EGC Eastern Goldfields College	Student Name SOLUTIONS **Eastern Goldfields College** **Mathematics Essentials U3&4 2016** **Test 3**
Working Time: 50 minutes	**Total Marks: 48 marks**

Calculators allowed. Show all working where necessary to maximize your marks.

Question 1 [6 marks: 2, 2, 1, 1]

a) In the context of data collection, what is a census?

The collection of data from an entire population ✓ ✓

b) The Australian Government conducts a census every 5 years. What is the purpose of this census.

Count number of people ✓, Key characteristics of people & housing. Enables government to plan for future and allocate money for schools, roads education etc ✓

c) State one advantage of conducting a census.

Gives a more accurate idea of numbers/pop/housing etc
Able to see trends over 5yr period ✓ (many others)

d) State one disadvantage of conducting a census.

Very time consuming ✓
Very expensive ✓ (others)

Question 2 [3 marks]

The purpose of sampling as a method of data collection, is to provide an estimate of population values or characteristics.

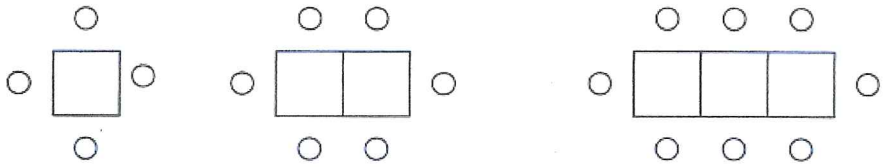
State one method of sampling, explain what it is and how it could be done to gather data.

random / systematic / stratified / self-selected / cluster ✓

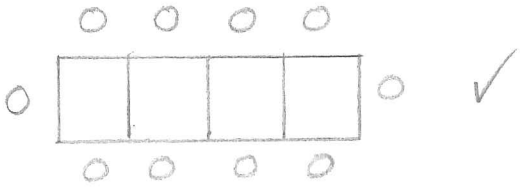
- random: equal chance — Names in hat & draw one
- systematic: every 10th/50th — alphabetical order & every 10th in list
- stratified: layers — propotion % of each group to reflect total
- self-selected: volunteers — ask for people to do survey
- cluster: grouping suburb — all are yr group or business to complete survey

Question 3 [5 marks – 1, 1, 2, 1]

The diagrams below represent an arrangement of tables and chairs.
This is summarized in the table below.



a) Draw the next diagram in the pattern.



b) Complete the table for values of t = 3 and t = 4.

Number of tables (t)	1	2	3	4	5	10	20	100
Number of chairs (n)	4	6	8	10	12	22	42	202

c) Write a rule linking t and n

$n = 2t + 2$

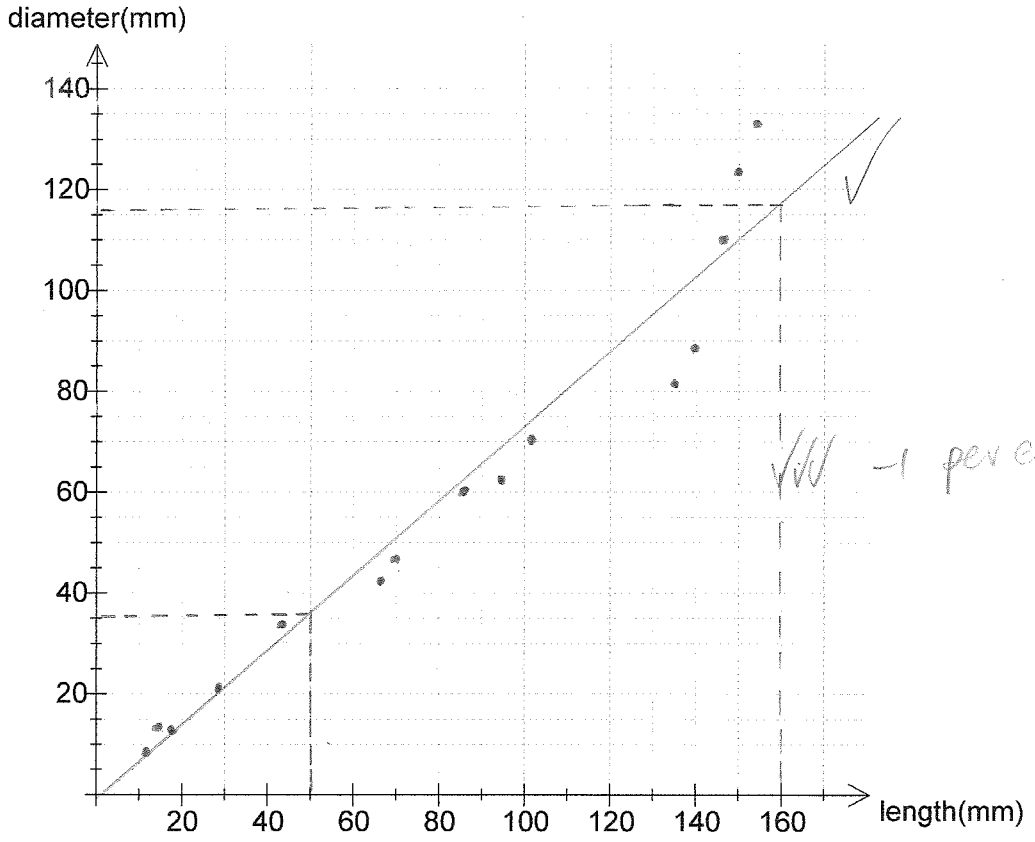
d) Complete the table above

Question 4 [11 marks – 3, 1, 1, 2, 1, 2, 1]

The table below shows the length and diameter of a small sample of bird eggs from different species of birds.

length (mm)	95	18	29	70	66	11	86	101	15	135	43	147	150	153	140
diameter (mm)	62	13	21	47	42	8	60	70	13	81	34	110	124	133	89

a) Construct a scatterplot for the data.



✓ ✓✓ -1 per error

b a) State the dependent and independent variables.

Dependent : Diameter Independent : Length ✓ r/w

c) b) Describe the relationship between length and diameter for the dataset.

Very strong positive ✓

d) c) Draw a line of best fit and use it to predict the diameter of an egg with a length of 50 mm.

35mm ✓ See above from their line

e) d) Predict the diameter of an egg with a length of 160 mm.

116 cm ✓ (from their line)

f) e) Which answer is likely to be more reliable/accurate – (c) or (d)? Explain why. d) or e)

d) as interpolation is used ✓

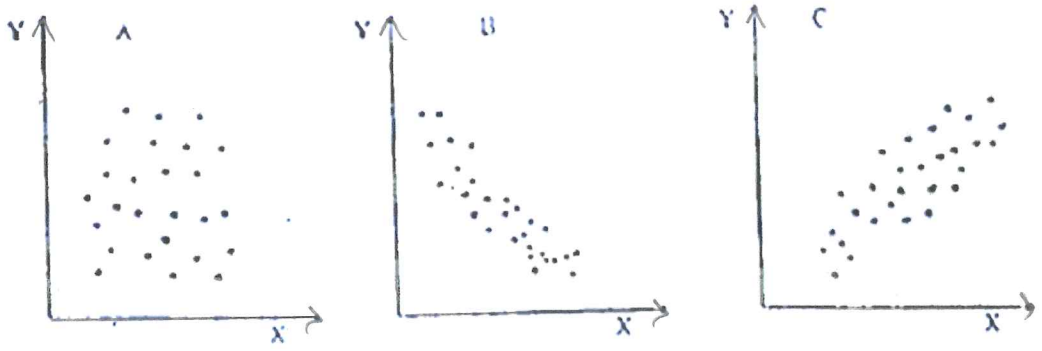
g) f) Describe the trend of the data.

Increasing ✓

Question 5 [5 marks – 2, 3]

a) Given these three scattergraphs, which one shows the strongest linear relationship? Justify your answer.

B ✓ as dots closer to a straight line. ✓



b) Match each of the scattergraphs with one of these descriptions.

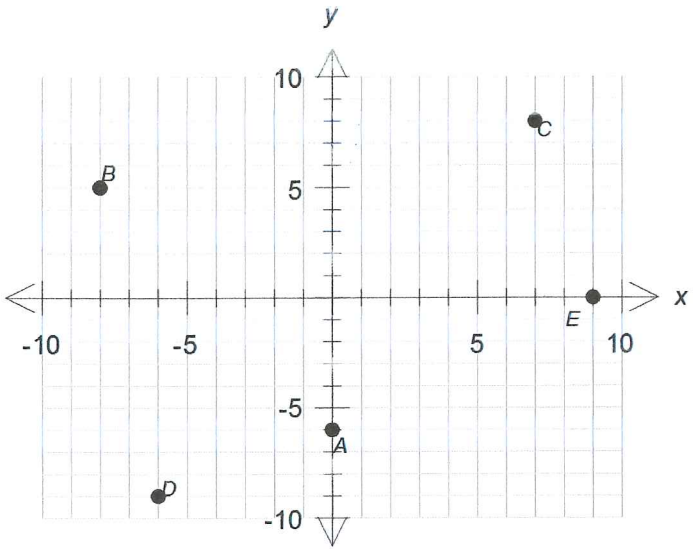
i) The ages of second hand cars and their selling price B ✓

ii) The height of people and the length of their feet C ✓

ii) Marks in a history exam and the distance travelled by the students to school. A ✓

Question 6 [5 marks]

State the coordinates of each point.



A (0, -6) ✓

B (-8, 5) ✓

C (7, 8) ✓

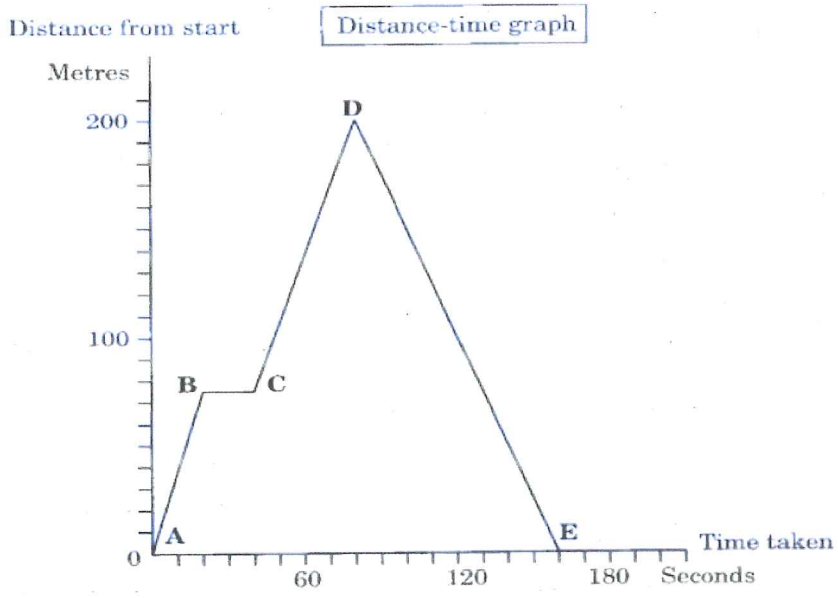
D (-6, -9) ✓

E (9, 0) ✓

-1 if no brackets

Question 7 [2 marks]

The following graph shows the motion of a runner on a path.



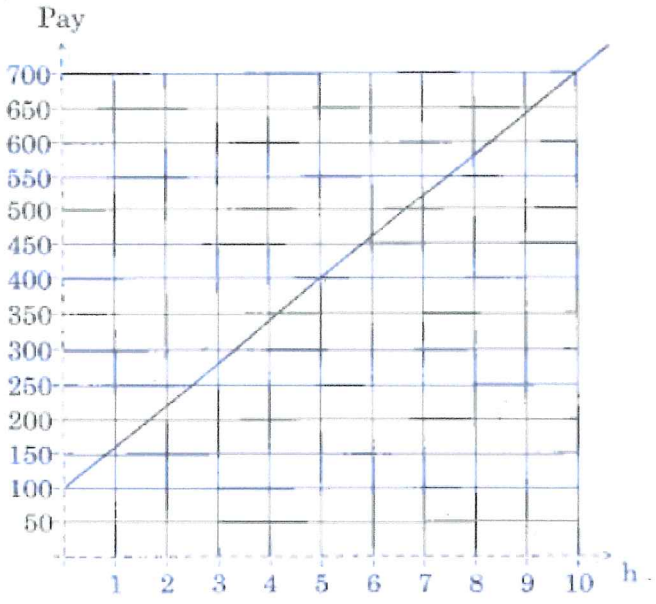
Which of the following statements is **false** and why?

a) The runner fell over.
b) The runner ran up a hill and down the other side. ✓
c) The runner's fastest speed was indicated by the part of the graph marked AB.
d) The runner's average speed was the same as the speed indicated by the part of the graph marked DE.

It is about distance from start. He ran 200m from the start & back again. ✓

Question 8 [7 marks – 2, 1, 2, 2]

Shane is paid a retainer (fixed amount when no sales are made) and a commission on the value of his sales. His work involves getting people to sign up for holidays.



Holidays

a) What is his retainer and what feature of the graph indicates this?

✓$100 ✓, The y intercept or where graph crosses vertical axis. ✓

b) How much does he earn for 10 contracts?

$700. ✓

c) What is the gradient of the line and what does this represent in the context of this situation?

60 ✓, it represents amount he gets/contract. ie $60 for 1 holiday package. ✓

d) What is the rule in terms of 'h' to calculate Shane's pay (P)?

$P = 60h + 100$

✓ ✓

Question 9 [4 marks – 2, 2]
The data below was gathered from the 2011 Census and the 2006 Census.

Western Australia – Dwellings

	2011	2006
Total dwellings	963,325	851,163
Occupied private dwellings	851,393	757,990
Dwelling structure	Separate house – 78.1%	Separate house – 78.6%
	Flat/Unit/Apartment – 8.8%	Flat/Unit/Apartment– 8.5%
	Semi-detached – 10.8%	Semi-detached – 10.6%
Tenure	Owned outright – 29.5%	Owned outright – 31.4%
	Owned with mortgage – 37.8%	Owned with mortgage – 37.6%
	Rented – 29.2%	Rented – 27.2%
Household composition	Single/multi-family household – 72.2%	Single/multi-family household – 71.7%
	Lone person household – 23.8%	Lone person household – 24.7%
	Group household – 4.0%	Group household – 3.6%
Median household rent (weekly)	$300	$170
Median household mortgage repayments (monthly)	$1,950	$1,213
Average people per household	2.6	2.5
Average people per bedroom	1.1	1.1

a) What is the percentage increase in the median household rent from 2006 to 2011?

$\frac{130}{170} \times 100 = 76.5\%$ ✓ ✓ (accept 76%)

b) In 2011, what percentage of total dwellings were occupied private dwellings?

$\frac{851\,393}{963\,325} \times 100 = 88.4\%$ ✓ ✓ (accept 88%)

END OF TEST