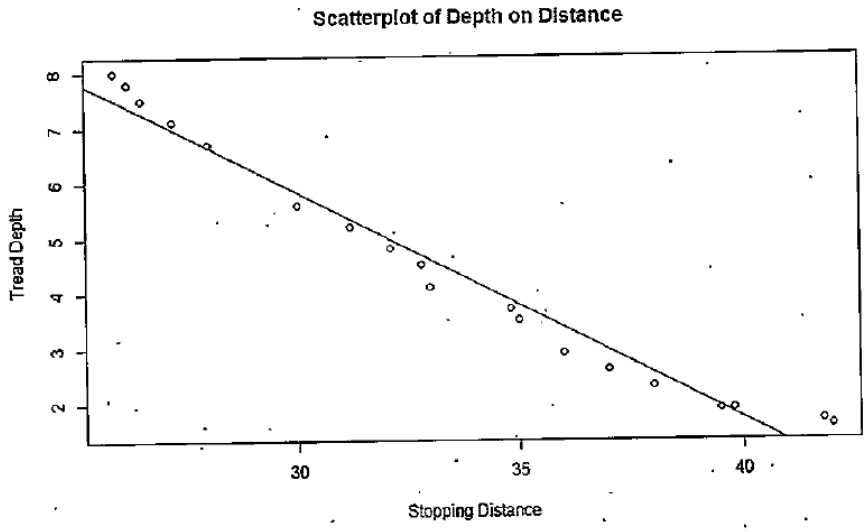
Answer:

There is a strong negative relationship

(c)

Statistical software output:

```
Coefficients:
(Intercept)      Distance
    18.1166       -0.4096
```



Answer:
Depth=-0.4096Distance+18.1166

(d)

Statistical software output:

```
     fit       lwr       upr
1 15.57723 14.32786 16.82659
```

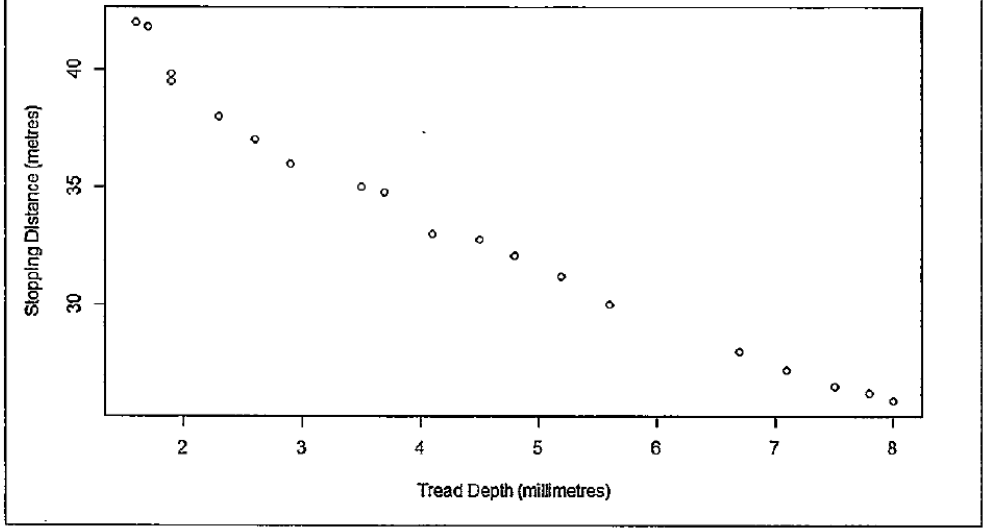
Answer:
15.57723

Candidate 6

Question 3

(a)

Statistical software output:



(b) (i)

Statistical software output:

```
Pearson's product-moment correlation

data:  Depth and Distance
t = -24.771, df = 17, p-value = 8.839e-15
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 -0.9948849 -0.9642455
sample estimates:
       cor
-0.9864292
```

Answer:

(ii)

Answer:
P= 8.839e-15, Due to p<0.05 we reject the null hypothesis, this means that there is a significant difference between the two samples.

(c)

Statistical software output:

```
Coefficients:
(Intercept)         Depth
     43.944        -2.376
```

Answer:
Distance=43.944*(-2.376)^X

(d)

Statistical software output:

```
predict(lm(Distance ~ Depth),
newdata=data.frame(Depth=6.2),interval = "pred")
       fit      lwr      upr
1 29.21441 27.23409 31.19474
```

Answer:
The stopping distance will roughly be 1.29 meters

Question 4

Candidate 7

4. As part of a recruitment process to become a firefighter, candidates must complete a verbal reasoning test and a numerical reasoning test.

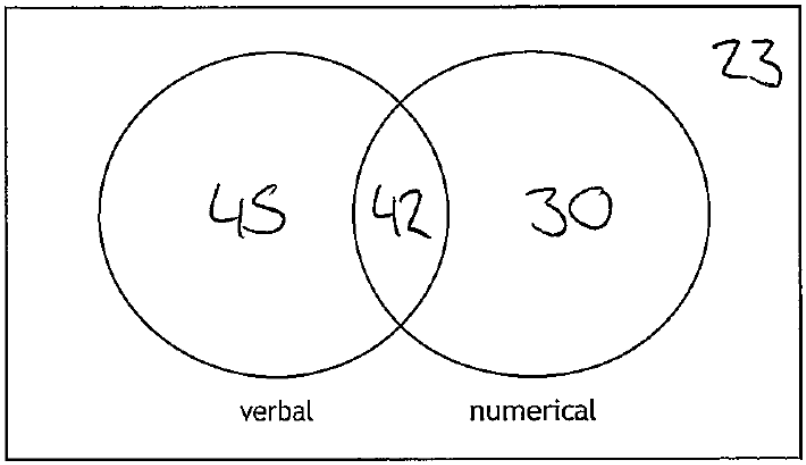
One day, a group of 140 candidates sat both tests.

The results were as follows:

- 87 passed the verbal reasoning test
- 75 passed the numerical reasoning test
- 42 passed both tests.

(a) Complete the Venn diagram to show this information. 2

(An additional diagram, if required, can be found on *page 21*.)



One candidate is chosen at random from this group.

(b) Calculate the probability that this candidate passed only one of the tests. 1

$P(\text{one}) = \frac{75}{140} = \frac{15}{28}$

Candidate 8

4. As part of a recruitment process to become a firefighter, candidates must complete a verbal reasoning test and a numerical reasoning test.

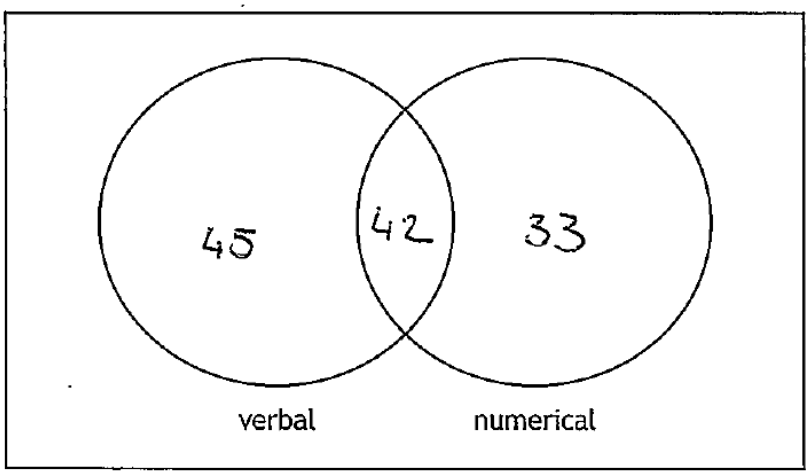
One day, a group of 140 candidates sat both tests.

The results were as follows:

- 87 passed the verbal reasoning test
- 75 passed the numerical reasoning test
- 42 passed both tests.

(a) Complete the Venn diagram to show this information. **2**

(An additional diagram, if required, can be found on *page 21*.)



One candidate is chosen at random from this group.

(b) Calculate the probability that this candidate passed only one of the tests. **1**

$P(\text{verbal}) = \frac{45}{140} = 3.1111...$

$P(\text{numerical}) = \frac{33}{140} = 4.2424...$

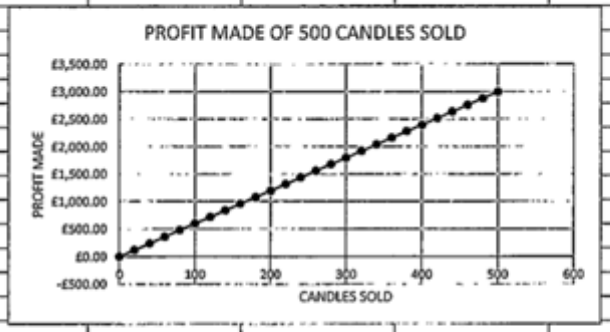
$= 7.353...$ chance of only passing one test.

Question 5

Candidate 9

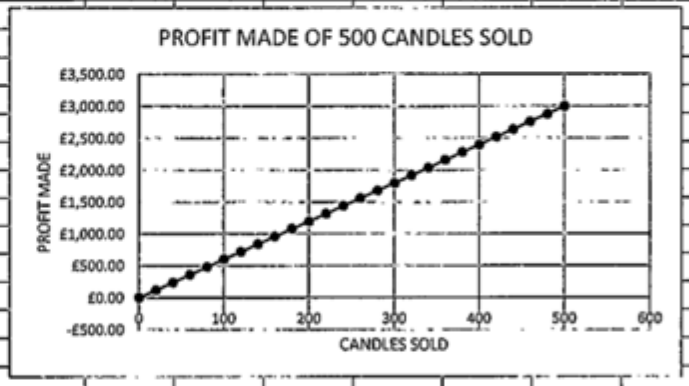
X844/76/01 Question 5(a)

	A	B	C	D	E	F	G	H
1		Name:						
2		SCN:						
3		Centre name:						
4								
5		Candle Profit Prediction						
6								
7		selling price per candle (s)	9					
8		cost to produce each candle (c)	3					
9								
10		Number of candles (x)	Profit (£)					
11		0	=($C$7-$C$8)*B11-0.015^2					
12		20	=($C$7-$C$8)*B12-0.015^2					
13		40	=($C$7-$C$8)*B13-0.015^2					
14		60	=($C$7-$C$8)*B14-0.015^2					
15		80	=($C$7-$C$8)*B15-0.015^2					
16		100	=($C$7-$C$8)*B16-0.015^2					
17		120	=($C$7-$C$8)*B17-0.015^2					
18		140	=($C$7-$C$8)*B18-0.015^2					
19		160	=($C$7-$C$8)*B19-0.015^2					
20		180	=($C$7-$C$8)*B20-0.015^2					
21		200	=($C$7-$C$8)*B21-0.015^2					
22		220	=($C$7-$C$8)*B22-0.015^2					
23		240	=($C$7-$C$8)*B23-0.015^2					
24		260	=($C$7-$C$8)*B24-0.015^2					
25		280	=($C$7-$C$8)*B25-0.015^2					
26		300	=($C$7-$C$8)*B26-0.015^2					
27		320	=($C$7-$C$8)*B27-0.015^2					
28		340	=($C$7-$C$8)*B28-0.015^2					
29		360	=($C$7-$C$8)*B29-0.015^2					
30		380	=($C$7-$C$8)*B30-0.015^2					
31		400	=($C$7-$C$8)*B31-0.015^2					
32		420	=($C$7-$C$8)*B32-0.015^2					
33		440	=($C$7-$C$8)*B33-0.015^2					
34		460	=($C$7-$C$8)*B34-0.015^2					
35		480	=($C$7-$C$8)*B35-0.015^2					
36		500	=($C$7-$C$8)*B36-0.015^2					



X844//6/01 Question 5(a)

	A	B	C	D	E	F	G	H	I	J	K	L
1		Name:										
2		SCN:										
3		Centre name:										
4												
5		Candle Profit Prediction										
6												
7		selling price per candle (s)	£9									
8		cost to produce each candle (c)	£3									
9												
10		Number of candles (x)	Profit (£)									
11		0	£0.00									
12		20	£120.00									
13		40	£240.00									
14		60	£360.00									
15		80	£480.00									
16		100	£600.00									
17		120	£720.00									
18		140	£840.00									
19		160	£960.00									
20		180	£1,080.00									
21		200	£1,200.00									
22		220	£1,320.00									
23		240	£1,440.00									
24		260	£1,560.00									
25		280	£1,680.00									
26		300	£1,800.00									
27		320	£1,920.00									
28		340	£2,040.00									
29		360	£2,160.00									
30		380	£2,280.00									
31		400	£2,400.00									
32		420	£2,520.00									
33		440	£2,640.00									
34		460	£2,760.00									
35		480	£2,880.00									
36		500	£3,000.00									



5. (continued) MARKS

(b) (i) State the type of model Claire is using. 1

linear

(ii) Explain what the graph shows when Claire produces and sells more than 400 candles. 1

her profit isn't as strong but is still going up slightly

(iii) State how many candles Claire should produce and sell to maximise her profit. 1

30

To produce each candle, Claire pours wax into a mould in the shape of a cuboid.

Each mould has a length of exactly 3 centimetres and a breadth of exactly 4 centimetres.

Claire pours the wax to a height of 7 centimetres with a relative error of 2%.

(c) Calculate the absolute error of the volume of the candle. 2

2% of 7 = 0.14

max = 7 + 0.14 = 7.14

min = 7 − 0.14 = 6.86

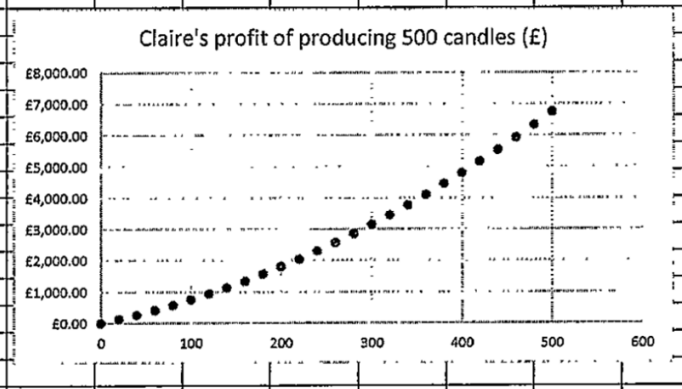
max volume = b × h × l = 7.14 × 3 × 4 = 85.68

min volume = 6.86 × 3 × 4 = 82.32

Candidate 10

X844/76/01 **Question 5(a)**

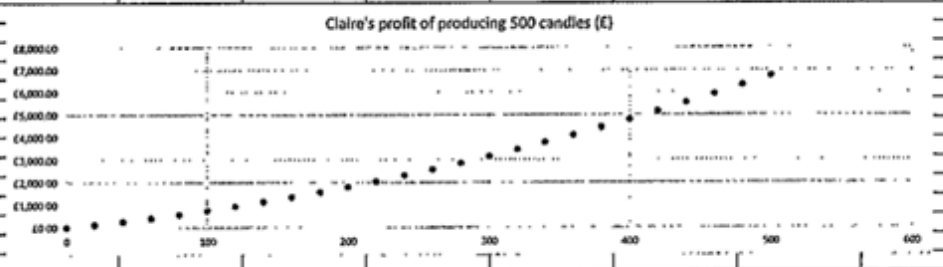
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		Name:												
2		SCN:												
3		Centre name:												
4														
5		Candle Profit Prediction												
6														
7		selling price per candle (s)	£9											
8		cost to produce each candle (c)	£3											
9														
10		Number of candles (x)	Profit (£)											
11		0	£0.00											
12		20	£126.00											
13		40	£264.00											
14		60	£414.00											
15		80	£576.00											
16		100	£750.00											
17		120	£936.00											
18		140	£1,134.00											
19		160	£1,344.00											
20		180	£1,566.00											
21		200	£1,800.00											
22		220	£2,046.00											
23		240	£2,304.00											
24		260	£2,574.00											
25		280	£2,856.00											
26		300	£3,150.00											
27		320	£3,456.00											
28		340	£3,774.00											
29		360	£4,104.00											
30		380	£4,446.00											
31		400	£4,800.00											
32		420	£5,166.00											
33		440	£5,544.00											
34		460	£5,934.00											
35		480	£6,336.00											
36		500	£6,750.00											



X844/76/01

Question 5(a)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		Name:												
2		SCN:												
3		Centre name:												
4														
5		Candle Profit Prediction												
6														
7		selling price per candle (r)	9											
8		cost to produce each candle (c)	3											
9														
10		Number of candles (r)	Profit (£)											
11		0	=B11*2*0.015-B11*(SC$8-SC$7)											
12		20	=B12*2*0.015-B12*(SC$8-SC$7)											
13		40	=B13*2*0.015-B13*(SC$8-SC$7)											
14		60	=B14*2*0.015-B14*(SC$8-SC$7)											
15		80	=B15*2*0.015-B15*(SC$8-SC$7)											
16		100	=B16*2*0.015-B16*(SC$8-SC$7)											
17		120	=B17*2*0.015-B17*(SC$8-SC$7)											
18		140	=B18*2*0.015-B18*(SC$8-SC$7)											
19		160	=B19*2*0.015-B19*(SC$8-SC$7)											
20		180	=B20*2*0.015-B20*(SC$8-SC$7)											
21		200	=B21*2*0.015-B21*(SC$8-SC$7)											
22		220	=B22*2*0.015-B22*(SC$8-SC$7)											
23		240	=B23*2*0.015-B23*(SC$8-SC$7)											
24		260	=B24*2*0.015-B24*(SC$8-SC$7)											
25		280	=B25*2*0.015-B25*(SC$8-SC$7)											
26		300	=B26*2*0.015-B26*(SC$8-SC$7)											
27		320	=B27*2*0.015-B27*(SC$8-SC$7)											
28		340	=B28*2*0.015-B28*(SC$8-SC$7)											
29		360	=B29*2*0.015-B29*(SC$8-SC$7)											
30		380	=B30*2*0.015-B30*(SC$8-SC$7)											
31		400	=B31*2*0.015-B31*(SC$8-SC$7)											
32		420	=B32*2*0.015-B32*(SC$8-SC$7)											
33		440	=B33*2*0.015-B33*(SC$8-SC$7)											
34		460	=B34*2*0.015-B34*(SC$8-SC$7)											
35		480	=B35*2*0.015-B35*(SC$8-SC$7)											
36		500	=B36*2*0.015-B36*(SC$8-SC$7)											



5. (continued) MARKS

(b) (i) State the type of model Claire is using. 1

a graph of her profit

(ii) Explain what the graph shows when Claire produces and sells more than 400 candles. 1

the graph shows her profit increasing up

(iii) State how many candles Claire should produce and sell to maximise her profit. 1

until her profit stops increasing

1000 candles

To produce each candle, Claire pours wax into a mould in the shape of a cuboid.

Each mould has a length of exactly 3 centimetres and a breadth of exactly 4 centimetres.

Claire pours the wax to a height of 7 centimetres with a relative error of 2%.

(c) Calculate the absolute error of the volume of the candle. 2

L=3 B=4 H=7

V= LxBxh
= 3x4x7
= 84cm^3

2% of 84 = 1.68

84+1.68 = 85.68

84-1.68 = 82.32

Question 6

Candidate 11

6. Natasha opens a savings account.

The **annual** effective rate of interest for this savings account is 1.5%.

Interest is paid at the end of each month.

(a) Calculate the monthly effective rate of interest. 1

$((1+\frac{r}{100})^{\frac{1}{12}}-1)(\times 100)$

0.015×12

$= 0.18$

Natasha will make an initial deposit of £1000 into this savings account on the first day of July.

One month later, and every month after that, she will deposit £150 on the first day of each month.

(b) Complete the savings schedule to calculate Natasha's savings account balance immediately after making her second deposit. 2

Time (months)	Interest earned (£)	Deposit (£)	Balance (£)
0			1000
1	1018	150	1168
2	1189.02	150	1339.02

Space for working if required

$1000 +$

$1.018 \times 1000 = 1018$

$1.018 \times 1168 = 1189.024$

Candidate 12

6. Natasha opens a savings account.

The **annual** effective rate of interest for this savings account is 1.5%.

Interest is paid at the end of each month.

(a) Calculate the monthly effective rate of interest. **1**

100 − 1.5 = 98.5

98.5 ÷ 100 = 0.985

Natasha will make an initial deposit of £1000 into this savings account on the first day of July.

One month later, and every month after that, she will deposit £150 on the first day of each month.

(b) Complete the savings schedule to calculate Natasha's savings account balance immediately after making her second deposit. **2**

Time (months)	Interest earned (£)	Deposit (£)	Balance (£)
0			1000
1		985	15
2			

Space for working if required

0.985 × 1000

1985 − 1000

1000 − 0.15%

Question 7

Candidate 13

7. A university student wants to answer the following research question:

'Is there a significant difference in the mean time taken to run 100 metres between pupils aged 10 and pupils aged 12?'

The university student selects a random sample of pupils aged 10 and 12.

They then record how long each pupil takes to run 100 metres.

(a) (i) State an appropriate hypothesis test to investigate the research question. 1

~~Box plot~~ Scattergraph

(ii) State the null and alternative hypotheses. 1

H_0: There is no statistically significant difference in the mean time taken to run 100 metres between pupils aged 10 and pupils aged 12.

H_1: There is a statistically significant difference in the mean time taken to run 100 metres between pupils aged 10 and pupils aged 12.

The hypothesis test was performed and generated a p-value of 0.072.

(b) Interpret the p-value, and the result of the hypothesis test, in context. 2

as the pvalue is more than 0·05, we fail to reject the null hypothesis and we can conclude that there is not a statistically significant difference in the mean time taken to run 100 metres between pupils aged 10 and pupils aged 12.

Candidate 14

7. A university student wants to answer the following research question:

'Is there a significant difference in the mean time taken to run 100 metres between pupils aged 10 and pupils aged 12?'

The university student selects a random sample of pupils aged 10 and 12.

They then record how long each pupil takes to run 100 metres.

(a) (i) State an appropriate hypothesis test to investigate the research question. 1

My hypothesis is that there is a difference between children aged 10 to 12 for their 100meter sprint times.

(ii) State the null and alternative hypotheses. 1

Null: There is NO difference between pupils aged 10 to 12 for their 100 meter sprint times.

alt: there is a difference between pupils aged 10 to 12 for their 100 meter sprint times.

The hypothesis test was performed and generated a p-value of 0.072.

(b) Interpret the p-value, and the result of the hypothesis test, in context. 2

due to the P-value being grater than 0.05 we will fail to reject null hypothesis meaning there is a difference in sprint times for the 100 meter for kids aged from 10 to 12 years old.

Candidate 15

8. You must refer to the information on 'Deductions from salaries' and 'Mortgage products and affordability' given in the pre-release material when answering this question.

You must refer to the spreadsheet file 'Q8 Janet's Mortgage.xlsx' when answering this question.

You must complete part (b) using the spreadsheet file.

Parts (a) and (c) must be completed in the answer space provided.

Janet's gross annual salary is £32,100.

She contributes 3% of her salary before tax into her pension fund.

Janet pays £130.16 in National Insurance each month.

(a) Calculate Janet's net monthly income. **4**

3% of £32,100 = £963

32,100 - 963 = 31137 - 130.16 = £31,006.84

0% of (12,570) = £0

19% of (15,397 - 12,570) = £537.13

20% of (27,491 - 15,397) = £2418.80 +

21% of (31,006.84 - 27,491) = £738.33

£3694.26 ÷ 12

= £307.86

Question 8(b)

	A	B	C	D	E	F
1		Name:				
2		SCN:				
3		Centre Name:				
4						
5		**Mortgage repayment schedule**				
6						
7		Initial loan amount	£ 98,000.00			
8		Annual effective interest rate	5.40%			
9		Monthly effective interest rate	0.44%			
10		Loan period (months)	24			
11		Monthly repayment	- 3,862.92			
12						
13						
14		**Time (months)**	**Repayment (£)**	**Interest content of repayment (£)**	**Capital content of repayment (£)**	**Mortgage outstanding (£)**
15		0				98,000.00
16		1	- 3,862.92	430.45	4,293.37	93,706.63
17		2	- 3,862.92	411.59	4,274.51	89,432.12
18		3	- 3,862.92	392.81	4,255.73	85,176.39
19		4	- 3,862.92	374.12	4,237.04	80,939.35
20		5	- 3,862.92	355.51	4,218.43	76,720.92
21		6	- 3,862.92	336.98	4,199.90	72,521.02
22		7	- 3,862.92	318.54	4,181.46	68,339.56
23		8	- 3,862.92	300.17	4,163.09	64,176.47
24		9	- 3,862.92	281.88	4,144.80	60,031.67
25		10	- 3,862.92	263.68	4,126.60	55,905.07
26		11	- 3,862.92	245.55	4,108.47	51,796.60

Question 8(b)

	A	B	C	D	E	F
1		Name:				
2		SCN:				
3		Centre Name:				
4						
5		Mortgage repayment schedule				
6						
27		12	- 3,862.92	227.51	4,090.43	47,706.17
28		13	- 3,862.92	209.54	4,072.46	43,633.71
29		14	- 3,862.92	191.65	4,054.57	39,579.14
30		15	- 3,862.92	173.84	4,036.76	35,542.38
31		16	- 3,862.92	156.11	4,019.03	31,523.35
32		17	- 3,862.92	138.46	4,001.38	27,521.97
33		18	- 3,862.92	120.89	3,983.81	23,538.16
34		19	- 3,862.92	103.39	3,966.31	19,571.85
35		20	- 3,862.92	85.97	3,948.89	15,622.96
36		21	- 3,862.92	68.62	3,931.54	11,691.42
37		22	- 3,862.92	51.35	3,914.27	7,777.15
38		23	- 3,862.92	34.16	3,897.08	3,880.07
39		24	- 3,863.03	17.04	3,880.07	0.00

Question 8(b)

	A	B	C	D	E	F
1		Name:				
2		SCN:				
3		Centre Name:				
4						
5		Mortgage repayment schedule				
6						
7		Initial loan amount	98000			
8		Annual effective interest rate	0.054			
9		Monthly effective interest rate	=(1+$C$8)^(1/12)-1			
10		Loan period (months)	24			
11		Monthly repayment	-3862.92			
12						
13						
14		Time (months)	Repayment (£)	Interest content of repayment (£)	Capital content of repayment (£)	Mortgage outstanding (£)
15		0				=C7
16		1	=$C$11	=ROUND(F15*$C$9,2)	=D16-C16	=F15-E16
17		2	=$C$11	=ROUND(F16*$C$9,2)	=D17-C17	=F16-E17
18		3	=$C$11	=ROUND(F17*$C$9,2)	=D18-C18	=F17-E18
19		4	=$C$11	=ROUND(F18*$C$9,2)	=D19-C19	=F18-E19
20		5	=$C$11	=ROUND(F19*$C$9,2)	=D20-C20	=F19-E20
21		6	=$C$11	=ROUND(F20*$C$9,2)	=D21-C21	=F20-E21
22		7	=$C$11	=ROUND(F21*$C$9,2)	=D22-C22	=F21-E22
23		8	=$C$11	=ROUND(F22*$C$9,2)	=D23-C23	=F22-E23
24		9	=$C$11	=ROUND(F23*$C$9,2)	=D24-C24	=F23-E24
25		10	=$C$11	=ROUND(F24*$C$9,2)	=D25-C25	=F24-E25
26		11	=$C$11	=ROUND(F25*$C$9,2)	=D26-C26	=F25-E26
27		12	=$C$11	=ROUND(F26*$C$9,2)	=D27-C27	=F26-E27
28		13	=$C$11	=ROUND(F27*$C$9,2)	=D28-C28	=F27-E28
29		14	=$C$11	=ROUND(F28*$C$9,2)	=D29-C29	=F28-E29
30		15	=$C$11	=ROUND(F29*$C$9,2)	=D30-C30	=F29-E30
31		16	=$C$11	=ROUND(F30*$C$9,2)	=D31-C31	=F30-E31
32		17	=$C$11	=ROUND(F31*$C$9,2)	=D32-C32	=F31-E32
33		18	=$C$11	=ROUND(F32*$C$9,2)	=D33-C33	=F32-E33
34		19	=$C$11	=ROUND(F33*$C$9,2)	=D34-C34	=F33-E34
35		20	=$C$11	=ROUND(F34*$C$9,2)	=D35-C35	=F34-E35
36		21	=$C$11	=ROUND(F35*$C$9,2)	=D36-C36	=F35-E36
37		22	=$C$11	=ROUND(F36*$C$9,2)	=D37-C37	=F36-E37
38		23	=$C$11	=ROUND(F37*$C$9,2)	=D38-C38	=F37-E38
39		24	=$C$11-0.11	=ROUND(F38*$C$9,2)	=D39-C39	=F38-E39

Candidate 16

8. You must refer to the information on 'Deductions from salaries' and 'Mortgage products and affordability' given in the pre-release material when answering this question.

You must refer to the spreadsheet file 'Q8 Janet's Mortgage.xlsx' when answering this question.

You must complete part (b) using the spreadsheet file.

Parts (a) and (c) must be completed in the answer space provided.

Janet's gross annual salary is £32,100.

She contributes 3% of her salary before tax into her pension fund.

Janet pays £130.16 in National Insurance each month.

(a) Calculate Janet's net monthly income. **4**

NI
130.16 per month
12 × 130.16 = 1561.92 a year

Pension
3% of 32100 =
0.03 × 32100 = £963

Taxable income
32100 − 963 = £31137

Tax
0.19(15397 − 12570) + 0.2(27491 − 15397)
+ 0.21(31137 − 27491) = £3721.59

Annual
32100 − 1561.92 − 963 − 3721.59
= £25853.49

Monthly
25853.49 ÷ 12 = £2154.46

Question 8(b)

	A	B	C	D	E	F
1		Name:				
2		SCN:				
3		Centre Name:				
4						
5		Mortgage repayment schedule				
6						
7		Initial loan amount	98000			
8		Annual effective interest rate	0.054			
9		Monthly effective interest rate	=(1+C8)^(1/12)-1			
10		Loan period (months)	24			
11		Monthly repayment	211.4			
12						
13						
14		Time (months)	Repayment (£)	Interest content of repayment (£)	Capital content of repayment (£)	Mortgage outstanding (£)
15		0				=C7
16		1	=$C$11	=ROUND(F15*$C$9,2)	=D16-C16	=F15-E16
17		2	=$C$11	=ROUND(F16*$C$9,2)	=D17-C17	=F16-E17
18		3	=$C$11	=ROUND(F17*$C$9,2)	=D18-C18	=F17-E18
19		4	=$C$11	=ROUND(F18*$C$9,2)	=D19-C19	=F18-E19
20		5	=$C$11	=ROUND(F19*$C$9,2)	=D20-C20	=F19-E20
21		6	=$C$11	=ROUND(F20*$C$9,2)	=D21-C21	=F20-E21
22		7	=$C$11	=ROUND(F21*$C$9,2)	=D22-C22	=F21-E22
23		8	=$C$11	=ROUND(F22*$C$9,2)	=D23-C23	=F22-E23
24		9	=$C$11	=ROUND(F23*$C$9,2)	=D24-C24	=F23-E24
25		10	=$C$11	=ROUND(F24*$C$9,2)	=D25-C25	=F24-E25
26		11	=$C$11	=ROUND(F25*$C$9,2)	=D26-C26	=F25-E26
27		12	=$C$11	=ROUND(F26*$C$9,2)	=D27-C27	=F26-E27
28		13	=$C$11	=ROUND(F27*$C$9,2)	=D28-C28	=F27-E28
29		14	=$C$11	=ROUND(F28*$C$9,2)	=D29-C29	=F28-E29
30		15	=$C$11	=ROUND(F29*$C$9,2)	=D30-C30	=F29-E30
31		16	=$C$11	=ROUND(F30*$C$9,2)	=D31-C31	=F30-E31
32		17	=$C$11	=ROUND(F31*$C$9,2)	=D32-C32	=F31-E32
33		18	=$C$11	=ROUND(F32*$C$9,2)	=D33-C33	=F32-E33
34		19	=$C$11	=ROUND(F33*$C$9,2)	=D34-C34	=F33-E34
35		20	=$C$11	=ROUND(F34*$C$9,2)	=D35-C35	=F34-E35
36		21	=$C$11	=ROUND(F35*$C$9,2)	=D36-C36	=F35-E36
37		22	=$C$11	=ROUND(F36*$C$9,2)	=D37-C37	=F36-E37
38		23	=$C$11	=ROUND(F37*$C$9,2)	=D38-C38	=F37-E38
39		24	=$C$11-0.04	=ROUND(F38*$C$9,2)	=D39-C39	=F38-E39

Question 8(b)

	A	B	C	D	E	F
1		Name:				
2		SCN:				
3		Centre Name:				
4						
5		Mortgage repayment schedule				
6						
7		Initial loan amount	£ 98,000.00			
8		Annual effective interest rate	5.40%			
9		Monthly effective interest rate	0.44%			
10		Loan period (months)	24			
11		Monthly repayment	211.40			
12						
13						
14		Time (months)	Repayment (£)	Interest content of repayment (£)	Capital content of repayment (£)	Mortgage outstanding (£)
15		0				98,000.00
16		1	211.40	430.45	219.05	97,780.95
17		2	211.40	429.49	218.09	97,562.86
18		3	211.40	428.53	217.13	97,345.73
19		4	211.40	427.57	216.17	97,129.56
20		5	211.40	426.62	215.22	96,914.34
21		6	211.40	425.68	214.28	96,700.06
22		7	211.40	424.74	213.34	96,486.72
23		8	211.40	423.80	212.40	96,274.32
24		9	211.40	422.87	211.47	96,062.85
25		10	211.40	421.94	210.54	95,852.31
26		11	211.40	421.01	209.61	95,642.70

Question 8(b)

	A	B	C	D	E	F
1		Name:				
2		SCN:				
3		Centre Name:				
4						
5		Mortgage repayment schedule				
6						
27		12	211.40	420.09	208.69	95,434.01
28		13	211.40	419.18	207.78	95,226.23
29		14	211.40	418.26	206.86	95,019.37
30		15	211.40	417.36	205.96	94,813.41
31		16	211.40	416.45	205.05	94,608.36
32		17	211.40	415.55	204.15	94,404.21
33		18	211.40	414.65	203.25	94,200.96
34		19	211.40	413.76	202.36	93,998.60
35		20	211.40	412.87	201.47	93,797.13
36		21	211.40	411.99	200.59	93,596.54
37		22	211.40	411.11	199.71	93,396.83
38		23	211.40	410.23	198.83	93,198.00
39		24	211.36	409.36	198.00	93,000.00

8. (continued)

Janet is applying for a mortgage of £98,000.

Level repayments would be made at the end of every month.

The fixed annual effective rate of interest would be 5.4% for the first two years.

Janet would like her mortgage balance to be **no more than £93,000** at the end of the fixed rate period so that she can reduce her loan-to-value ratio.

Open the 'Mortgage' worksheet.

(b) Complete the 'Mortgage repayment schedule' to determine the minimum level monthly repayment amount required. **4**

(c) Determine whether Janet's mortgage lender would consider this amount affordable.

Give a reason for your answer. **1**

monthly
28% of 2594.75 = 0.28×2594.72 = £726.52
30737÷12 = 2594.75

98000 − 93000 = 5000 − yes as
she meets
the 28/36 rule.

Print the 'Mortgage' worksheet in value view and formula view.

Question 9

Candidate 17

9. A company has won a contract to manufacture and deliver flooring to a new housing development.

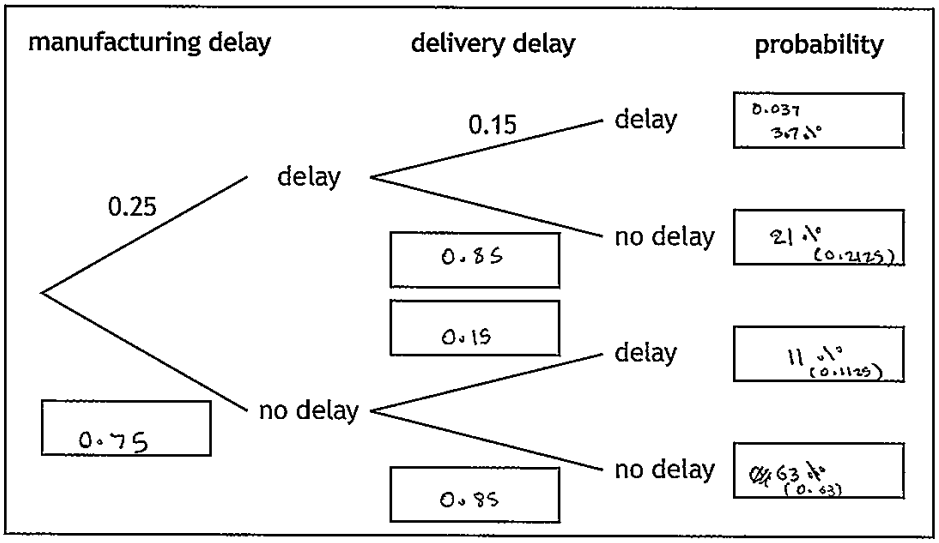
If they fail to supply the flooring on time, they will have to pay a penalty of £120,000.

Two reasons for a possible delay have been identified:

- Manufacturing delay — there is a 0.25 probability that there is a delay in the manufacture of the flooring.
- Delivery delay — there is a 0.15 probability that there is a delay while the company deliver the flooring.

(a) (i) Calculate the missing probabilities and complete the tree diagram. 2

(An additional diagram, if required, can be found on *page 21*.)



(ii) Determine the probability that one or both of these delays will happen. 1

0.362 (36.2 %

0.1125 + 0.2175 + 0.037 = 0.367

(iii) Hence, calculate the expected cost of a delay. 1

0.367 × 120000 = £44040

9. (continued)

The company is considering using the following control measures:

- Control measure 1 — hire additional staff to help manufacture the flooring at an additional cost of £20,000.
- Control measure 2 — hire an external delivery company to help deliver the flooring at a cost of £12,500.

(b) Calculate the expected cost of delay using:

(i) only control measure 1 1

£120000 × 0.15 + 2000 = £38000

(ii) only control measure 2. 1

£120,000 × 0.25 + £125000 = £42500

The company decides to use both control measures.

(c) Based on your calculations, explain why the company decided to use both control measures. 1

Because £32500 (£12500 + £20000)
is cheaper than the cost of any delay happening
even if one control measure is taken

£32500 < £38000 < £42500 < £44040

[Turn over

Candidate 18

9. A company has won a contract to manufacture and deliver flooring to a new housing development.

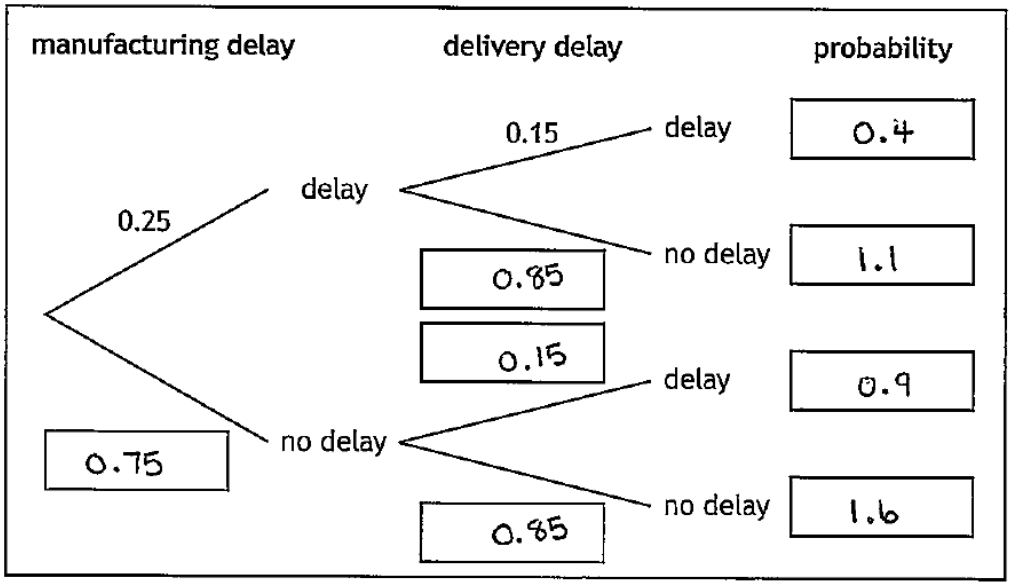
If they fail to supply the flooring on time, they will have to pay a penalty of £120,000.

Two reasons for a possible delay have been identified:

- Manufacturing delay — there is a 0.25 probability that there is a delay in the manufacture of the flooring.
- Delivery delay — there is a 0.15 probability that there is a delay while the company deliver the flooring.

(a) (i) Calculate the missing probabilities and complete the tree diagram. 2

(An additional diagram, if required, can be found on *page 21*.)



(ii) Determine the probability that one or both of these delays will happen. 1

0.4 + 0.9 = 1.3

(iii) Hence, calculate the expected cost of a delay. 1

120000 × 1/8 0.5
= £60000

9. (continued)

The company is considering using the following control measures:

- Control measure 1 — hire additional staff to help manufacture the flooring at an additional cost of £20,000.
- Control measure 2 — hire an external delivery company to help deliver the flooring at a cost of £12,500.

(b) Calculate the expected cost of delay using:

(i) only control measure 1 **1**

120000 + (12500 × 0.25)
= £123,125

(ii) only control measure 2. **1**

120000 + (20000 × 0.15)
= £123000

The company decides to use both control measures.

(c) Based on your calculations, explain why the company decided to use both control measures. **1**

Due to the costs of the control measures being very similar in price meaning its a better value for money.

Question 10

Candidate 19

10. Deirdre bought a van using a finance deal. As part of the deal, she must make a final lump sum payment.

The lump sum payment of £8175 is due in three years' time.

To budget for this payment, Deirdre will make a single deposit into a savings account with an annual effective rate of interest of 7.1%.

(a) Calculate the minimum amount Deirdre must deposit to ensure she has accumulated at least £8175 when the lump sum payment is due. **2**

$= \frac{8175}{1.071^3} = £6654.56$

$8175 - 6654.56$

$= £1502.44$

In June 2021, when Deirdre bought the van, the Consumer Price Index (CPI) was 111.4.

After three years, the CPI was 133.0.

(b) Determine whether Deirdre's savings have increased at least in line with inflation. Give a reason for your answer. **2**

$= \frac{8175}{111.4} = 73.38\%$

$\rightarrow \frac{6654.56}{133} = 50\%$

no, as $73.38 > 50\%$.

10. (continued)

Deirdre's insurance policy has a £195 excess for accidental damage.

Her van door is damaged in an accident.

A company has quoted £210 to repair the damage.

(c) Give one reason why Deirdre might not choose to make a claim on her insurance. 1

to save money on higher interest rates. the company may offer discounts

[Turn over

Candidate 20

10. Deirdre bought a van using a finance deal. As part of the deal, she must make a final lump sum payment.

The lump sum payment of £8175 is due in three years' time.

To budget for this payment, Deirdre will make a single deposit into a savings account with an annual effective rate of interest of 7.1%.

(a) Calculate the minimum amount Deirdre must deposit to ensure she has accumulated at least £8175 when the lump sum payment is due. 2

$P \times 1.071^{3/12} = 8175$

$8175 \div 1.071^{3/12} = £8036.01$

$8175 - 8036.01 = £138.99$

multiplier =

$100 + 7.1 = 107.1$

$107.1 \div 100 = 1.071$

In June 2021, when Deirdre bought the van, the Consumer Price Index (CPI) was 111.4.

After three years, the CPI was 133.0.

(b) Determine whether Deirdre's savings have increased at least in line with inflation. Give a reason for your answer. 2

$\frac{111.4}{133.0}$

No as $138.99 > 133.0$

10. (continued)

Deirdre's insurance policy has a £195 excess for accidental damage.

Her van door is damaged in an accident.

A company has quoted £210 to repair the damage.

(c) Give one reason why Deirdre might not choose to make a claim on her insurance. 1

As she won't be making much money from it and could use the policy for other damages which are cheaper.

Question 11

Candidate 21

11. You must refer to the information on 'Honeybees' given in the pre-release material when answering this question.

Each year the National Hive Count takes place. During the count, all UK beekeepers are asked to submit the number of honeybee hives they own.

The following data was collected:

Year	Number of honeybee hives
2019	264 000
2020	260 000
2021	272 631
2022	288 311

(a) State one reason why the data might misrepresent the number of honeybee hives in the UK. **1**

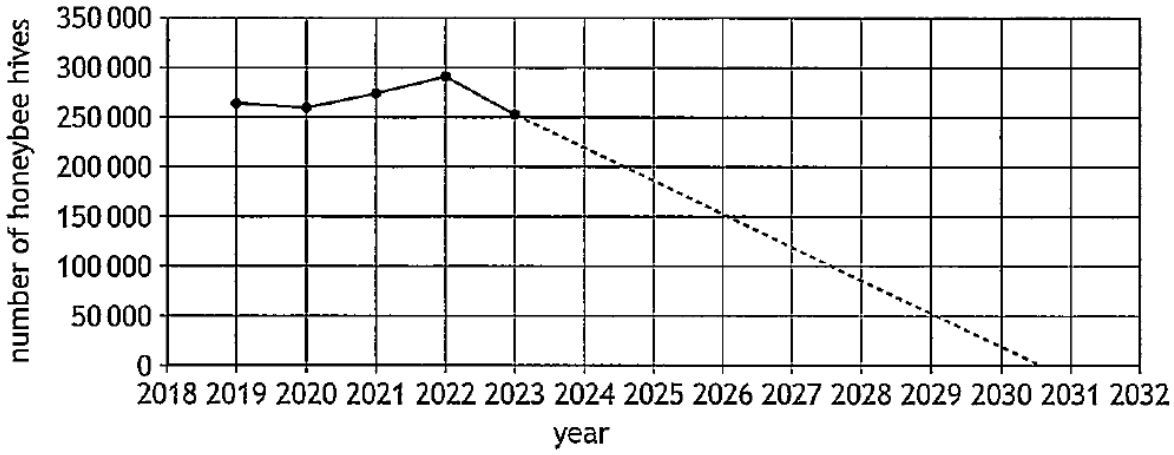
honeybees only live for 6 weeks so the number of hives may have fluctuated throughout the year.

11. (continued) MARKS

From 2022 to 2023 there was a decline of approximately 36 000 beehives.

A newspaper published this graph with the headline:

'NO honeybees in UK by 2031!'



(b) Explain why the headline may be unrealistic. 1

36000 is too specific - impossible to know exact amount of beehives in UK

It takes approximately 17 000 honeybees one month to produce one jar of honey.

(c) Estimate the **weight** of honey produced in the UK in 2022.

State any assumptions you have made. 3

288311 ÷ 17000
= 16·96
1·41 × 12
= 16·92 jars of honey produced in 2022.

288311 × 100.000 = 2·88 × 10^10 bees
÷ 17000 = 1695947·059 jars of honey

288311 ÷ 12
= 24025·92 honeybees per month
24025·92 ÷ 17000
= 1·41 jars of honey per month

Candidate 22

11. You must refer to the information on 'Honeybees' given in the pre-release material when answering this question.

Each year the National Hive Count takes place. During the count, all UK beekeepers are asked to submit the number of honeybee hives they own.

The following data was collected:

Year	Number of honeybee hives
2019	264 000
2020	260 000
2021	272 631
2022	288 311

(a) State one reason why the data might misrepresent the number of honeybee hives in the UK. 1

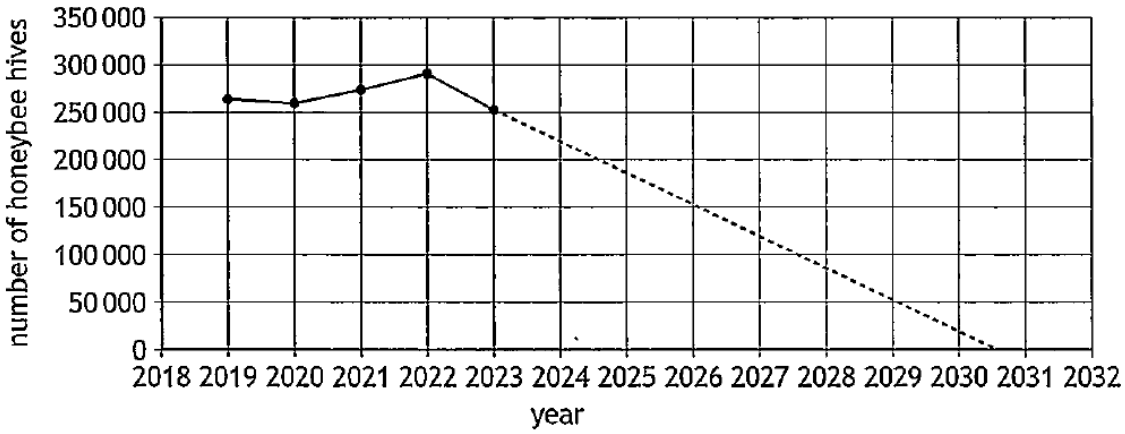
because there could be more wild honeybeehives that aren't owned by anyone but aren't taken into consideration

11. (continued) **MARKS**

From 2022 to 2023 there was a decline of approximately 36 000 beehives.

A newspaper published this graph with the headline:

'NO honeybees in UK by 2031!'



(b) Explain why the headline may be unrealistic. 1

Because it doesn't say "expected" and we can't be 100% sure of the number of honeybee hives in 2031, so it should say "expected" or "predicted"

It takes approximately 17 000 honeybees one month to produce one jar of honey.

(c) Estimate the **weight** of honey produced in the UK in 2022.

State any assumptions you have made. 3

- 1 jar = 1 kg
- 1 jar every month of the year
- 34 000 honeybees
- 12 months in a year

=24kg of honey per year.