core:maths
A NEW QUALIFICATION FOR WORK, STUDY & LIFE

Homework 19A

Godalming College

You have one week to complete this. What you hand in should be your best work, and you must attempt every question.

If you are stuck then please either consult notes or textbooks, attend a workshop, or ask your teacher.

You may need to refer to the formula book, found here:

or financial information, found here:

1) During the first week in May, the plumber completed 4 jobs and the mean charge for each job was £295.

During the second week in May, the plumber completed 3 jobs and the charges made were £314, £290 and £428.

Calculate the mean charge for the 7 jobs.

[3 marks]

2) The durations, in minutes, of a sample of 10 telephone calls to a helpline were as follows.

32 15 10 17 32 8 20 38 25 18

The duration of calls to the helpline has a known standard deviation of 7.5 minutes.

(a) Stating **two** necessary assumptions, construct a 95% confidence interval for the mean duration of telephone calls to the helpline.

[7 marks]

(b) Hence comment, with justification, on a claim that the mean duration of telephone calls to the helpline is 25 minutes.

[2 marks]

3) The volume of *Everwhite* toothpaste in a pump-action dispenser may be modelled by a normal distribution with a mean of 106 ml and a standard deviation of 2.5 ml.

Determine the probability that the volume of *Everwhite* in a randomly selected dispenser is:

(a) less than 110 ml; *(3 marks)*

(b) more than 100 ml; *(2 marks)*

(c) between 104 ml and 108 ml; *(3 marks)*

(d) **not** exactly 106 ml. *(1 mark)*

4) Dr Hanna has a special clinic for her older patients. She asked a medical student, Lenny, to select a random sample of 25 of her male patients, aged between 55 and 65 years, and, from their clinical records, to list their heights, weights and waist measurements.

Lenny was then asked to calculate three values of the product moment correlation coefficient based upon his collected data. His results were:

(a) 0.365 between height and waist measurement;

(b) 1.16 between height and weight;

(c) −0.583 between weight and waist measurement.

For **each** of Lenny's three calculated values, state whether the value is definitely correct, probably correct, probably incorrect or definitely incorrect. *(3 marks)*

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5) **(a)** Complete the scatter diagram for the data.

The first four points have been plotted for you.

(b) For the data, the mean number of miles is 26 thousand.

(b) (i) Work out the mean depth of tread.

(b) (ii) Use these mean values to help you draw a line of best fit on the scatter diagram.

(c) Use your line of best fit to estimate the depth of tread for a tyre which has travelled 20 thousand miles.

(d) It is illegal to have less than 1.6 mm of tread on a tyre.

Use your line to estimate the number of miles travelled before a tyre becomes illegal.

(e) Which of your answers, 13(c) or 13(d), do you think is **more** reliable?

Give a reason for your choice.

(f) Is there likely to be a **causal** relationship between the number of miles travelled and the depth of tread?
Give a reason for your answer.

6) Henrietta lives on a small farm where she keeps some hens.

For a period of 35 weeks during the hens' first laying season, she records, **each week**, the total number of eggs laid by the hens.

Her records are shown in the table.

Total number of eggs laid in a week (x)	Number of weeks (f)
66	1
67	2
68	3
69	5
70	7
71	8
72	4
73	2
74	2
75	1
Total	**35**

(i) state values for the mode and the range;

[2 marks]

(ii) find values for the median and the interquartile range;

[3 marks]

(iii) calculate values for the mean and the standard deviation.

[4 marks]

7) The table below shows information about the ages of the 136 people who lived in St. Martin's in the Isles of Scilly in March 2011

(a) Draw a cumulative frequency diagram on the grid opposite to show the data.
You may use the spare column in the table for any calculation required.

[4 marks]

(b) Use your cumulative frequency diagram to find:

(b) (i) the median;

[1 mark]

(b) (ii) the interquartile range.

[2 marks]

(c) Cartmel is a village in Cumbria.
The ages of people living in Cartmel in March 2011 were also recorded.
These are shown in the box and whisker diagram below.
For March 2011, compare the ages of people living in Cartmel with the ages of people living in St.Martin's.

[4 marks]

8) In the USA, the price of a Kindle with free 3G was \$202.
The exchange rate was \$1.62 to £1.

Calculate the cost of the Kindle in pounds (£).

9) The price of a block of butter in 2015 was half the price it was in 2017.

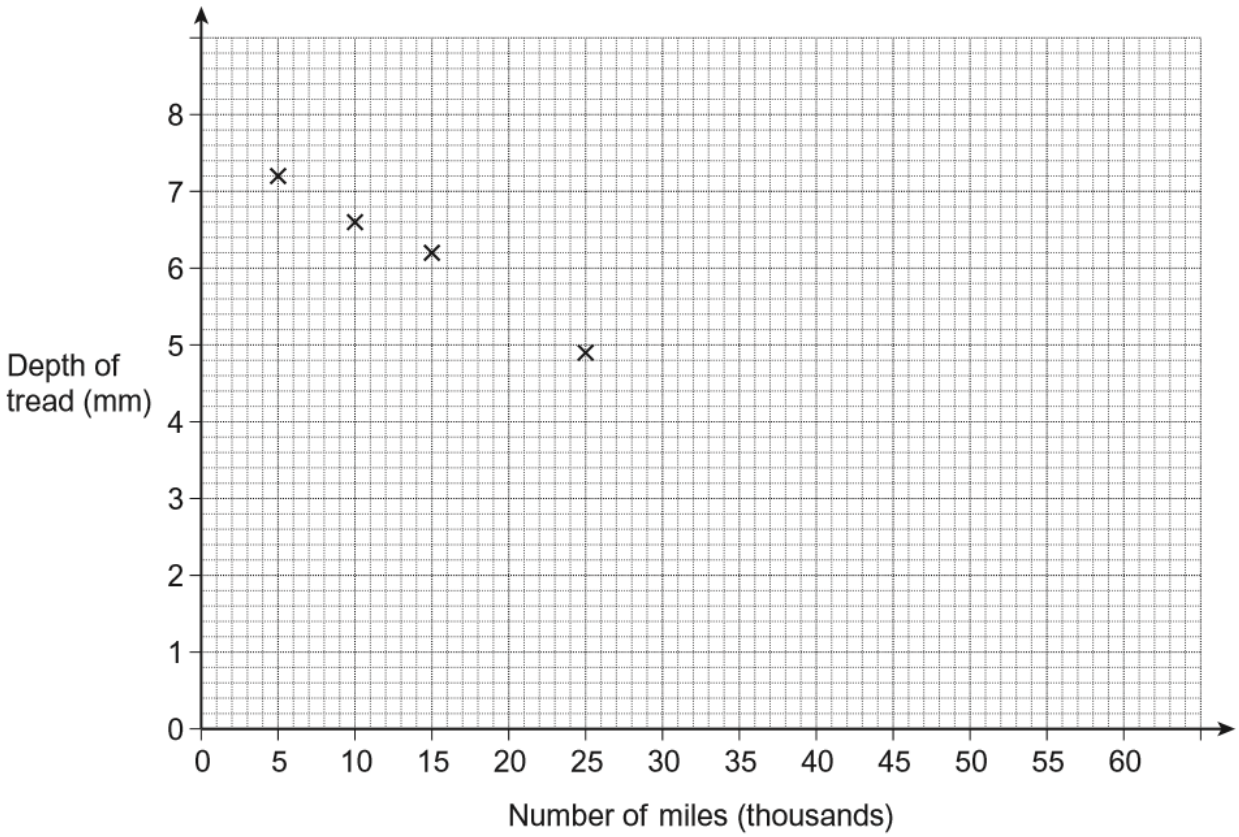
Taking 2015 as the base year, what is the index number for the price of butter in 2017?
Circle your answer.

[1 mark]

0.5 50 150 200

Homework 19A – Answer sheet

5)



(2 marks)

Homework 19A – Answer sheet

6)

Age, a years	Number of people	
$0 \leqslant a < 20$	22	
$20 \leqslant a < 40$	42	
$40 \leqslant a < 60$	31	
$60 \leqslant a < 80$	31	
$80 \leqslant a < 100$	10	
Total	136