



Eastern Goldfields College

Student Name _____

Eastern Goldfields College Mathematics Applications 2017

Test 4 (U2 T1) – Calculator Free

Total Marks: 26 marks

Time allowed: 22 minutes

No calculator or notes permitted for this section.

Answer all of the following questions. Show all working to obtain full marks.

Question 1 (5 marks: 1, 1, 1, 1, 1)

Using the four classifications listed below, classify each of the following variables and identify the best way to display them.

Four Classifications are:

- Categorical and nominal
- Categorical and ordinal
- Numerical and discrete
- Numerical and continuous

| | Data Classification | Data Display |
|------------------------------------|---------------------|----------------------|
| Gender | Cat - Nom | Col/Bar/Pie |
| Number of Children | Num - Dis | Dot Plot |
| Finishing position in a 100 m race | Cat - Ord | Table |
| Height | Num - Cont | Hist. |
| Height to the nearest cm | Num - Discrete | Dot Plot / Stem Leaf |

1/2 each

Question 2 (7 marks: 1, 2, 2, 2)

Solve the following equations:

a) $2x - 6 = 14$

$2x = 20$

$x = 10$ ✓ 10

c) $\frac{3x}{10} = \frac{2}{5}$

$15x = 20$

$x = \frac{20}{15}$

$x = \frac{4}{3}$ or $\frac{4}{3}$ ✓ 4/3 error

d) $\frac{5}{x} = 40$

$18 - 6x = 28$

$-6x = 10$

$x = \frac{-10}{-6} = \frac{5}{3} = 1\frac{2}{3}$ ✓ -17 error

$5 = 40x$

$\frac{5}{40} = x$

$x = \frac{1}{8}$ ✓ 1/8 error

Question 3 (6 marks: 2, 4)

(a) The mean height of a sports team is 182 cm. One of the players who is 172 cm tall leaves the team. Will the mean height increase, decrease or remain the same. Justify your answer.

increase ✓
∴ majority of players are taller than him/her

(b) The whole numbers below are arranged in ascending order and have a mean of 6.

1, 3, a, 6, 7, b, 9, 10

Determine all the possible values for a and b.

$6 = \frac{1 + 3 + a + 6 + 7 + b + 9 + 10}{8}$

$48 = 36 + a + b$

$12 = a + b$

a = 3, b = 9

or a = 4, b = 8

or a = 5, b = 7

111 all 3 ✓ 0.4

if 1/2 ✓

Question 4 (4 marks: 1, 2, 1)

A rectangular field is x metres wide and $x + 130$ metres long. The perimeter of the field is 520 metres.

(a) Write an equation in terms of x for the perimeter of the field.

Accept $2x + 2(x + 130) = 520$ ✓
 Any: $2(x + 130) = 520$
 $2(2x + 130) = 520$ $4x + 260 = 520$

(b) Use your equation to solve for x .

$x = 65\text{m}$ ✓✓ f.t. exp (a).
 -1 f error

(c) What are the dimensions of the field.

width = 65m or 65m | 195m
 length = $65 + 130 = 195\text{m}$ ✓ 2/w. -1 units overall

Question 5 (4 marks)

Paula had some marbles and Stephen had 11 less than Paula. Together they had a total of 61 marbles. Write an equation to represent this and show full algebraic working to determine how many marbles Stephen had.

Paula = x .

Stephen = $x - 11$

$x + x - 11 = 61$

$2x - 11 = 61$

$2x = 72$

$x = 36$

∴ Stephen

had 36 - 11

= 25 marbles ✓

End of Non-Calculator Section



Eastern Goldfields College
 Mathematics Applications 2017

Test 4 (U2 T1) – Calculator Assumed 32

Total Marks: 34 marks

Time allowed: 34 minutes

Calculator and 1 x double sided A4 notes permitted for this section.

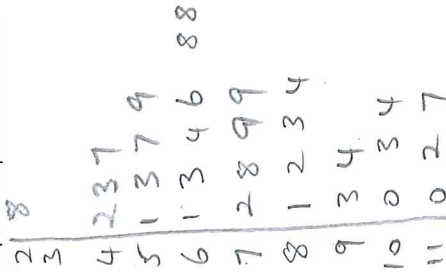
Answer all of the following questions. Show all working to obtain full marks.

Question 1 (6 marks: 2, 2, 2)

Jeremy sells sausages in bread outside Bunnings on Sundays. The number of sales each day over 30 Sundays was recorded as follows:

| | | | | | | | | | |
|----|----|-----|-----|----|-----|----|----|-----|-----|
| 66 | 64 | 28 | 93 | 47 | 110 | 53 | 68 | 117 | 43 |
| 72 | 68 | 84 | 103 | 59 | 82 | 78 | 61 | 104 | 79 |
| 51 | 63 | 112 | 81 | 79 | 94 | 42 | 57 | 83 | 100 |

a) Draw a stem-and-leaf plot to represent this data



✓✓ 0/1 errors.

ok ✓ 2/3 errors.

b) On what percentage of days did Jeremy have more than 50 sales?

$\frac{26}{30} = 86.7\% (1dp)$ ✓✓ F.T. ✓

c) One day only had 28 sales. Give one possible reason for this in relation to the scenario.

Hot day ∴ less sales

or

Event (eg show) on ∴ less ppl + less sales

✓ any reasonable answer

Question 2 (12 marks: 3, 1, 2, 2, 2, 2)

The birth weights, in kilograms, of 12 baby girls are listed in ascending order below:

2.95, 3.00, 3.03, 3.06, 3.07, 3.10, 3.15, 3.25, 3.29, 3.41, 3.45, 3.49

(a) For these 12 weights, determine

(i) the mean

$$\bar{x} = 3.1875 \quad \checkmark \text{ p.w.}$$

(ii) the median

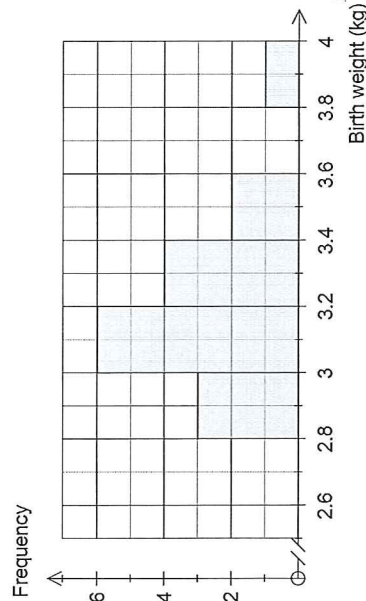
$$\text{med} = 3.125 \quad \checkmark \text{ p.w.}$$

(b) Briefly explain why the mode is not a suitable measure for indicating central location for this data.

No mode

\therefore Not suitable \checkmark

The histogram below shows the birth weights of 16 baby boys.



(c) Describe the distribution of the weights of the 16 baby boys.

- five skewed. \checkmark 1 F
- model class 3-3.2 kg
- gap/no births with weight 3.6-3.8
- Range = 4 - 2.8 = 1.2
- correct's must use #s

(d) Use the information on the previous page to complete the frequency table below for the combined weights of all 28 babies.

| Weight (kg) | Frequency |
|--------------------|-----------|
| $2.6 < w \leq 2.8$ | 0 |
| $2.8 < w \leq 3.0$ | 5 |
| $3.0 < w \leq 3.2$ | 11 |
| $3.2 < w \leq 3.4$ | 6 |
| $3.4 < w \leq 3.6$ | 5 |
| $3.6 < w \leq 3.8$ | 0 |
| $3.8 < w \leq 4.0$ | 1 |

\checkmark
-1 error.

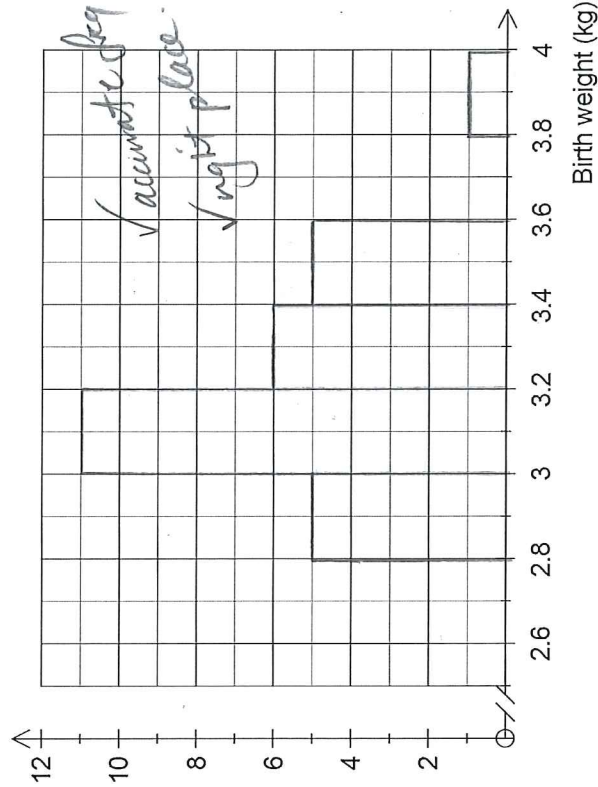
(e) Estimate the mean weight of all 28 babies using the frequency table.

$$\bar{x} \approx 3.2071429 \quad \checkmark \text{ p.w.}$$

$$\approx 3.2 \text{ kg (1dp)} \quad \text{ft (d)}$$

(f) Use the frequency table in (d) to construct a frequency histogram on the axes below.

Frequency

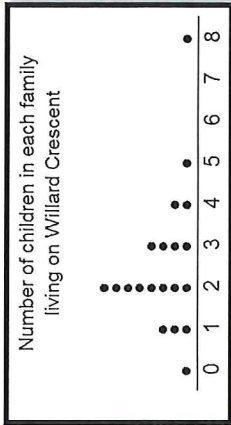


\checkmark accurate freq
 \checkmark sig fig place.

Fit.

Question 3 (9 marks: 1, 2, 1, 2, 2)

This dot plot shows the number of children in each family living on Willard Crescent.



a) How many families live on Willard Crescent?

20 ✓ r/w

b) Calculate the mean number of children per family.

$$\bar{x} = \frac{52}{20} = 2.6 \quad \checkmark \text{ r/w}$$

c) The family with 8 children is an outlier. Without re-calculating the mean, how is the mean affected if this outlier is removed from the data set?

decrease. ✓ r/w.

d) Give two reasons why the mean is not a good measure of centre for this data.

✓ = cannot have 0.7 of a child.

✓ = outlier skews impacts. any reasonable answer.

e) An extra family moved into Willard Crescent, increasing the mean number of children to 3. Considering all the original data (including the outlier), how many children did the new family have?

$$\bar{x} = \frac{\sum x}{n}$$

$$3 = \frac{52 + x}{20 + 1}$$

$$63 = 52 + x$$

$$x = 4 \text{ children}$$

$$x = 11 \quad \checkmark$$

Question 3 (2 marks)

The mean of seven scores is 53. If six of the scores were 60, 50, 37, 60, 55 and 32, find the seventh score.

$$53 = \frac{60 + 50 + 37 + 60 + 55 + 32 + x}{7}$$

$$371 = 294 + x$$

$$x = 77 \quad 7^{\text{th}} \text{ score} = 77 \quad \checkmark$$

Question 5 [5 marks]

Two classes, class A and class B, sit the same test and the combined mean is 72%. Class A has 50 students in it and the class mean is 69%. Class B has a class mean of 78%. Determine the total number of students for class B. Ensure you show full algebraic working.

$$\text{Class A} \quad \frac{69 = \frac{\sum a}{50}}$$

$$\sum a = 3450$$

$$\text{Class B} \quad \frac{78 = \frac{78x}{x}}$$

$$\text{TOTAL} \quad \frac{3450 + 78x}{50 + x}$$

$$72(50 + x) = 3450 + 78x$$

$$3600 + 72x = 3450 + 78x$$

$$150 = 6x$$

$$\frac{150}{6} = x \quad x = 25 \quad \checkmark$$

Class B has 25 students

End of Calculator Section