School Name
Mathematics Test 2017

Year 7

Data Collection and Representation

Non Calculator Section

Name_____

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)

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

Writing the answer in the box provided.

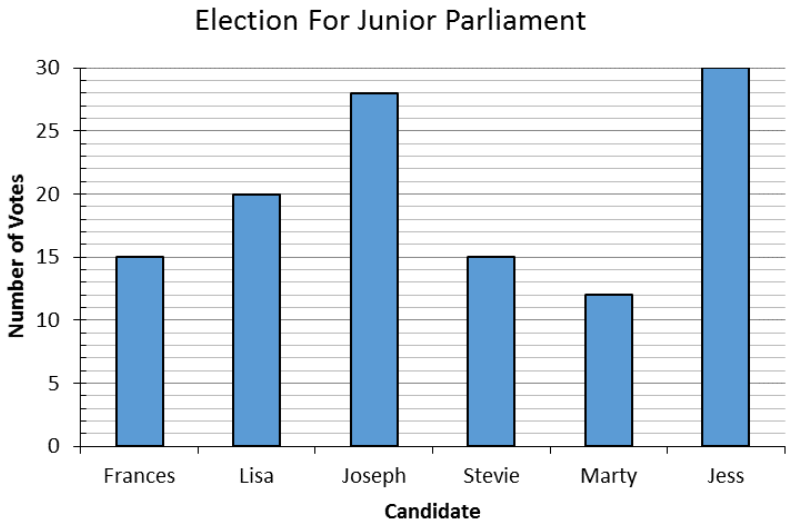
or

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 in this section.

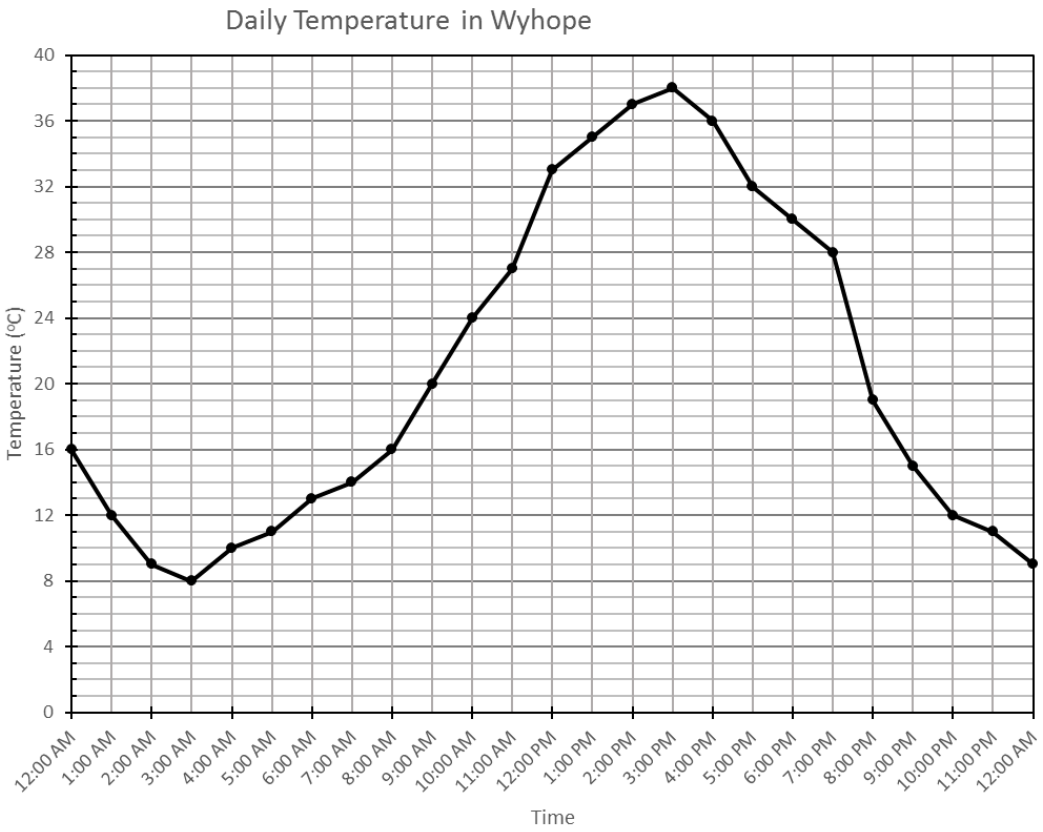
You will need a ruler and protractor.

Questions 1 – 4 refer to the following.



1.	How many votes did Lisa get? ☐
2.	How many votes were cast altogether? ☐
3.	What number of votes were received by two candidates? ☐ 12 ☐ 15 ☐ 20 ☐ 28
4.	How many candidates got more than 18 votes? ☐ 1 ☐ 2 ☐ 3 ☐ 4
5.	Which of these situations would be suitable to use a census to collect the data? ☐ Predicting the result of a federal election. ☐ Publishing the ratings of television programs. ☐ Producing a list of the top selling music tracks in a given week. ☐ Electing the Class Captain from a year 7 class.
6.	For which of the following could the data be collected by observation? ☐ The colours of the pets that are exercised in a park. ☐ The favourite colours of the members of a club. ☐ The heights of students in a year 7 class. ☐ The opinions of people about transport in a city.

Question 7 – 10 refer to the graph below.



7. What was the temperature at 4 pm on this day?

8. At what time(s) was the temperature 8° C?

9. How many times during the day was the temperature 12° C?

☐ 1 ☐ 2 ☐ 3 ☐ 4

10. What was the difference between the maximum and minimum temperatures on the day?

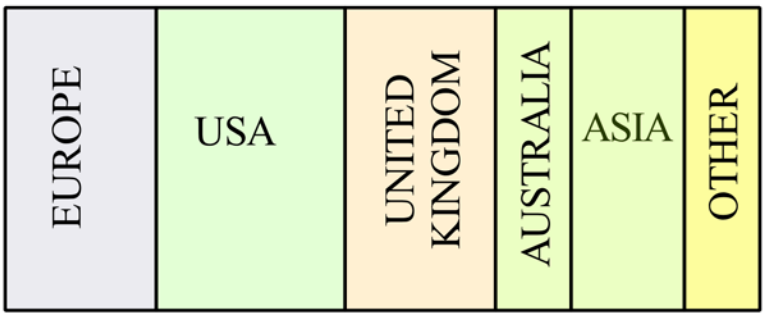
☐ 29° C ☐ 30° C ☐ 31° C ☐ 32° C

11. Which of the following types of graph would be suitable to show the proportion of students who have different coloured eyes?

- ☐ Frequency Histogram
- ☐ Line Graph
- ☐ Sector graph
- ☐ Stem and Leaf plot.

Questions 12 – 16 refer to the following:

Moondance Film Festival
Region of Origin



The divided bar graph shows the region of origin of the 50 movies that played at the Moondance Film Festival.

12. Which region produced the most movies at the festival?

- ☐ Asia
- ☐ Australia
- ☐ United Kingdom
- ☐ USA

13. Which regions produced more movies than Asia but less than the USA?

☐ and ☐

14. What fraction of the movies were produced in Europe?

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

15. Which country produced $\frac{3}{20}$ of the movies?

- ☐ Asia
- ☐ Australia
- ☐ United Kingdom
- ☐ USA

16.	How many of the 50 movies were made in Other regions?

School Name
Mathematics Test 2017

Year 7

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Calculator Allowed
Short Answer Section

Name_____

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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.

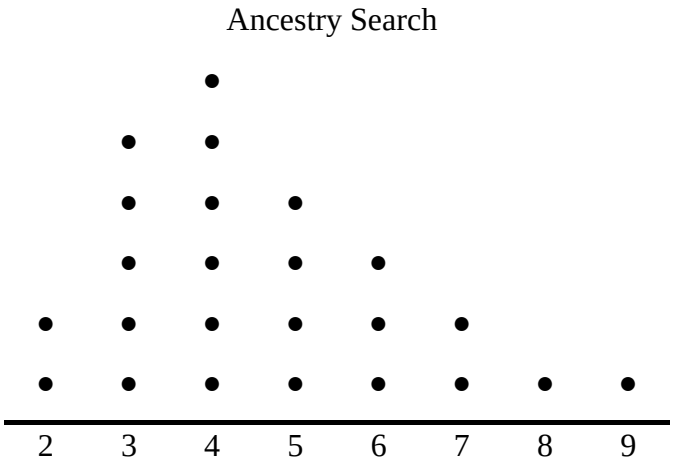
1. Angela is a researcher who wants to collect data on the heights of people in Australia.
Which would be a practical way of conducting his research?

- ☐ Measuring every person in Australia.
- ☐ Measuring every person in South Australia.
- ☐ Sending a survey form to every person in Australia, asking their height.
- ☐ Sending a survey form to 100 people from all around Australia, asking their height.

2. Sandra records the preferred political party of voters a week before an election.
Which type of graph would **not** be suitable to represent this information?

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

Question 3 - 6 refer to the dot plot below.



The plot shows the number of generations of ancestors that the students in a class had found during an assignment on ancestry.

3. How many students found exactly 6 generations of ancestors?

4. What number of generations was found by 5 students?

5. What fraction of the students found exactly 4 generations of ancestors?

☐ $\frac{1}{12}$ ☐ $\frac{1}{6}$ ☐ $\frac{1}{5}$ ☐ $\frac{1}{4}$

6. What fraction of the students found more than 6 generations of ancestors?

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

Number of Passengers on 30 Buses.

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

The stem and leaf plot was completed by counting the number of passengers on thirty buses which passed a checkpoint on a highway.

7. How many buses had 19 passengers?

8. What was the most common number of passengers?

9. How many buses had fewer than 20 passengers?

☐ 14 ☐ 15 ☐ 16 ☐ 17

10. What fraction of buses had more than 40 passengers?

☐ $\frac{1}{12}$ ☐ $\frac{1}{6}$ ☐ $\frac{1}{5}$ ☐ $\frac{1}{4}$

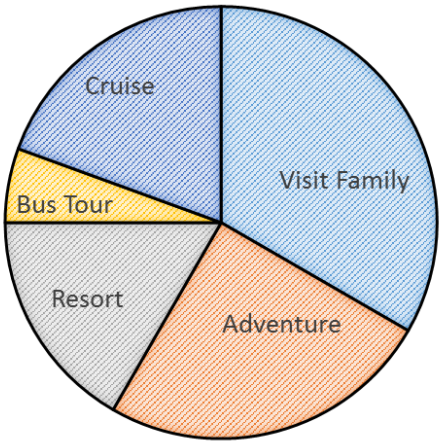
11. Mark asks 50 people chosen from a town of 10 000 to answer how strongly they agree with questions by rating their agreement on a scale of 1 – 5.

Which is true?

- ☐ He is using a census to collect continuous numerical data.
- ☐ He is using a census to collect categorical data.
- ☐ He is using a sample to collect continuous numerical data.
- ☐ He is using a sample to collect categorical data.

Question 12-16 refer to the sector graph below.

Student's Holiday Type



A survey of 108 students asked which type of holiday they had most recently experienced. The sector graph is drawn from the results of the survey.

12. Which type of holiday was least common?

13. What fraction of the students had an Adventure holiday?

14. Which holiday type was taken by $\frac{1}{6}$ of the students?

☐ Adventure ☐ Bus Tour ☐ Cruise ☐ Resort

15. How many of the 108 students visited family for their holiday?

☐ 27 ☐ 30 ☐ 36 ☐ 39

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

☐ Categorical Data from observation. ☐ Categorical Data from measurement.
☐ Categorical Data from survey responses. ☐ Numerical Data from survey responses.

School Name
Mathematics Test 2017

Year 7

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

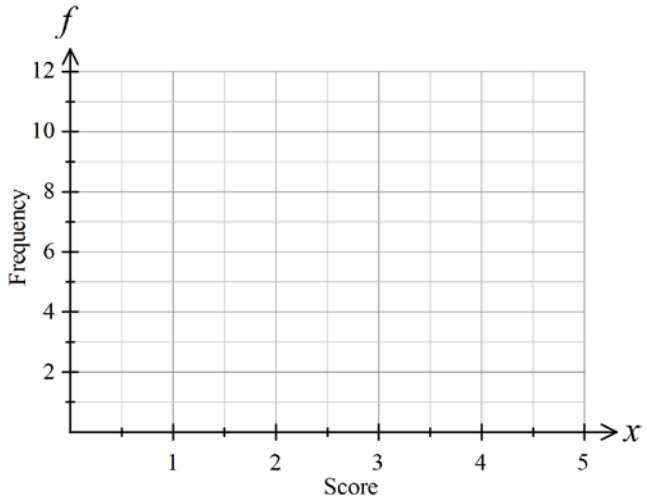
1. The frequency distribution table records the number of children in 25 families.

Score (x)	Tally	Frequency (f)	(fx)
1	~~IIII~~ ~~IIII~~		
2	~~IIII~~ III		
3	~~IIII~~		
4	II		
		Σf =	Σfx =

(a) Complete the table, including the column totals. **4**

Marks

(b) Draw a frequency histogram for the data. **2**



(c) What percentage of the families had 3 children? **1**

……..

……..

2. The Cougars Netball team coach recorded the number of goals that the team scored in each game they played in a season. The results are shown below.

29	48	52	35	42
30	24	45	38	39
9	17	26	36	47
48	28	32	34	48
56	18	32		

(a) Compile the data above into a stem and leaf plot. **2**

Stem	Leaves							
0								
1								
2								
3								
4								
5								

Marks

(b) Would you describe the distribution of scores as being symmetric? Explain your answer. **1**

……..

……..

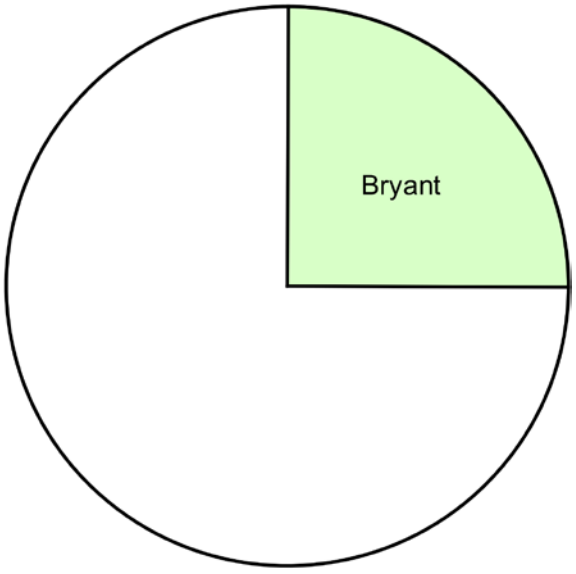
(c) What score occurred in more games than any other? **1**

……..

3. Complete the table and the sector graph below for the results of an election. **4**

A protractor will be needed.

Candidate	Percent	Angle
Nguyen	10%	36°
Kwong	45%	
Liaw	20%	
Bryant	25%	90°



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Mathematics Test 2017

Year 7

Data Collection and Representation

Non Calculator Section

ANSWERS

Question	Working and Answer
1.	Lisa got **20 votes**
2.	15+20+28+15+12+30 **=120**
3.	Stevie and Frances both received **15 votes** **2nd Answer**
4.	Lisa, Joseph and Jeff , so **3 candidates** **3rd Answer**
5.	Electing the representative from a year 7 class could be done by asking every student to vote, which is a census. **4th Answer**.
6.	The dog colours could be recorded by observing. **1st Answer**
7.	At 4 pm it was **36° C**.
8.	It was 8° C at **3 am.**
9.	On three occasions, 1:00 am, 5:30 am and 10:00 pm. **3rd Answer**

Question	Working and Answer
10.	Maximum Temperature = 38° C Minimum Temperature = 8° C Difference = 30° C **2nd Answer**
11.	Sector graph is best of these to show proportions as it shows parts of a circle. **3rd Answer**
12.	The USA has the longest section of the bar. **4th Answer**
13.	**Europe and the United Kingdom**
14.	Europe had 20 mm section, out of 100 mm long bar. $\text{Fraction} = \frac{20}{100} = \mathbf{\frac{1}{5}}$
15.	$\frac{3}{20}$ of 100 mm = 15 mm **Asia** has a 15 mm long section. **1st Answer**
16.	Other Section = 10 mm $\text{Other fraction} = \frac{10}{100} = \frac{1}{10}$ $\text{Number of Other Movies} = \frac{1}{10} \times 50 = \mathbf{5\ movies.}$

School Name
Mathematics Test 2017

Year 7

Data Collection and Representation

Calculator Allowed
Short Answer
Section

ANSWERS

Question	Working and Answer
1.	Only the last option is practical as she is using a sample. **4th Answer**
2.	A line graph is best to represent changing quantities over time, not categorical data. **3rd Answer**
3.	6 generations has 3 dots, so **3 people**
4.	There are 5 dots on **3 generations.**
5.	4 generations has 6 dots, so 6 people out of 24 $\text{Fraction} = \frac{6}{24} = \frac{1}{4}$ **4th Answer**
6.	7, 8 and 9 generations have 2, 1 and 1 dots respectively, so 4 people out of 24 $\text{Fraction} = \frac{4}{24} = \frac{\mathbf{1}}{\mathbf{6}}$
7.	9 occurs twice on the 1 stem, so **2 buses.**
8.	5 occurs four times on the 1 stem, which is more than any other, so the most common number of passengers is **15.**

9.	All the leaves on the 0 and 1 stems are fewer than 20, so number = 7 + 8 = **15** **2nd Answer**
10.	All the leaves on the 4 and 5 stems are more than 40, so number = 5 + 1 = **6** $\text{Fraction} = \frac{6}{30} = \frac{\mathbf{1}}{\mathbf{5}}$ **3rd Answer**
11.	He is choosing a sample of 50 from the town Rating on a scale is categorical data. **4th Answer**
12.	Smallest angle is for **Bus Tour**
13.	Adventure has a 90° angle. $\text{Fraction} = \frac{90}{360} = \frac{\mathbf{1}}{\mathbf{4}}$
14.	$\text{Angle for } \frac{1}{6} \text{ of students} = \frac{1}{6} \times 360 = 60°.$ Measuring, the type with a 60° angle is **Resort.** **4th Answer**
15.	Visit Family has a 120° angle. $\text{Fraction} = \frac{120}{360} = \frac{1}{3}$ $\text{Number} = \frac{1}{3} \times 108 = \mathbf{36}$ **3rd Answer**
16.	The data is names of holiday types so is Categorical. It comes from survey responses. **3rd Answer**

School Name

Mathematics Test 2017

Year 7

Data Collection and Representation

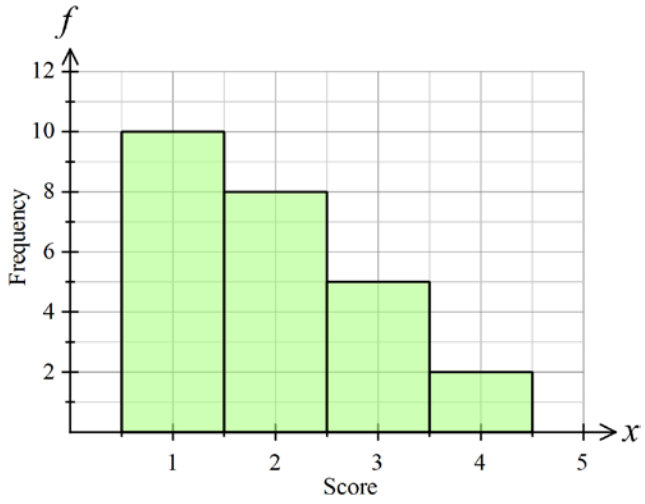
Calculator Allowed

Longer Answer Section

ANSWERS

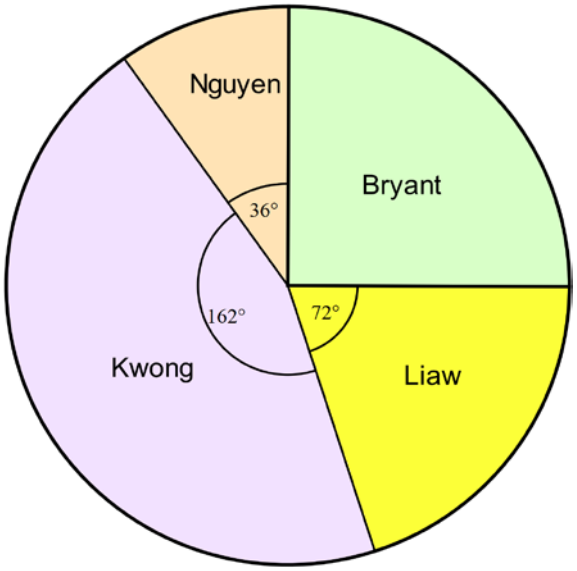
<table>
<tr><th>Question</th><th>Working and Answer</th><th>Marks</th></tr>
<tr><td>1.</td><td>(a)
<table>
<tr><th>Score (x)</th><th>Tally</th><th>Frequency (f)</th><th>(fx)</th></tr>
<tr><td>1</td><td>~~IIII~~ ~~IIII~~</td><td>10</td><td>10</td></tr>
<tr><td>2</td><td>~~IIII~~ III</td><td>8</td><td>16</td></tr>
<tr><td>3</td><td>~~IIII~~</td><td>5</td><td>15</td></tr>
<tr><td>4</td><td>II</td><td>2</td><td>8</td></tr>
</table>
$\Sigma f = 25 \quad \Sigma fx = 49$</td><td>4 marks in total for correctly completed table.

1 mark for each column and 1 for each total.
Do not penalise subsequent errors.</td></tr>
</table>

<table>
<tr><th>Question</th><th>Working and Answer</th><th>Marks</th></tr>
<tr><td></td><td>(b)
 
</td><td>2 marks for correct and accurate graph

1 mark if a minor error or lack of accuracy.</td></tr>
<tr><td></td><td>(c) $\text{Percentage} = \frac{5}{25} \times 100$
$= \frac{1}{5} \times 100\%$
$= 20\%$</td><td>1 mark for correct answer</td></tr>
<tr><td>2.</td><td>(a)
<table>
<tr><th>Stem</th><th colspan="8">Leaves</th></tr>
<tr><td>0</td><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>1</td><td>7</td><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>4</td><td>6</td><td>8</td><td>9</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>0</td><td>2</td><td>2</td><td>4</td><td>5</td><td>6</td><td>8</td><td>9</td></tr>
<tr><td>4</td><td>2</td><td>5</td><td>7</td><td>8</td><td>8</td><td>8</td><td></td><td></td></tr>
<tr><td>5</td><td>2</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td><td>2 marks for correct and accurate plot

1 mark if a minor error or lack of accuracy.</td></tr>
<tr><td></td><td>(b) It is not symmetric as there are more scores at the upper end of the range.</td><td>1 mark for correct answer with some valid description</td></tr>
<tr><td></td><td>(c) 48</td><td>1 mark for correct answer</td></tr>
</table>

Question	Working and Answer	Marks
3.	Complete the table and the sector graph below for the results of an election. A protractor will be needed. **Candidate / Percent / Angle** Nguyen / 10% / 36° Kwong / 45% / **162°** Liaw / 20% / **72°** Bryant / 25% / 90°  	**2 marks for completing the two values in the table** **2 marks for completing the sector graph accurately.** **1 mark if error made in two sectors or if generally inaccurate but otherwise correct.**