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 Frag
Finishing position in a 100 m race	Cat - O, d	Table
Height	Num - Cont	Hist.
Height to the nearest cm	Num - Disc	Dot Frag / Stem Leaf

½ each

Question 2 **(7 marks: 1, 2 , 2, 2)**
Solve the following equations:

a) $2x - 6 = 14$

$2x = 20$

$x = 10$ ✓R/W

b) $3(6 - 2x) = 28$

$18 - 6x = 28$

$-6x = 10$

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

✓✓ -1 J error

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

$15x = 20$ ✓✓-1 J error

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

$x = 1\frac{1}{3}$ or $\frac{4}{3}$

d) $\frac{5}{x} = \frac{40}{1}$

$5 = 40x$

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

$x = \frac{1}{8}$

✓✓ -1 J 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 ✓ ∵ $\bar{x}$ 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 $a = 5, b = 7$

list all 3 ✓✓ or if ½ ✓

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

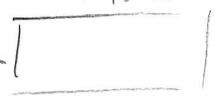
(b) Use your equation to solve for x.

$x = 65$ m ✓✓ f.t. eqn (a).
−1 ∄ error.

(c) What are the **dimensions** of the field.

Width = 65 m
length = 65 + 130 = 195 m

OR



✓R/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

Student Name _____

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.

5. 1

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

2	8
3	
4	2 3 7
5	1 3 7 9
6	1 3 4 6 8 8
7	2 8 9 9
8	1 2 3 4
9	3 4
10	0 3 4
11	0 2 7

?? ✓✓ 0/1 errors.
OR
✓ 2/3. errors.

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

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

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

✓ any reasonable answer

Hot day ∴ less sales
OR
Event (eg show) on ∴ less ppl + less sales

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

$\bar{x} = 3.1875$ ✓✓ R/W.

(ii) the median

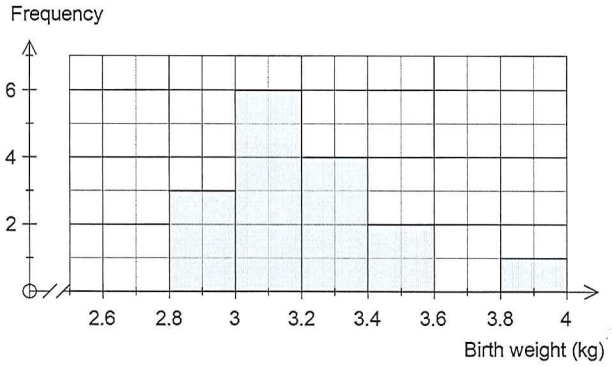
med = 3.125 ✓R/W.

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

No mode

∴ Not suitable ✓

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



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

✓✓ 1 ∄ correct must use #'s.

- +ive skewed.
- modal class 3 - 3.2 kg
- gap/no births with weight 3.6 - 3.8
- Range = 4 - 2.8 = 1.2

(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

✓✓ -1 ∄ error.

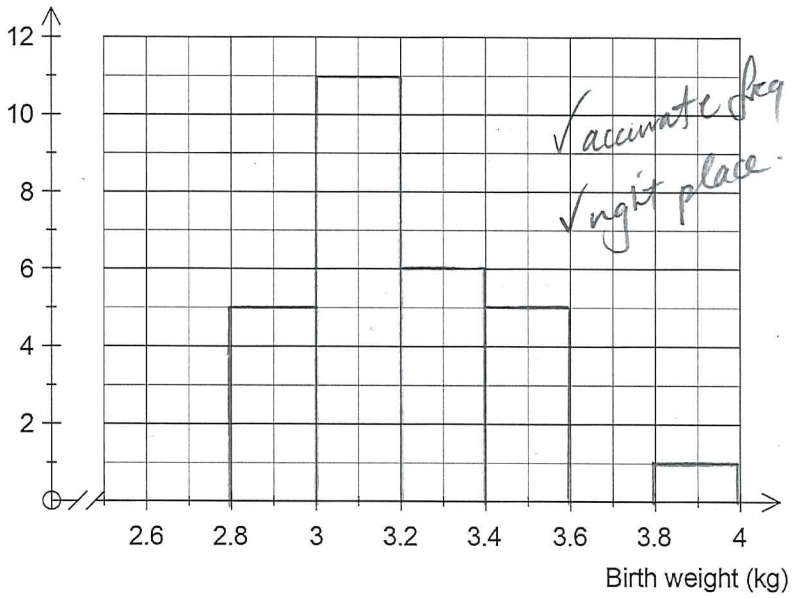
(e) Estimate the mean weight of all 28 babies using the frequency table.

$\bar{x} \simeq 3.2071429$

$\simeq 3.2$ kg (1 dp)

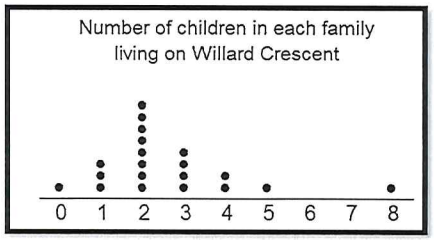
✓✓ R/W. ft (d)

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



Question 3 (9 marks: 1, 2, 1, 1, 2, 2) /8

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.

$\bar{x} = \frac{52}{20} = 2.6$ ✓✓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?

$\bar{x} = \frac{\Sigma x}{N}$

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

$63 = 52 + x$ ✓

$x = 4$ children

$x = 11$ ✓

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.

✓ $53 = \frac{60+50+37+60+55+32+x_7}{7}$

$371 = 294 + x_7$

✓ $x = 77$

7th score = 77.

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.

Class A

$69 = \frac{\Sigma a}{50}$

$\Sigma a = 3450$

Class B

$78 = \frac{78 \times x}{x}$

TOTAL

$72 = \frac{3450 + 78x}{50+x}$ ✓ ✓

equation ✓ values ✓

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

$3600 + 72x = 3450 + 78x$

$150 = 6x$

$\frac{150}{6} = x$ $x = 25$ ✓

Class B has 25 students

End of Calculator Section