

MATHEMATICS APPLICATIONS

MAWA

Semester 2 (Unit 1 & Unit 2) Examination 2015

Calculator-free

Marking Key

Section One: Calculator-free

(55 Marks)

Question 1 (a)

Solution	
$\$2000 \div 80 = \25	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> determines cost per share 	1

Question 1 (b)

Solution	
$\$500 \div \$2000 \times 100 = 25\%$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> calculates percentage increase 	1

Question 1 (c)

Solution	
$7\% \times \$2500 = \175	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> determines expression to calculate dividend 	1
<ul style="list-style-type: none"> calculates dividend 	1

Question 2 (a)

Solution	
\$17	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> interprets step graph 	1

Question 2 (b)

Solution	
12:15 pm	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> applies value read from step graph to context 	1

Question 2 (c)

Solution	
\$125	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> uses value read from step graph in context 	1

Question 2 (d)

Solution	
Graph misread – should be \$7 It is not the same price for the whole time range: 3 hours parking costs \$7 but 4 hours parking costs \$10	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> justifies incorrect conclusion with one reason 	1
<ul style="list-style-type: none"> justifies incorrect conclusion with second reason 	1

Question 3 (a)

Solution	
$\sin A = \frac{4}{5} = \frac{BC}{1000}$ $BC = 800\text{m}$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> expresses relationship of triangle sides in terms of $\sin A$ 	1
<ul style="list-style-type: none"> determines length of side BC 	1

Question 3 (b)

Solution	
$\cos \angle BAC = \frac{600}{1000}$ $\angle BAC = \cos^{-1} 0.6$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> identifies trigonometric ratio for $\angle BAC$ 	1
<ul style="list-style-type: none"> expresses $\angle BAC$ with inverse trigonometric ratio 	1

Question 3 (c)

Solution	
$180 + 37 = 217^\circ$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> Adds 180 to $\angle ABC$ 	1

Question 4 (a)

Solution	
$2x + 3y = 10.5$	1.
$3x + 2y = 9.5$	2.
$6x + 9y = 31.5$	3. (1.×3)
$6x + 4y = 19$	4. (2.×2)
$5y = 12.5$	(3. – 4.)
$y = 2.5$	
$3x + 5 = 9.5$	
$3x = 4.5$	
$x = 1.5$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> • multiplies first equation by scalar value • multiplies equation 2 by value to bring equal terms • subtracts new equations • solves for first variable • solves for second variable 	1 1 1 1 1

Question 4(b)

Solution	
x represents the cost of a caramel bar	
y represents the cost of a chocolate bar	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> • identifies variables describe cost • allocates variable to corresponding items 	1 1

Question 5 (a)

Solution	
% Chance of winning = $(m - k) \times 0.01 + 50$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> • develops linear formula from worded description • attends to the order of operations 	1 1

Question 5 (b)

Solution	
$(5000 - 4500) \times 0.01 + 50 = 55\%$	
$(5000 - 6200) \times 0.01 + 50 = 38\%$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> uses rule identified in part (a) 	1
<ul style="list-style-type: none"> determines % Chance of winning with first example 	1
<ul style="list-style-type: none"> determines % Chance of winning with second example 	1

Question 6 (a)

Solution	
18	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> reads maximum score from boxplot 	1

Question 6 (b)

Solution	
The range in 2012 is lower than that in 2014	
A range of 12 in 2012 and of 14 in 2014	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> identifies that 2012 is lower 	1
<ul style="list-style-type: none"> indicates difference in range 	1

Question 6 (c)

Solution	
$14 - 6 = 8$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> reads boxplot to determine interquartile range 	1

Question 6 (d)

Solution	
12	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> interprets boxplot 	1

Question 6 (e)

Solution	
On half the days in the 2014 period there were at least 10 houses sold but in 2012 this number was only 8	
On 75% of the days in the 2014 period there were at least 14 houses sold but in 2012 this number was only 12	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> gives one interpretation of difference on boxplots 	1
<ul style="list-style-type: none"> gives second interpretation of difference on boxplots 	1

Question 6 (f)

Solution	
It does not have to be interpreted as such.	
On 25% of the days the number of houses sold did not exceed 6. (could have been less)	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> concludes correctly the meaning of lower quartile 	1
<ul style="list-style-type: none"> explains decision in the context of the data 	1

Question 7 (a)

Solution	
10%	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> reads graph, relating information to data supplied 	1

Question 7 (b)

Solution	
Discrete	
Beats are counted OR there are no parts of a beat	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> identifies type of variable 	1
<ul style="list-style-type: none"> justifies choice of variable type 	1

Question 7 (c)

Solution	
71-80 beats per minute	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> reads modal class from graph 	1

Question 7 (d)

Solution	
Any value below 30 or above 140	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> identifies suitable outlier 	1

Question 7 (e)

Solution	
101-110 and 121-130	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> identifies equal frequencies 	1

Question 7 (f)

Solution	
Yes	
Can be any value from 41-50	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> draws correct conclusion 	1
<ul style="list-style-type: none"> demonstrates understanding of scale on horizontal axis 	1

Question 7 (g)

Solution	
The graph is slightly skewed to the right OR most data is on the left	
Most resting pulses are between 41 and 90 (78% in first 5 classes) and not so many between 91 and 130 (20% in last 4 classes)	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> describes the shape of the data distribution 	1
<ul style="list-style-type: none"> interprets shape in context of data 	1

Question 8 (a)

Solution	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> • labels $\angle W$ and $\angle E$ • labels $\angle D$ • applies scale factor to second side of triangles • applies same scale factor to third side of triangle 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>

Question 8 (b)

Solution	
$\text{Area} = \frac{1}{2} \times 3 \times 4 \times \sin 125 \quad \text{or}$ $\text{Area} = \sqrt{6.6(6.6-3)(6.6-4)(6.6-6.2)}$	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> • selects correct formula and substitutes correct values for sides • substitutes correct value for angle (or half perimeter) 	<p>1</p> <p>1</p>

Question 8 (c)

Solution	
79.2 cm	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> • calculates perimeter of triangle 	1

Question 8 (d)

Solution	
<p>36 $\text{Area} = \frac{1}{2} \times 18 \times 24 \times \sin 125$ is 6 x 6 the formula used in 8 (b)</p> <p>OR When a 2-D shape is scaled by factor k the area is scaled by factor k^2</p>	
Marking key/mathematical behaviours	Marks
<ul style="list-style-type: none"> • determines correct scale factor • identifies it is 6 x 6 • justifies why it is 6 x 6 	<p>1</p> <p>1</p> <p>1</p>

Acknowledgements – see exam paper for Question 7

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