Applications of Mathematics PRACTICE Test

Part 1

Candidate's name: _ANSWERS_

Read carefully

1. **You may NOT use a calculator.**

2. Attempt all questions.

3. Show appropriate working.

4. You have approximately 20 minutes to complete Part 1.

5. State units in your answer where appropriate.

Attempt ALL questions.	R	O

1. Muhammad buys a laptop computer which costs £537·99.

He also buys an internet security package which costs £39·99.

He has budgeted £600 to buy both of these.

How much money does he have left?

| | 2 | 1 |

$$537.99$$
$$+ \quad 39.99$$
$$£577.98$$

$$£600 - £577.98 = £22.02$$

2. Can A has a volume of 440 ml.

Can B holds $\frac{3}{10}$ of this.

How much does can B hold?

| | 2 | 1 |

A   B

$$440 \times \frac{3}{10} = 132\,ml$$

		R	O
3.	A 120 mm **length** of iron bar has a tolerance of ± 1·5 mm. Calculate the maximum and minimum length of the iron bar in millimetres. MAX = 120 + 1·5 = 121·5 mm MIN = 120 − 1·5 = 118·5 mm		1
4.	Ali wants to deposit £1800 in a bank for 1 year. The Independent Bank pays no interest but gives a £100 bonus on new accounts. The Free Bank pays interest of 3% per year. Based on your calculations, which bank should Ali choose? Give a reason for your answer.	2	1

INDEPENDENT BANK

£1800 + £100 = £1900

FREE BANK

$1800 + 1800 \times \dfrac{3}{100}$

= 1800 + 54 = £1854

ALI SHOULD USE INDEPENT
SINCE £1900 > £1854

		R	O

5. The same carton of milk in six different shops costs:

£0·90, £0·89, £0·82, £0·79, £0·81, £0·75.

Calculate the mean cost of the carton of milk.

Give your answer to the nearest penny.

$$MEAN = \frac{0.9 + 0.89 + 0.82 + 0.79 + 0.81 + 0.75}{6}$$

$$= \frac{4.96}{6}$$

$$= 0.8266$$

$$= £0.83 = 83p$$

R	O
2	2

[End of Part 1 of the Test]

Applications of Mathematics PRACTICE Test

Part 2

Candidate's name: _ANSWERS_

Read carefully

1. **You may use a calculator.**

2. Attempt all questions.

3. Show appropriate working.

4. You have approximately 40 minutes to complete Part 2.

5. State units in your answer where appropriate.

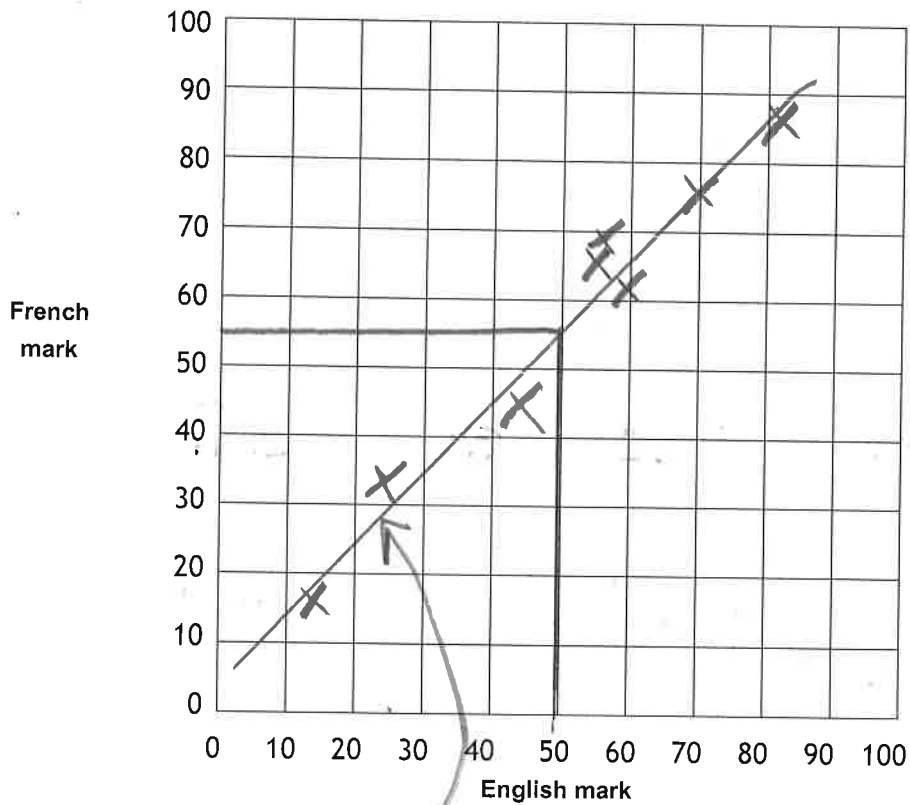1. . The table below shows the marks scored by eight pupils in an English assessment and a French assessment.

Pupil	A	B	C	D	E	F	G	H
English	26	15	56	60	83	57	45	70
French	31	17	65	61	88	68	45	77

a   Use these marks to draw a scatter diagram.

English and French assessment results

b   Draw a line of best fit.

c   A pupil who missed her French assessment scored 50 in her English assessment.

Use your line of best fit to predict her French mark.

55% FRENCH

2. Eden Primary School organised a Coffee Morning to raise funds for charity.

◆ 95 tickets were sold at £1·30 each
◆ 30 books of raffle tickets were sold at £1·25 each

Items bought by the club are shown below:

Item	Cost
1 box of raffle tickets	£3·50
Tea	£6·40
Coffee	£9·55
Milk and sugar	£13·50

a. Use the above information about income and expenditure to complete the Financial Statement below:

Financial Statement

95 × 1·30
30 × 1·25

	INCOME		EXPENDITURE	
Item	Amount (£)	Item	Amount (£)
TICKES	£123·50	RTicke	3·50
BOOKS	37·50	TEA	6·40
		COFFEE	9·55
		M&S	13·50
Total Income	£161	Total Expenditure	£32·95

1 3

b. Overall, did the Coffee Morning raise money for charity?

Give a reason for your answer.

YES
MADE
£128·05

$\left(\begin{array}{l} 161 - 32·95 \\ = £128·05 \end{array} \right)$

1 1

3. Shaheen works in a factory. Her payslip for one week is shown below. The payslip is only partially complete.

Name	Employee No	Week	NI Number
Shaheen Ahmed	0031	09	ZT969152C

Basic Pay	**Overtime Pay**	Bonus	**Gross Pay**
£320	£60	£75	455

National Insurance	Income Tax	Pension	**Total Deductions**
£54·60	+ £59·83	+ £18·20	= 132·63

			Net Pay
			£ 332·87

Her rate of pay is £8 per hour.

When she works overtime she is paid time and a half.

a Calculate her **Overtime Pay** for the week if she works 5 hours overtime.

$$OT \, PAY = 8 \times 1.5 \times 5$$
$$= £60$$

b Calculate Shaheen's Net Pay.

£ 332·87

4. The table below can be used to find the cost of road tax (Vehicle Excise Duty) based on the CO₂ emissions of a car.

12-month Vehicle Excise Duty (VED) rates for cars registered since 1st March 2001

VED Band	Vehicle CO2 emissions	Standard rate Petrol/Diesel 2012-2013	First year rate Petrol/Diesel 2012-2013	Standard rate Green car 2012-2013	First year rate Green car 2012-2013
A	Up to 100 g/km	£0	£0	£0	£0
B	101-110 g/km	£20	£0	£10	£0
C	111-120 g/km	£30	£0	£20	£0
D	121-130 g/km	£100	£0	£90	£0
E	131-140 g/km	£120	£120	£110	£110
F	141-150 g/km	£135	£135	£125	£125
G	151-165 g/km	£170	£170	£160	£160
H	166-175 g/km	£195	£275	£185	£265
I	176-185 g/km	£215	£325	£205	£315
J	186-200 g/km	£250	£460	£240	£450
K	201-225 g/km	£270	£600	£260	£590
L	226-255 g/km	£460	£815	£450	£810
M	Over 255 g/km	£475	£1030	£465	£1020

Lewis owns a car which uses petrol.
It has CO₂ emissions of 174 g/km.
He pays road tax of £195.

His wife Anne owns a Green car. Their **total** road tax bill for the year 2012-13 is £645.

If Anne pays her road tax at the first year rate, how much road tax did she pay?

What is the VED Band of Anne's car?

- ANNE PAYS 645 – 195 = £450
- VED BAND = J

5. Susan goes on holiday to Canada with 500 Canadian Dollars.

She spends 405 Canadian Dollars during her holiday.

After her holiday is over, she wants to change the remaining Canadian Dollars to British Pounds.

At her local bank, she is told that the exchange rate is £1 = 1·60 Canadian Dollars. The bank charges commission of 2%.

How much will she receive?
Give your answer to the nearest penny.

LEFT OVER = 500 - 405 = 95 CD

$$
\begin{array}{ll}
C.D. & £ \\
\$ 1·60 \longrightarrow £1 \\
\$ 1 \longrightarrow \dfrac{1}{1·60} = £0·625 \\
£ 95 \longrightarrow 0·625 \times 95 \\
 = £59·38 \\
\end{array}
$$

2% of 59·38

$$= \dfrac{2}{100} \times 59·38 = \underline{1·19}$$

RECEIVES 59.38 - 1.19 = £58·19

	R	O

6. Kirsten is in Paris on holiday and decides to go on a 'Paris by Night' coach tour.

There is an evening tour and a late night tour.

Both tours run for the **same** length of time. The timetable for both tours is shown below (it is only partially complete).

	Evening Tour	Late Night Tour
Start time	1740	2245
Finish time	2005	0115

} + 2 Hrs 25 min

a What time does the late night tour finish?
Give your answer in 24-hour time.

| 2 | 2 |

17·40 → 1800 = 20·05
= 20 MINS + 2 HRS 5 MINS
= 2 HRS 25 MINS

2245 + 2 HRS 25 MINS = <u>0115</u>

b Kirsten goes on the late night tour. After the tour is over, she returns to her hotel:

- it takes 15 minutes to get to the nearest train station after the tour is over
- Kirsten waits 8 minutes for the train before it leaves
- the train journey takes 10 minutes
- then she walks 10 minutes to her hotel
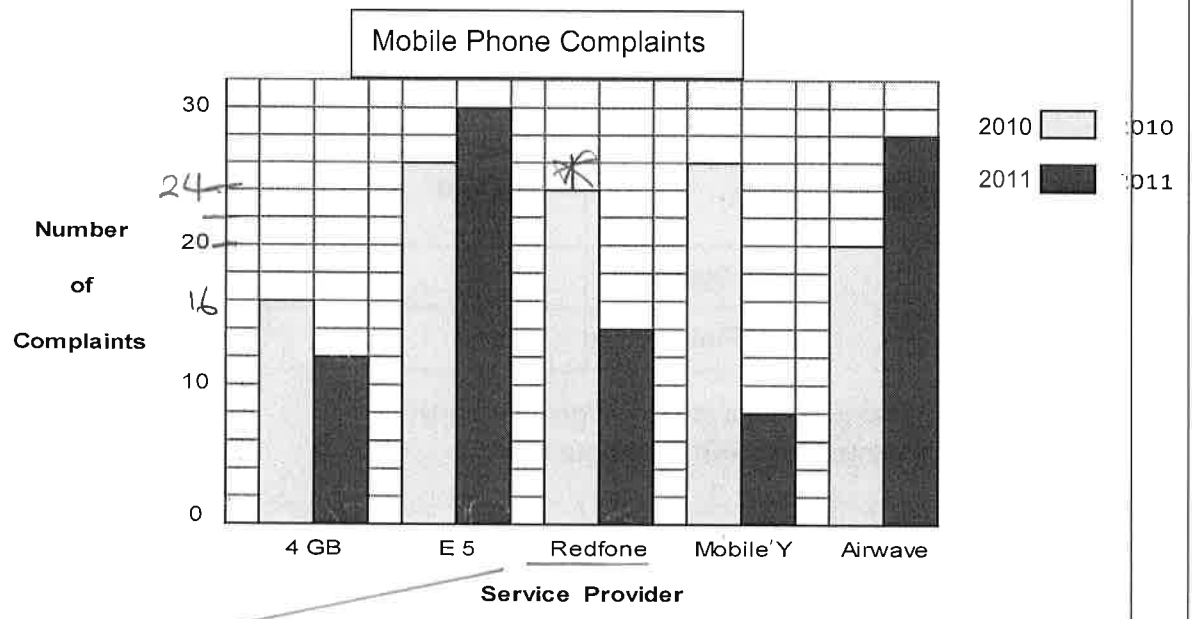
What time will she arrive back at the hotel?

| | 1 |

0115 + 15 + 8 + 10 + 10
= 0115 + 43 min
= <u>0158</u>

	R	O

7. The number of complaints received by mobile phone service providers in 2010 and 2011 from residents in a Scottish town is shown in the diagram below:

Mobile Phone Complaints

Number of Complaints

Service Provider

Legend: 2010, 2011

a In **2010**, **Redfone** found that 2/3 of the complaints they received from this Scottish town related to network coverage issues.

How many complaints related to network coverage issues?

$$2010 \Rightarrow COMPLAINTS = \frac{2}{3} \times 24^{8}$$

$$= 16$$

b In **2010 and 2011**, Aran dealt with **all** the complaints received by **Mobile Y**. Nala dealt with **all** the complaints received by **4 GB**.

How many more complaints did Aran deal with than Nala during these two years?
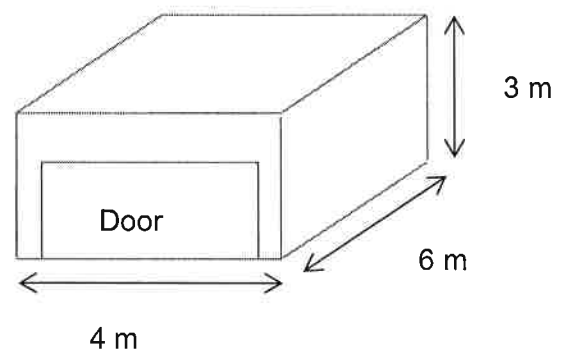
ARAN COMPLAINTS = 26 + 8 = 34

NALA COMPLAINTS = 16 + 12 = 28

DIFFERENCE = 34 - 28 = 6

① ARAN DEALT WITH 6 MORE COMPLAINTS THAN NALA

R values: 1, 3
O value: 1

	R	O

8. Josh's garage is in the shape of a cuboid.

It is 6 metres long, 4 metres broad and 3 metres high.

The door measures 2·5 metres by 3·2 metres.

3 m

Door

6 m

4 m

Josh decides to paint the four inside walls of his garage.

He does not paint over the door.

The paint costs £1·30 per square metre.

Calculate the total cost of the paint required.

$A_{TOTAL} = A_{LHS} + A_{RHS} + A_{BACK} + A_{FRONT}$

$= (6 \times 3) + (6 \times 3)$

$+ (4 \times 3) + [(4 \times 3) - (2.5 \times 3.2)]$

$= 18 + 18 + 12 + [12 - 8]$

$= 48 - 4 = \underline{44 m^2}$

$COST = \dfrac{44}{1.3} = \underline{£33.85}$

3 | **2**