High School Mathematics Test 2015

Year 7

Data Collection and Representation

Non Calculator Section

Skills and Knowledge Assessed:

- Investigate techniques for collecting data, including census, sampling and observation (ACMSP284)
- Explore the practicalities and implications of obtaining data through sampling using a variety of investigative processes (ACMSP206)
- Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)
- Construct and compare a range of data displays including stem- and - leaf plots and dot plots (ACMSP170)

Name_____

Answer all questions in the spaces provided on this test paper by:

Writing the answer in the box provided.

or

Shading in the bubble for the correct answer from the four choices provided.

Show any working out on the test paper. Calculators are **not** allowed.

1. Reghan and Stacey collect information on the preferences of the students in their class of 24 students.

   Reghan gives a survey form to each student and collects them all back.

   Stacey interviews 8 of the students and records their answers.

   Which is true?

   - ☐ Stacey is using a census and Reghan is using a sample.
   - ☐ Stacey is using a sample and Reghan is using a census.
   - ☐ They are both using a census.
   - ☐ They are both using a sample.

2. Sheila measures the weight of her new puppy every week for the first 12 weeks that she has her.

   Which type of graph would be suitable to represent this information?

   - ☐ Column Graph.
   - ☐ Divided bar Graph.
   - ☐ Line Graph.
   - ☐ Sector Graph.

Question 3 - 6 refer to the Column Graph below.

The graph shows Mitchell's weekly earnings over a period of 10 years.

3. In which year did Mitchell earn $700?

4. What was his earnings in 2007?

5. In which years did his income drop compared to the previous year?

☐ 2005 and 2009 ☐ 2007 and 2012 ☐ 2008 and 2013 ☐ 2010 and 2014

6. What is the difference between his highest and lowest weekly earnings?

☐ $350 ☐ $400 ☐ $450 ☐ $500

Question 7-10 refer to the stem and leaf plot below.

Ages of Players of an Online Game

Stem	Leaves
1	1 2 2 3 5 7 9
2	2 5 5 5 5 7 9
3	0 3 5 7 7 7 8
4	1 1 1 2 4 8 9 9
5	2 4 6 8
6	4 7 9
7	2 4

7. How many players were 37 years of age?

8. What age was the youngest player?

-

9. What age was most common among the players?

☐ 12 ☐ 25 ☐ 37 ☐ 41

10. How many players were older than 50 years of age?

☐ 4 ☐ 7 ☐ 8 ☐ 9

11. James wants to collect data on the reading preferences of the people in Canberra.

Which would not be a practical way of conducting his research?

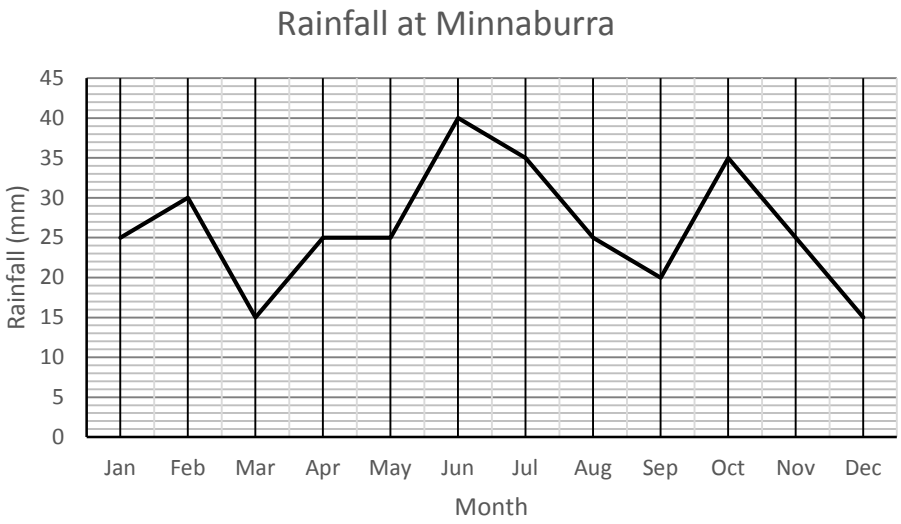
☐ Interviewing every person in Canberra.

☐ Interviewing a sample of 120 people in Canberra.

☐ Giving a survey form to 200 people in Canberra.

☐ Asking a bookstore for access to their records of sales.

Question 12-16 refer to the line graph below.



12. Which month recorded 30 mm of rainfall?

13. Which month had a 15 mm increase in rainfall compared to the previous month?

14. What was the difference between the highest and lowest monthly rainfall recordings?

☐ 15 mm ☐ 20 mm ☐ 25 mm ☐ 30 mm

15. The same amount of rainfall was recorded in five different months.
What was this amount?

☐ 15 mm ☐ 25 mm ☐ 35 mm ☐ 40 mm

16. What type of data is represented in the graph above.

☐ Observed Categorical Data. ☐ Measured Categorical Data.
☐ Observed Numerical Data. ☐ Measured Numerical Data

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Data Collection and Representation

Calculator Allowed Short Answer Section

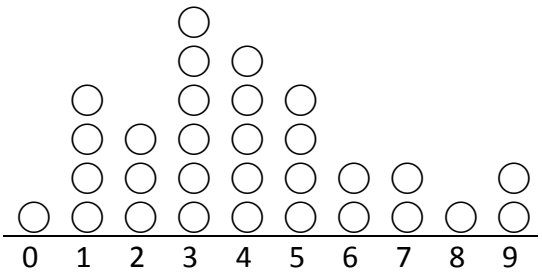
Name_____

Answer all questions in the spaces provided on this test paper by:
Writing the answer in the box provided.
or
Shading in the bubble for the correct answer from the four choices provided.
Show any working out on this test paper. Calculators are allowed.

Questions 1 – 4 refer to the dot plot below.

All of the members of a class were given ten shots each at a basketball hoop.

The teacher recorded how many successful shots each student had in the dot plot below.



Number of Successful Shots

1. How many students had 4 successful shots? ☐

2. How many students were in the class? ☐

3. What number of successful shots was recorded by exactly three students?

☐ 1 ☐ 2 ☐ 3 ☐ 4

4. How many students had more than 5 successful shots?

☐ 3 ☐ 5 ☐ 7 ☐ 11

5. Which of these would be a biased sample of the citizens of a town of 6 000 people.

- ☐ Selecting every 5th citizen from a list of all citizens.
- ☐ Selecting every 10th citizen from a list of all citizens.
- ☐ Selecting every 10th male and every 10th female citizen from a list of all citizens.
- ☐ Selecting every 5th citizen from a list of all female citizens.

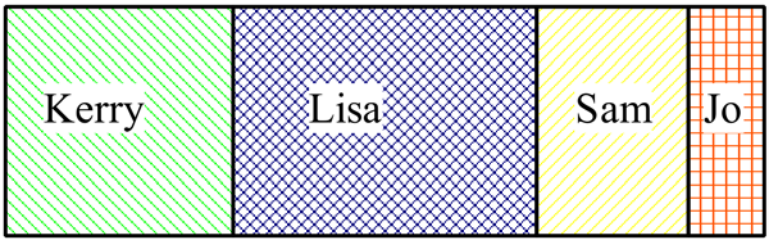
6. Wally collects information on the insects in his backyard by isolating an area of 2 square metres and counting the insects in that area.

Which is a good description of what he is doing?

- ☐ Taking a census of the backyard by measuring the insects.
- ☐ Taking a census of the backyard by observing the insects.
- ☐ Taking a sample of the backyard by measuring the insects.
- ☐ Taking a sample of the backyard by observing the insects.

Question 7 – 10 refer to the divided bar chart below.

Four friends worked together to make a quilt.



The chart shows the relative amounts of time each spent working on the quilt.

7. Who spent four times as long as Jo working on the quilt?

☐

8. What fraction of the total time did Sam spend working on the quilt?

$$\frac{\square}{\square}$$

9. Altogether they spent a total of 120 hours working on the quilt.

How many hours did Kerry spend?

☐ 12 hours ☐ 18 hours ☐ 24 hours ☐ 36 hours

10. How many more hours did Lisa spend, compared to Sam?

☐ 12 hours ☐ 18 hours ☐ 24 hours ☐ 36 hours

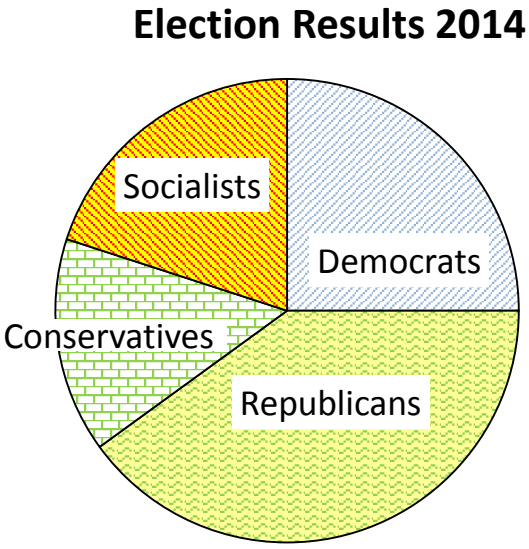
11. Which of the following types of graph shows parts of a whole rather than actual values?

☐ Column graph. ☐ Line Graph

☐ Sector graph ☐ Dot plot.

Questions 12-16 refer to the sector graph below.

A I



12. Which party received the least votes?

☐ Conservatives ☐ Democrats

☐ Republicans ☐ Socialists

13. What fraction of the total votes did the Democrats achieve?

$$\frac{\square}{\square}$$

14. No party received more than 50% of the votes.

List two parties that could combine their votes to achieve more than 50% of the votes.

_____ and _____

15. Which party received $\frac{1}{5}$ of the vote?

- ☐ Conservatives
- ☐ Democrats
- ☐ Republicans
- ☐ Socialists

16. There were 48 000 votes cast altogether.

How many votes were received by the Republicans?

- ☐ 12 000
- ☐ 19 200
- ☐ 21 000
- ☐ 24 000

High School Mathematics Test 2015

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Data Collection and Representation

Calculator Allowed
Longer Answer Section

Name_____

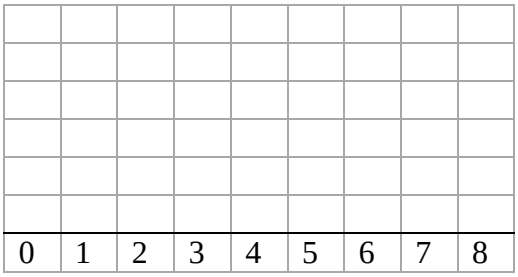
Write all working and answers in the spaces provided on this test paper.
Marks may not be awarded if working out and/or answers are not clear.
Marks allocated are shown beside each question.
Calculators are allowed.

Marks

1. The Lions FC coach records the number of goals that the team scores in each game they plays in a season. The results are shown below.

5	4	6	2	1
6	3	4	1	3
2	2	8	5	3
1	1	3	0	2
0	4	3	2	3

(a) Compile the data above into a dot plot. **1**



(b) Would you describe the distribution of scores as being symmetric? Explain your answer. **2**

……..

……..

(c) What is the range of the scores? (The difference between the highest and lowest scores.) **1**

……..

……..

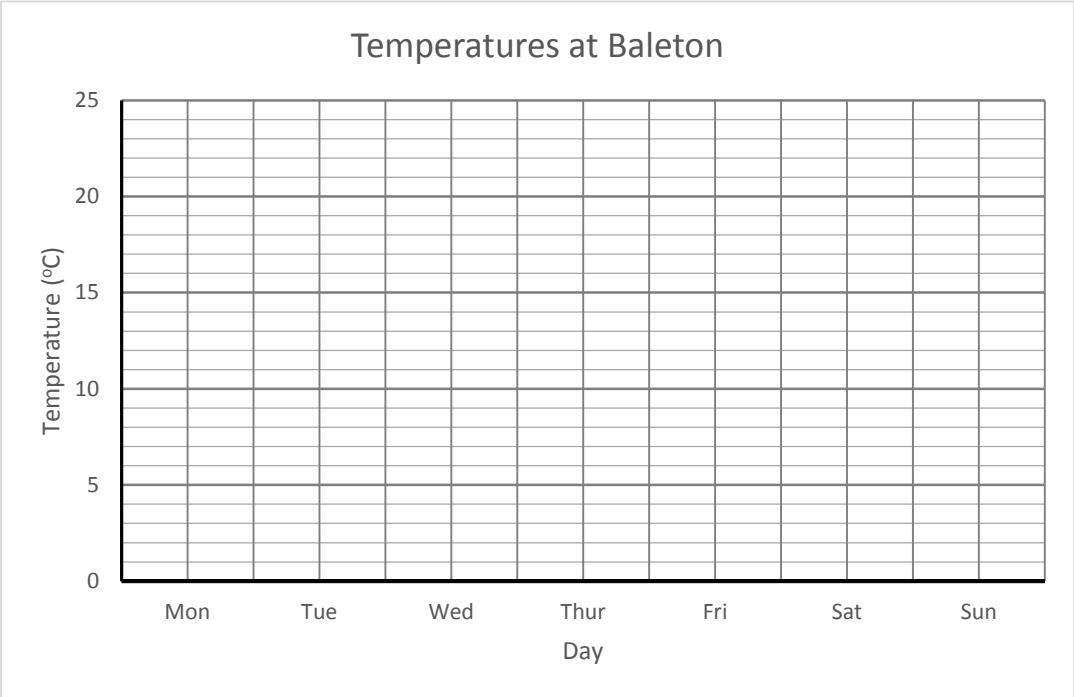
Marks

2. May recorded the minimum temperatures for a week at Baleton.

The results are shown in the table.

Day	Min Temp (°C)
Mon	8
Tue	12
Wed	11
Thur	15
Fri	16
Sat	20
Sun	21

(a) Draw a line graph of the temperatures on the axes below. **2**



(b) What was the range of temperatures for the week? **1**

……..

……..

(c) Describe the overall trend in the temperatures over the week. **1**

……..

……..

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Year 7

Data Collection and Representation

Non Calculator Section

ANSWERS

No.	WORKING	ANSWER
1.	Reghan is using census as she surveys all students, while Stacey only surveys 8 out of 24 so she is using a sample.	2nd Answer
2.	A line graph is best to represent quantities over time.	3rd Answer
3.	2011	2011
4.	In 2007 he made 650 per week	$650
5.	2008 and 2013	3rd Answer
6.	Difference = 800 – 450 = 350	1st Answer
7.	There are 3 who are 37	3
8.	Youngest was 11	11
9.	Most common was 25 (4 people)	2nd Answer
10.	From 52 to 74 there were 9 people over 50.	4th Answer
11.	Interviewing everyone in Canberra would not be practical for one person.	1st Answer
12.	February	February
13.	From May (25) to June (40) is 15 mm increase	June
14.	Highest 40 – lowest 15 = 25	25
15.	25 mm in Jan, Apr,May, Aug and Nov.	25 mm
16.	Measured Numerical Data	4th Answer

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Data Collection and Representation

Calculator Allowed
Short Answer Section

ANSWERS

No.	WORKING	ANSWER
1.	5 dots for 5 students	5
2.	1+4+3+6+5+4+2+2+1+2 =30	30
3.	2	2nd Answer
4.	2+2+1+2=7	3rd Answer
5.	Selecting only from the female citizens would give a biased sample of the town.	4th Answer
6.	By using a 2 square metre area he is taking a sample, and counting is done by observing.	4th Answer
7.	Kerry is 3 cm, Lisa is 4 cm, Sam is 2 cm and Jo 1 cm so Lisa is 4 times Jo.	Lisa
8.	Total Length = 3 + 4 + 2+1 = 10 cm Sam as fraction of total = $\frac{2}{10} = \frac{1}{5}$	$\frac{1}{5}$
9.	10 cm represents 120 hours, so 1 cm represents 12 hrs. Kerry is 3 cm, so time = 3 × 12 = 36 hours.	4th Answer
10.	Lisa = 4 × 12 = 48 hrs. Sam = 2 × 12 = 24 hrs Extra spent = 48 – 24 = 24 hours	3rd Answer
11.	Sector graph does not give actual values unless added in as data labels.	3rd Answer
12.	Conservatives have 54° angle, so is the smallest.	1st Answer
13.	Democrats have a 90° angle so fraction = $\frac{1}{4}$	$\frac{1}{4}$
14.	Any combination of 2 parties where Republicans is one of the pair.	Republicans and any other.
15.	$\frac{1}{5}$ of 360° = 72° Socialists have an angle of 72°.	4th Answer

16.	Republicans angle = 144^o $\text{Republicans fraction} = \frac{144}{360} = \frac{2}{5}$ $\text{Number of Republican votes} = \frac{2}{5} \times 48000 = 19\,200.$	2nd Answer

High School Mathematics Test 2015

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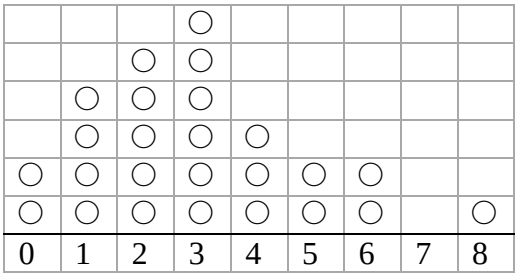
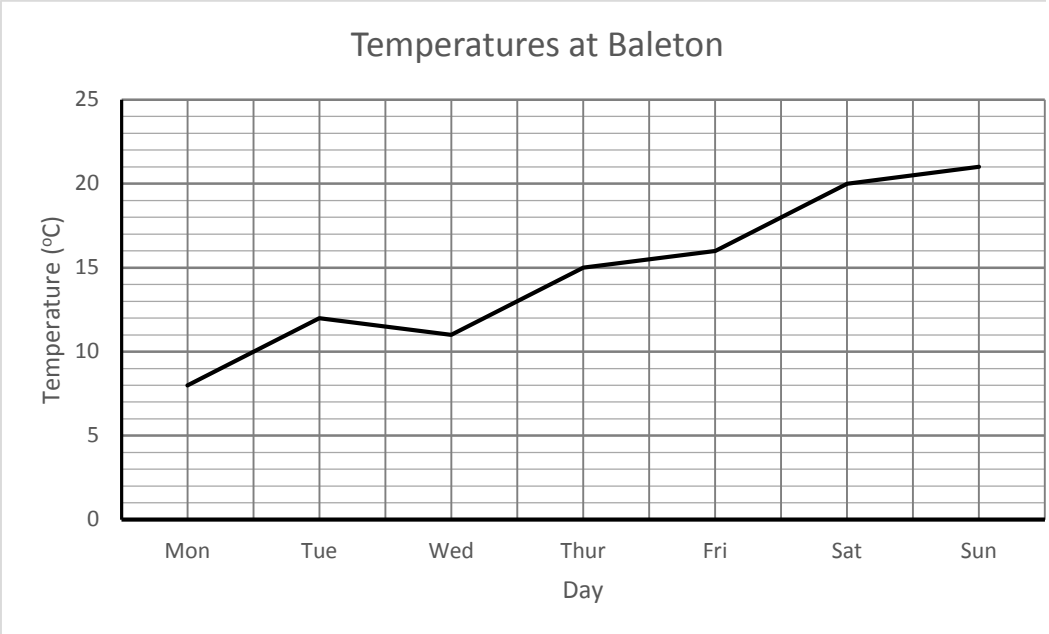
Data Collection and Representation

Calculator Allowed
Longer Answer Section

ANSWERS

		Marks
1.	(a) 	**1**
	(b) It is not symmetric as there are more scores toward the lower end of the scores.	**1 for not symmetric 1 for reason**
	(c) Range = 8 – 0 = 8	**1**
2.	(a) 	**2 marks in total for correctly drawn graph.** **1 mark if a bit messy or inaccurate or partially completed**

	(b) Range is from 21 to 8. 21 – 8 = 13	**1**
	(c) The trend is increasing as the week goes on.	**1**