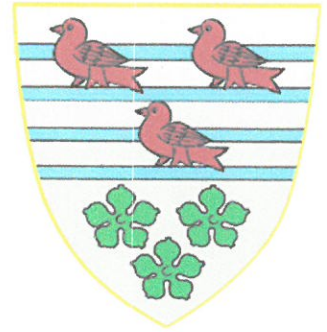# GCSE Numeracy

Calculator Allowed

Intermediate Tier   E   D   C   B

19   30   40   52

Progress Check #1

90 Minutes

Student Name: _____

Question	Topic	Grade	Maximum Mark	Mark Awarded
1	Recipe Scaling	E	3	3
2	Recipe Scaling	E	4	7
3	Evaluating Formula	D	7	14
4	Conversion Graph	D	5	19
5	Best Value	D	6	25
6	Best Value	D	5	30
7	Profit/Loss	C	9	39
8	Profit/Loss	C	7	46
9	Income Tax	C	6	52
10	Averages	E	7	59
11	Mean of Grouped Data	D	4	63
12a	Grouped Frequency Diagram	D	2	65
12b	Estimating Mean	C	4	69
12cd	Modal Median Groups	C	2	71
13	Reverse Mean	B	4	75
14	Reverse Mean	B	5	80

1. The following is a list of ingredients to make 24 scones.

480g flour   80g sultanas   120g margarine
150ml milk   48g sugar   2 pinches of salt

Calculate how much salt, flour and milk would be needed to make 36 scones.

[3]

$36 \div 24 = 1.5$

SALT $2 \times 1.5 = 3$ pinches

Flour $480 \times 1.5 = 720$ g

Milk $150 \times 1.5 = 225$ ml

2. Here is a recipe for spaghetti with a tomato and basil sauce to serve 4 people.

Ingredients to serve 4 people	
For the spaghetti	**For the sauce**
400 g/14 oz plain flour	4 tablespoons olive oil
4 eggs	2 onions
	800 g/28 oz fresh chopped tomatoes
	20 leaves of fresh basil

(a) Complete a version of this recipe to serve 10 people. $10 \div 4 = 2.5$

Ingredients to serve 10 people	
For the spaghetti	**For the sauce**
1000 g/ 35 oz plain flour	10 tablespoons olive oil
10 eggs	5 onions
	2000 g/ 70 oz fresh chopped tomatoes
	50 leaves of fresh basil

[3]

(b) Use the information given in the recipe to complete this statement.

100 g is 3.5 oz

[1]

3. The formula for converting Centigrade to Fahrenheit is given below

$$F = \frac{9C + 160}{5}$$

Use this formula to calculate the temperature in Fahrenheit when

(a) it is 25°C [2]

$$F = \frac{9(25) + 160}{5} = 77\,°F$$

(b) it is 0°C [2]

$$F = \frac{9(0) + 160}{5} = 32\,°F$$
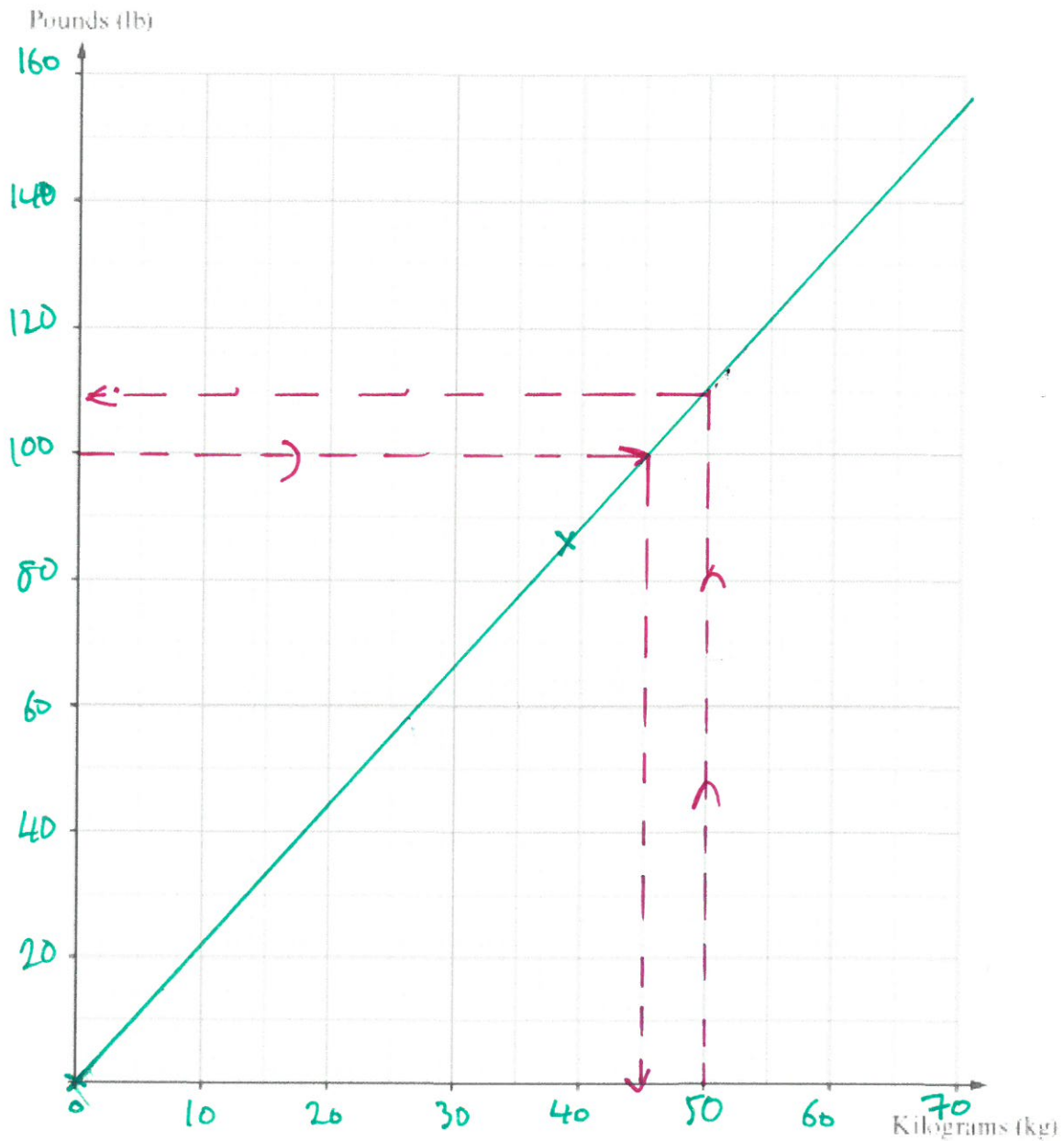
(c) it is -8°C [3]

$$F = \frac{9(-8) + 160}{5} = 17.6\,°F$$

4. In a hospital clinic the following information is used to convert between kilograms (kg) and pounds (lb).

Kilograms (kg)	0	39	68
Pounds (lb)	0	86	150

(a) Use the information in the table to draw a conversion graph.

[2]

(b) Use your graph to find an estimate for 50 kilograms in pounds.

108 lbs

[1]

(c) Find an estimate for 200 pounds in kilograms.

100 pounds = 45 kg
So 200 pounds = 90 kg

[2]

5.

"Cuppa - Jo" smooth roast coffee is sold in a variety of sizes.

200 grams	100 grams	400 grams
£5.60	£3	' £11.80

Decide which size of "Cuppa - Jo" smooth roast coffee is the best buy and why.
You must show the calculations that support your decision.

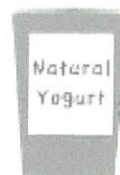For 200g jar, the cost per 100g = £5.60 ÷ 2 = £2.80

100g jar = £3 per 100g.

for 400 g jar, cost per 100g = 11.80 ÷ 4 = £2.95

The 200g jar of coffee is the best value because it
and has the lowest cost per 100g.

[6]

6.

A supermarket sells 500 g pots of natural yogurt for £1.50 each.

During the first week of April, the supermarket has a special offer on this yogurt.

Natural
Yogurt

Buy 1 pot and
get a 2nd pot
for half price!

Two weeks later, the price of the same 500 g pot of natural yogurt is still the same but the supermarket changes the offer to:

Buy 2 pots and
get a 3rd pot free!

Keenan always buys six 500 g pots of this natural yogurt for his restaurant.
Which would have been the better offer?
You must show all your working

[5]

Offer 1:   £1.50 + £0.75 = £2.25 for two pots

                                    ×3

                              £6.75 for six pots

offer 2 :   1.50 + 1.50 + 0 = £3 for three pots

                                    ×2

                              £6 for six pots

So offer 2 is best

7.   *You will be assessed on the quality of your written communication in this question.*

A band was hired to play at the local hall.

✓ The hall was hired for 4 hours at a cost of £20 per hour.
✓ The band cost £150 to hire
✓ Tickets for the event cost £5 each and 128 tickets were sold.

Calculate how much money was spent, how much money was collected and the profit or loss made on the event.

outgoings   hall hire = 4×20 = £80
           band   =   £150

Total outgoings = $80 + 150$ = £230

Income 128×5 = £640

So profit = $640 - 230$ = £410.

[7]+[2]

8.

You will be assessed on the quality of your written communication in this question.

Elinor plans to sell cups of juice at a disco.
✓ She buys 8 bottles of juice.
Each bottle holds 3 litres and costs £3.65 per bottle.
✓ The total cost of the plastic cups she uses is £2.50.
Each plastic cup is filled with 250ml of juice and is sold for 75p.
Elinor sells all the juice that she has bought.

How much profit does she make?   [7]

Outgoings   juice $8 \times 3.65 = £29.20$
            cups $£2.50$

So total outgoings $= 29.20 + 2.50 = £31.70$

Income   1 litre = 1000 ml

So 3 litres = 3000 ml $\times$ 8 bottles = 24000 ml

So number of cups sold $= \dfrac{\overset{24000}{\cancel{3000}}}{} \div 250 = \cancel{12}\,^{96}$ cups

Sells $\overset{96}{\cancel{12}} \times £0.75 = \cancel{£9}\ \cancel{£18}\ £72$

She ~~doesn't~~ make a profit. she makes a ~~loss~~ of £31.70 −9
                                          profit $= £22.70$ loss

profit $= 72 - 31.70$
       $= £40.30$

~~£18 31.70~~
~~= £16.30.~~

9.

Loretta is paid in euros.
She is checking her tax bill for last year.

The tax rates last year were as follows:

- No tax on the first €3500 of earnings
- Earnings in excess of €3500 and up to €10 500: taxed at a rate of 25%
- Earnings above €10 500: taxed at a rate of 35%

Last year, Loretta's total earnings before tax were €34 500

How much tax did Loretta pay in total?
You must show all your working   [6]

$$(34\,500 - 10\,500) \times 35\% = €8400$$
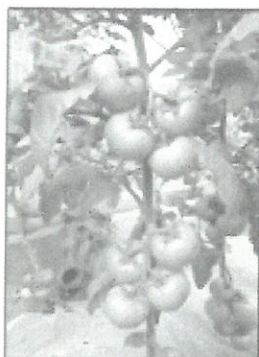
$$(10\,500 - 3500) \times 25\% = €1750$$

$$(3500 - 0) \times 0\% = €0$$

So total tax = ~~€8400~~ €10,150

Tax paid = € ....

10.

Last summer, Mr Williams had 10 tomato plants like the one shown below.

The number of tomatoes that grew on each plant is given below.

| 42 | 37 | 48 | 34 | 44 | 41 | 39 | 42 | 38 | 45 |

(a) Calculate the mean number of tomatoes per plant. [3]

total = 410
Count = 10

Mean = 410 ÷ 10
= 41

(b) Find the median number of tomatoes per plant. [2]

34   37   38   39   41, 42   42   44   45   48

41·5

(c) What is the modal number of tomatoes per plant? [1]

42

(d) Next summer, Mr Williams plans to buy more tomato plants like the one above.
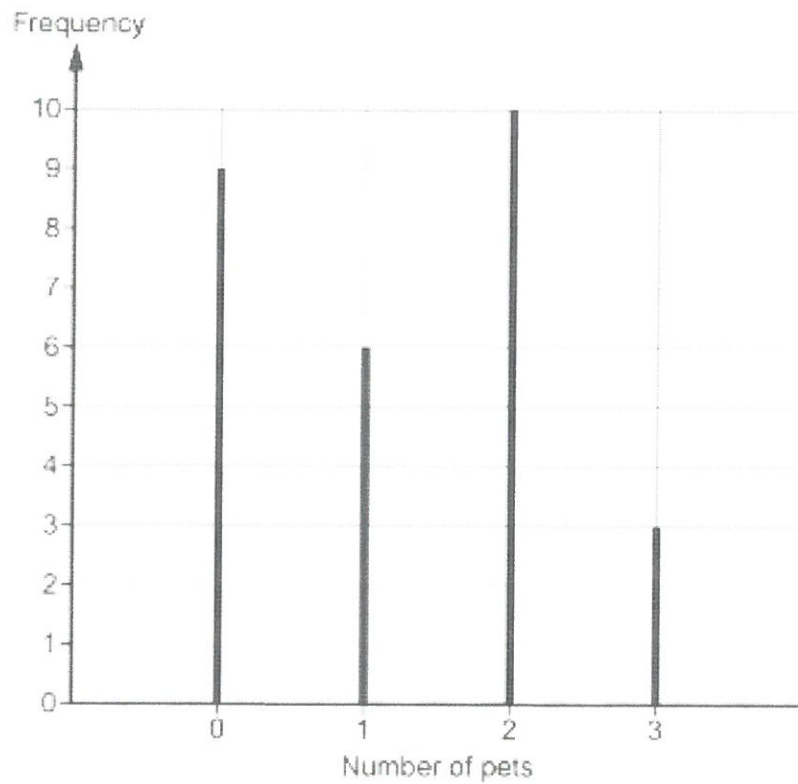
He says:

"On average, I should get about 41 tomatoes from each plant."

Give a reason why his data shows he is correct. [1]

he is correct because the mean of tomatoes is 41

11.   The children in a primary school class were asked how many pets they each owned.

The information was displayed on a vertical line diagram, as shown below.

Complete the frequency table below and calculate the mean number of pets per child   [4]

Number of pets		Frequency	
0	$\times$	9	0
1	$\times$	6	6
2	$\times$	10	20
3	$\times$	3	9

Total = 35
Count = 28

Mean = 35 ÷ 28 = 1.25

12. A group of pupils was timed in completing a maths test. The results are shown in the grouped frequency table below.

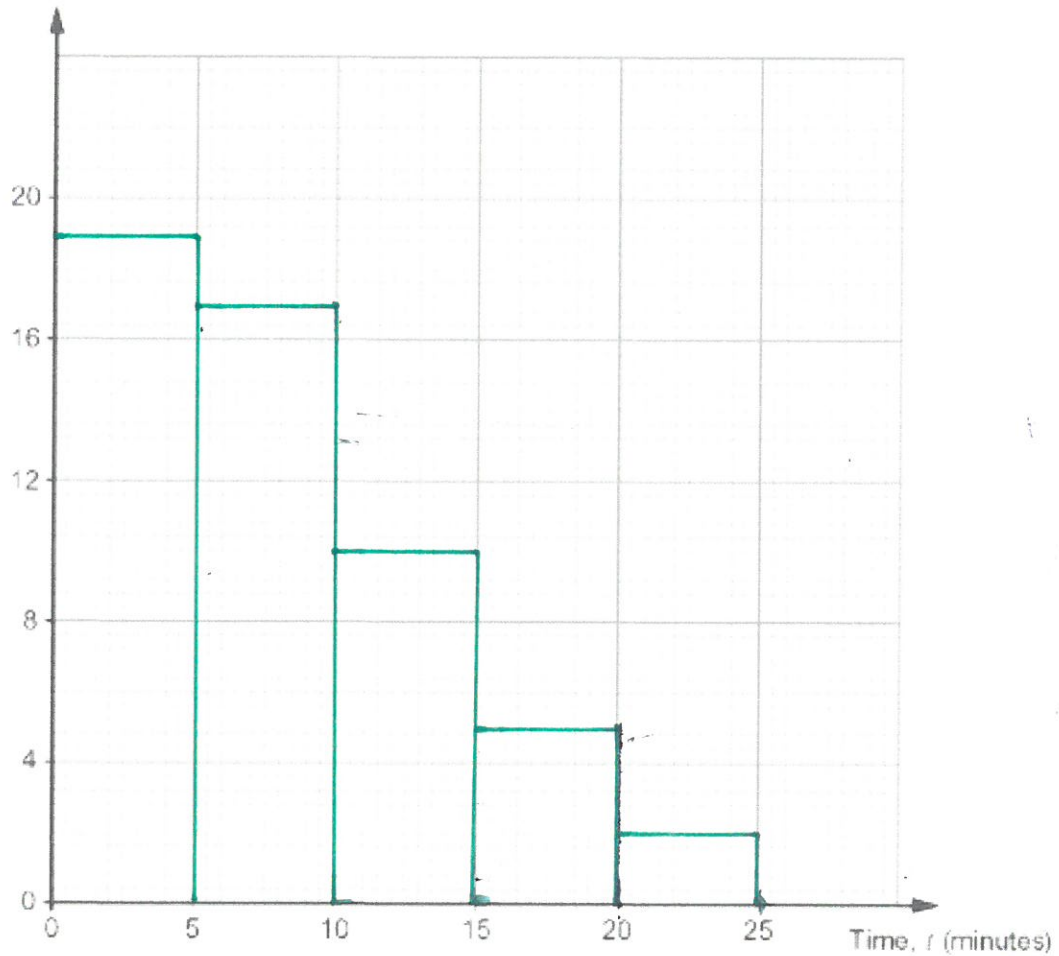| Time, t (minutes)	Number of pupils	Mid Value	
$0 < t \leqslant 5$	19	$\times 2.5 = 47.5$	
$5 < t \leqslant 10$	17	$\times 7.5 = 127.5$	
$10 < t \leqslant 15$	10	$\times 12.5 = 125$	
$15 < t \leqslant 20$	5	$\times 17.5 = 87.5$	
$20 < t \leqslant 25$	2	$\times 22.5 = 45$	$+$

19
46

$$\underline{432.5}$$

(a) Draw a grouped frequency diagram to illustrate these results. [2]

Number of pupils

Time, t (minutes)

(b) Calculate an estimate of the mean time taken to complete the test [4]

Total = 432.5
Count = 53

Mean = $432.5 \div 53$
= 8.16 mins.

(d) Write down the modal group [1]

$0 < t \leqslant 5$

(e) Write down the median group [1]

26th $5 < t \leqslant 10$.

13.

2	5	5	6	7

Five **single digit numbers** need to be written on the cards above.
The median, mode, mean and range of the numbers must all be 5.
Write a possible set of **single digit numbers** on the cards, in ascending order. [4]

Mean   Mean of 5 numbers = 5
         total of numbers = 5×5 = 25

14.   There are 25 students in a class, 10 girls and 15 boys.

On one particular night, the mean time spend on homework by the boys was 1.6 hours and the mean time spent on homework by the girls was 2.1 hours.

Work out the mean time spent on homework by all the students in the class. [5]

total time spent by the 15 boys = 15×1·6 = 24 hours.
total time spent by the 10 girls = 10×2·1 = 21 hours.

So mean time of 25 pupils = 45 ÷ 25 = 1·8 hours.