

High School Mathematics Test 2014

Year
9

Basic Statistics

Non Calculator

Skills and Knowledge Assessed:

- Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)
- Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)
- Describe and interpret data displays using median, mean and range (ACMSP172)
- Investigate techniques for collecting data, including census, sampling and observation (ACMSP284)
- Investigate the effect of individual data values, including outliers, on the mean and median

Name _____

Section 1 Short Answer Questions

Write all working and answers in the spaces provided on this test paper.

1. Five friends earn the following marks on a quiz out of 10 marks:

5, 5, 6, 9 and 10.

Find the mean (average) of their marks.

.....

.....

2. Abbey scores the following scores in 6 hands of a card game.

200, 180, 160, 140, 100 and 40.

Find the median of her scores.

.....

.....

3. Ellie plays eight games of netball and scores the following number of goals,

8, 3, 6, 7, 12, 9 and 14.

What is the range of her scores?

.....

.....

4. Taylah records the number of minutes of exercise she does each day over two weeks.

	Mon	Tue	Wed	Thur	Fri	Sat	Sun
Week 1	20	45	30	20	60	45	60
Week 2	45	20	45	30	20	45	35

Find the mode of her times.

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.....

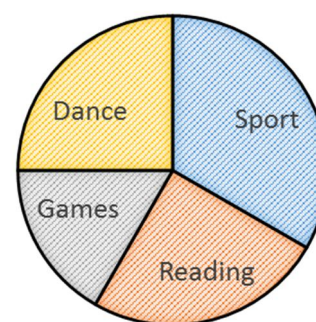
5. Rachel drew the sector graph to illustrate the hobbies of her classmates.

Which hobby was the mode?

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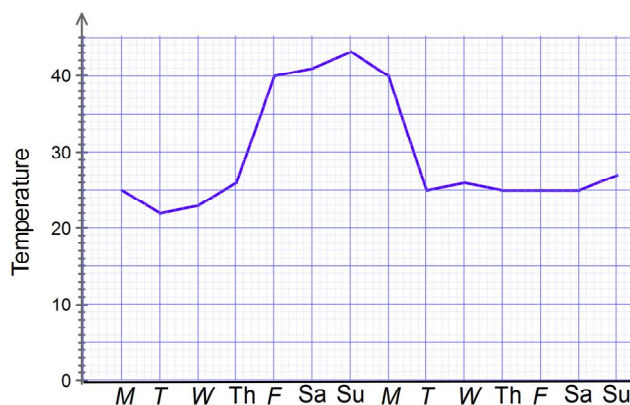
.....

HOBBIES FROM CLASS 9A



Mahta records the temperature at midday at her home over a period of a fortnight.

She draws a line graph from her results.



Questions 6 and 7 refer to Mahta's graph.

6. What was the range of the temperatures that she recorded?

.....

7. During the fortnight, there was a period that Mahta's mum described as a heatwave.

What were the first and last days of the heatwave ?

.....

.....

Mitchell's scores in 20 shots at a dartboard.

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

Question 8- 10 refer to the stem and leaf plot above.

8. What is the mode of the scores?

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.....

9. Which score could be described as an outlier?

.....

10. What effect would it have on the mean if the outlier were not included in the data?
(You don't have to calculate the mean to answer this question.)

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.....

Results of a survey on how young people communicated.



Questions 11 and 12 refer to the graph above. (A ruler would be useful).

11. What method of communication was used by one fifth of those surveyed?

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.....

12. What percentage of those surveyed chose social media.

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Score (x)	Frequency (f)	fx	Cumulative Frequency
6	4		
7	9		
8	10		
9	7		

$$\Sigma f = \quad \Sigma fx =$$

Questions 13 – 15 refer to the frequency distribution table above.

13. What is the mode of the scores?

.....

.....

14. What is the median of the scores?

.....

.....

15. What is the mean of the scores (correct to one decimal place)?

.....

.....

High School Mathematics Test 2014

Year
9

Basic Statistics

Calculator Allowed

Name _____

Section 2 Multiple Choice Questions

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

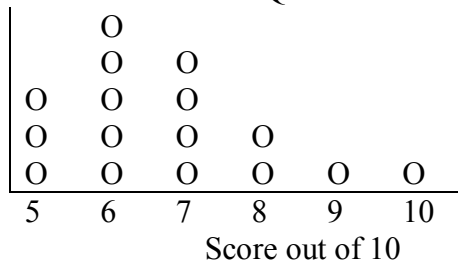
1. Twelve students score the following marks on a test out of 30.

16, 30, 28, 17, 22 18, 21, 16, 23, 23, 20 and 21.

What is the mean of the marks?

- A. 21 B. 21.25 C. 21.75 D. 22

Results on a 10 Mark Quiz.



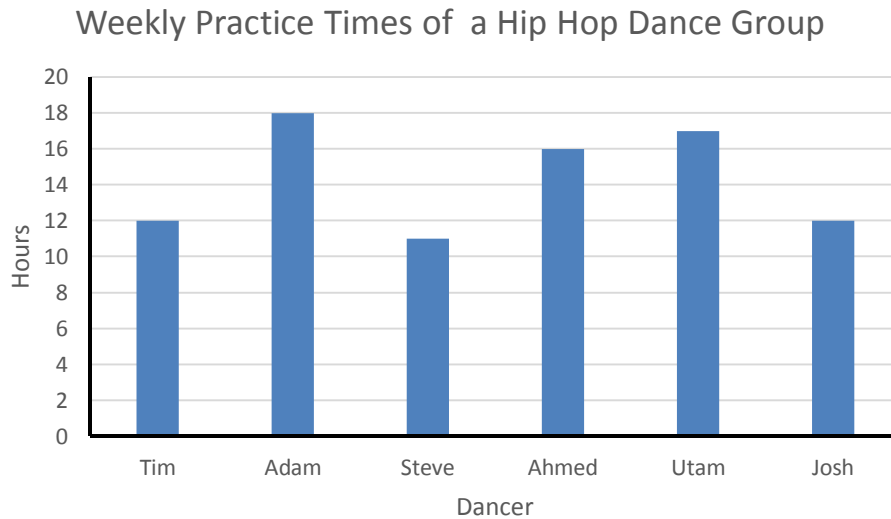
Questions 2 and 3 refer to the dot plot above.

2. What is the mode of the scores?

- A. 6 B. 6.5 C. 6.75 D. 7

3. What is the median of the scores?

- A. 6 B. 6.5 C. 6.75 D. 7



Questions 4 and 5 refer to the graph above.

4. What was the median time spent at practice by the 6 dancers?
- A. 6 hours
 - B. 12 hours
 - C. 14 hours
 - D. 16 hours
5. What was the range of times spent at practice by the 6 dancers?
- A. 4 hours
 - B. 5 hours
 - C. 6 hours
 - D. 7 hours

6. Molly is conducting a survey as part of her statistics assignment. She asks four males and four females from each school year to complete a survey form. She has used:
- A. A census of her class.
 - B. A sample of her class.
 - C. A census of her school.
 - D. A sample of her school.

Kayla compiled a frequency distribution table of the number of times her friend Chelsea mentioned her boyfriend's name in 60 phone conversations.

<i>Number of Mentions (x)</i>	Frequency (<i>f</i>)	<i>fx</i>
6	10	
7	18	
8	15	
9	8	
10	9	

$$\Sigma f = \quad \Sigma fx =$$

Questions 7 and 8 refer to the table above.

7. How many times was the boyfriend's name mentioned in the 60 conversations?

- A. 40 B. 60 C. 126 D. 468

8. What was the mean number of mentions?

- A. 7.0 B. 7.8 C. 8.0 D. 8.5

9. Brooke swam 100 metres 15 times one afternoon in her training. Her mean time for the 15 swims was 56 seconds.

She then did another 5 swims where her mean time was 55 seconds.

What was her mean time for the 20 swims ?

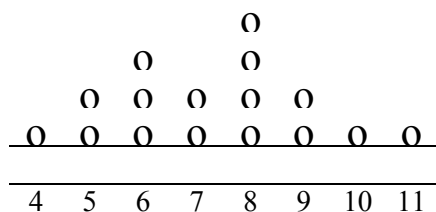
- A. 55.25 sec. B. 55.50 sec. C. 55.75 sec. D. 56.00 sec.

10. Blake measures the masses of 50 of the cattle on his property.

This is an example of:

- A. Continuous Numerical Data. B. Discrete Numerical Data.
C. Continuous Categorical Data. D. Discrete Categorical Data.

11. Heather records the ages of her 16 young cousins in the dot plot.



She realises that she has left out a cousin who is 7.

Which will change when she includes the extra score?

- A. The mean and median. B. The mean and mode.
C. The median and mode. D. The mode and range.

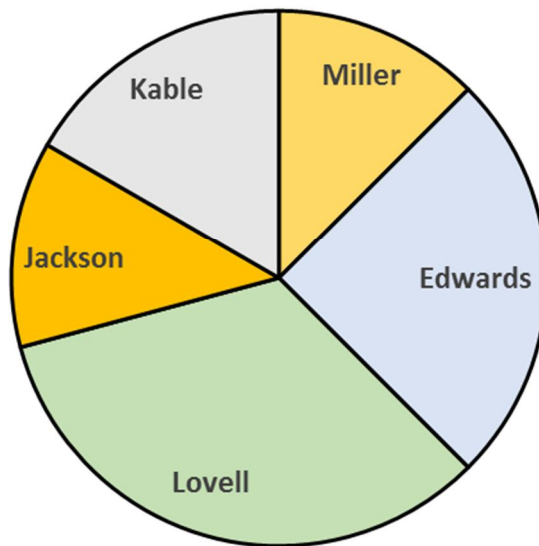
Points scored by the Giants Rugby team in their 2013 season games.

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

Questions 12 and 13 refer to the stem and leaf plot above.

12. What was the median number of points scored for the season?
- A. 22 B. 23 C. 24 D. 26
13. What was the mean number of points scored for the season (correct to 1 decimal place)?
- A. 4.8 B. 24.0 C. 24.8 D. 26.7

Votes Received by Five Candidates in an Election.



Questions 14 and 15 refer to the graph above. (A protractor would be helpful.)

14. What fraction of the votes did Lovell receive?
- A. $\frac{1}{5}$ B. $\frac{1}{4}$ C. $\frac{1}{3}$ D. $\frac{1}{2}$
15. Jackson received 1 200 votes. How many votes did Edwards receive?
- A. 2 000 B. 2 400 C. 3 000 D. 3 600

High School Mathematics Test 2014

Multiple Choice Answer Sheet

Name _____

Completely fill the response oval representing the most correct answer.

- | | | | | | | | | |
|-----|---|-----------------------|---|-----------------------|---|-----------------------|---|-----------------------|
| 1. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 2. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 3. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 4. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 5. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 6. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 7. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 8. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 9. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 10. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 11. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 12. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 13. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 14. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
| 15. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |

High School Mathematics Test 2014

Basic Statistics

ANSWERS

Section 1 (1 mark each)																									
	Working and Answers																								
1.	$\text{Mean} = \frac{5 + 5 + 6 + 9 + 10}{5}$ $= \frac{35}{5} = 7$																								
2.	200, 180, 160, 140, 100, 40. Median = Midway between 160 and 140 = 150																								
3.	8, <u>3</u> , 6, 7, 12, 9, <u>14</u> Range = 14 – 3 = 11																								
4.	<table border="1"><thead><tr><th></th><th>Mon</th><th>Tue</th><th>Wed</th><th>Thur</th><th>Fri</th><th>Sat</th><th>Sun</th></tr></thead><tbody><tr><td>Week 1</td><td>20</td><td><u>45</u></td><td>30</td><td>20</td><td>60</td><td><u>45</u></td><td>60</td></tr><tr><td>Week 2</td><td><u>45</u></td><td>20</td><td><u>45</u></td><td>30</td><td>20</td><td><u>45</u></td><td>35</td></tr></tbody></table> The mode is 45.		Mon	Tue	Wed	Thur	Fri	Sat	Sun	Week 1	20	<u>45</u>	30	20	60	<u>45</u>	60	Week 2	<u>45</u>	20	<u>45</u>	30	20	<u>45</u>	35
	Mon	Tue	Wed	Thur	Fri	Sat	Sun																		
Week 1	20	<u>45</u>	30	20	60	<u>45</u>	60																		
Week 2	<u>45</u>	20	<u>45</u>	30	20	<u>45</u>	35																		
5.	Sport has the largest sector. Sport is the mode.																								
6.	Max = 43 and min = 22 Allow for 1 degree error with both max and min. Range = 43 – 22 = 21																								
7.	The Friday of the 1 st week and the Monday of the 2 nd week were the first and last days of the heatwave.																								
8.	The mode is 26 (Occurs 4 times)																								
9.	The score of 60 is an outlier, as it is removed from the rest of the scores.																								
10.	The mean would be reduced if the outlier were not included, since the one large score boosts the total of the scores. (For those who do calculate the difference the mean is 19.95 with the outlier and 17.84 without it.)																								
11.	One fifth of 10 cm is 2 cm. The section which is 2 cm is Phone.																								
12.	Social media is 4.5 cm out of 10 cm = 45%.																								

13.	Score (x)	Frequency (f)	fx	Cumulative Frequency
	6	4	24	4
	7	9	63	13
	8	10	80	23
	9	7	63	30
	$\Sigma f = 30 \quad \Sigma fx = 230$			
	Mode is 8 (Occurs 10 times)			
14.	Median is 15 th and 16 th scores which are both 8's (from CF column) Median is 8.			
15.	Mean = $\frac{\Sigma fx}{\Sigma f} = \frac{230}{30} = 7.666 = 7.7$ (1 dp)			

Section 2 (1 mark each)																				
	Working	Answers																		
1.	$\text{Mean} = \frac{255}{12}$ $= 21.25$	B																		
2.	Mode is 6 (occurs 5 times)	A																		
3.	Median is between 6 and 7, so is 6.5.	B																		
4.	Median is between 12 and 16, so is 14.	C																		
5.	Range = $18 - 11 = 7$	D																		
6.	Since students chosen from all years it is a survey of the school, and since only four from each year it is a sample.	D																		
7.	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Number of Mentions (x)</th><th>Frequency (f)</th><th>fx</th></tr> </thead> <tbody> <tr> <td>6</td><td>10</td><td>60</td></tr> <tr> <td>7</td><td>18</td><td>126</td></tr> <tr> <td>8</td><td>15</td><td>120</td></tr> <tr> <td>9</td><td>8</td><td>72</td></tr> <tr> <td>10</td><td>9</td><td>90</td></tr> </tbody> </table> <p style="text-align: center;">$\Sigma f = 60 \quad \Sigma fx = 468$</p> <p>There were 468 mentions.</p>	Number of Mentions (x)	Frequency (f)	fx	6	10	60	7	18	126	8	15	120	9	8	72	10	9	90	D
Number of Mentions (x)	Frequency (f)	fx																		
6	10	60																		
7	18	126																		
8	15	120																		
9	8	72																		
10	9	90																		
8.	$\text{Mean} = \frac{468}{60} = 7.8$	B																		
9.	$\text{Mean of 20 swims} = \frac{15 \times 56 + 5 \times 55}{20} = \frac{1115}{20} = 55.75 \text{ sec}$	C																		
10.	Since it is measured (in kg or tonnes) it is continuous numerical data.	A																		
11.	$\text{Current mean} = \frac{117}{16} = 7.3125$ $\text{Current median} = 8^{\text{th}} \text{ and } 9^{\text{th}} = \frac{7+8}{2} = 7.5$ $\text{Current mode} = 8$ $\text{Current range} = 11 - 4 = 7$ $\text{New mean} = \frac{117 + 7}{16 + 1} = \frac{124}{17} = 7.2941$ $\text{New median} = 9^{\text{th}} = 7$ $\text{New mode} = 8$ $\text{New range} = 11 - 4 = 7$ <p>Mean and median change.</p>	A																		
12.	<p>Median is between the 8th and 9th scores which are 22 and 26.</p> $\text{Median} = \frac{22 + 26}{2} = \frac{48}{2} = 24$	C																		
13.	$\text{Mean} = \frac{427}{16} = 26.7 \text{ (1 dp)}$	D																		
14.	<p>Lovell section is 120° and total is 360°.</p> $\text{Fraction Lovell received} = \frac{120}{360} = \frac{1}{3}$	C																		
15.	<p>Jackson section measures 45° and Edwards is 90°, so Edwards got twice the votes of Jackson.</p> $\text{Edwards got } 1\,200 \times 2 = 2\,400$	B																		

High School Mathematics Test 2014

Multiple Choice Answer Sheet

Basic Statistics

Name _____ Marking Sheet

Completely fill the response oval representing the most correct answer.

- | | | | | | | | | |
|-----|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|
| 1. | A | <input type="radio"/> | B | <input checked="" type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
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| 5. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input checked="" type="radio"/> |
| 6. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input checked="" type="radio"/> |
| 7. | A | <input type="radio"/> | B | <input type="radio"/> | C | <input type="radio"/> | D | <input checked="" type="radio"/> |
| 8. | A | <input type="radio"/> | B | <input checked="" type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
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