Part 3: Short Answer Questions

Question 1

Solve each equation with the quadratic formula.

1) $v^2+2v-8=0$

2) $k^2+5k-6=0$

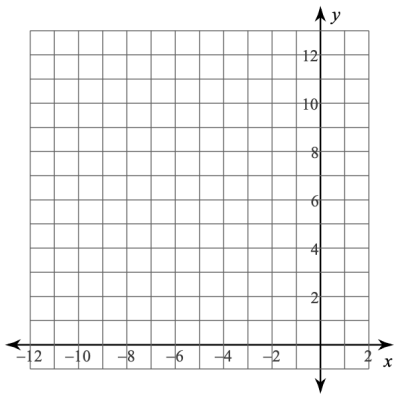
3) $14m^2+1=6m^2+7m$

4) $4x^2+4x-8=1$

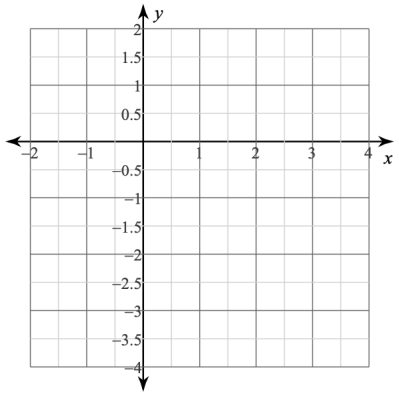
Question 2

Sketch the graph of each function.

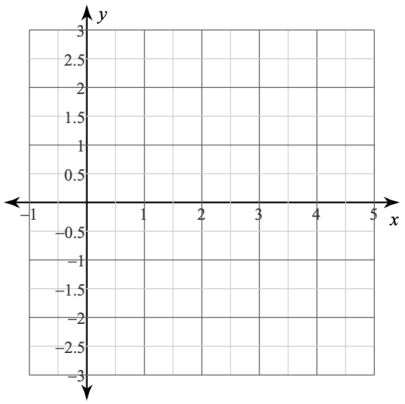
1) $y=3x^2$



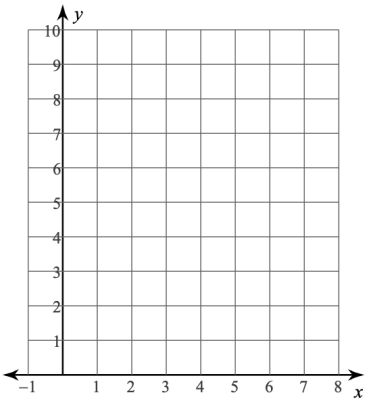
2) $y=-\frac{1}{2}x^2$



3) $y = -x^2 + 2x + 1$



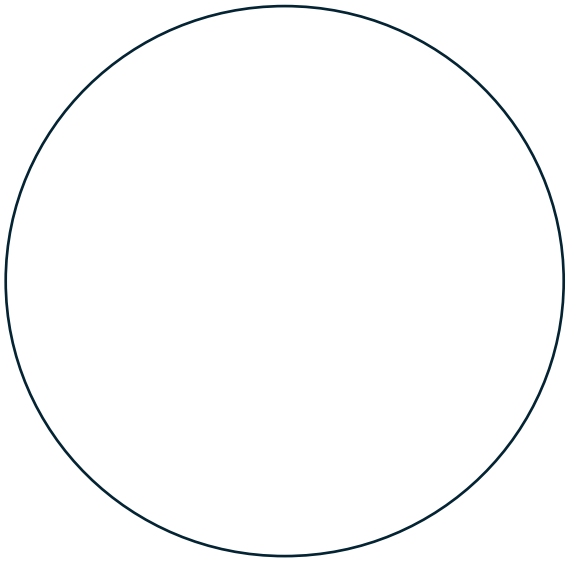
4) $y = 2x^2 - 16x + 33$



Question 3

Please complete the table and draw a pie chart based on the table

Holiday Destination	Frequency	Fraction	Angle
Europe	11	?	?
Asia	25	?	?
Africa	6	?	?
Antarctica	1	?	?



Question 4

a) Draw a bar chart for this frequency table using the axis provided. Ensure you label your axes.

Age	Freq
11-15	3
16-20	6
21-25	2
26-30	7

b) Why technically are we using a bar chart and not a histogram?

Question 5

The sum of five consecutive integers is equal to 140. What is the smallest of the five integers?

Question 6

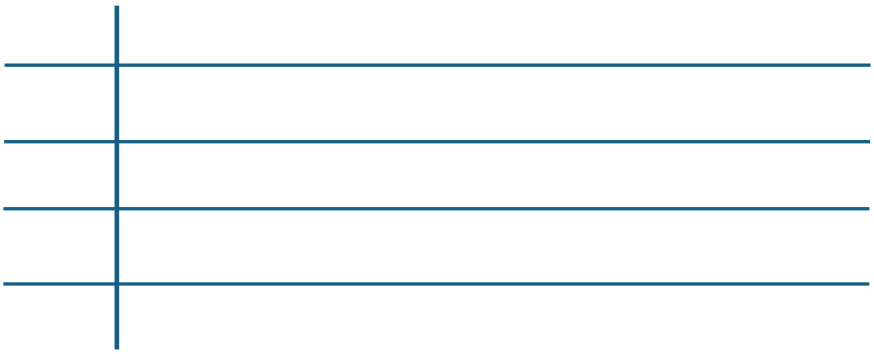
Three different positive integers have a mean of 7. What is the largest positive integer that could be one of them?

Question 7

Here is the weight of 15 cats:

4.5kg 4.9kg 5.2kg 3.9kg 4.1kg
5.0kg 3.6kg 4.9kg 5.3kg 4.3kg
7.4kg 3.6kg 5.3kg 3.8kg 5.3kg

(a) Produce an ordered stem and leaf diagram to show this information.



(b) What is the median weight?

(c) What is the mode weight?

Question 8

Sam collects the weights of 15 squirrels and puts them into weight ranges. His data is presented below. **Estimate the mean weight of a squirrel.**

Weight	10-16kg	16-20kg	20-30kg	30kg-32kg
Frequency	7	3	4	1

Question 9

Miss Clarke values a number of pieces of artwork in the Tiffin School Vault. The price ranges are summarised below. **Estimate the average value of a piece of art in school.**

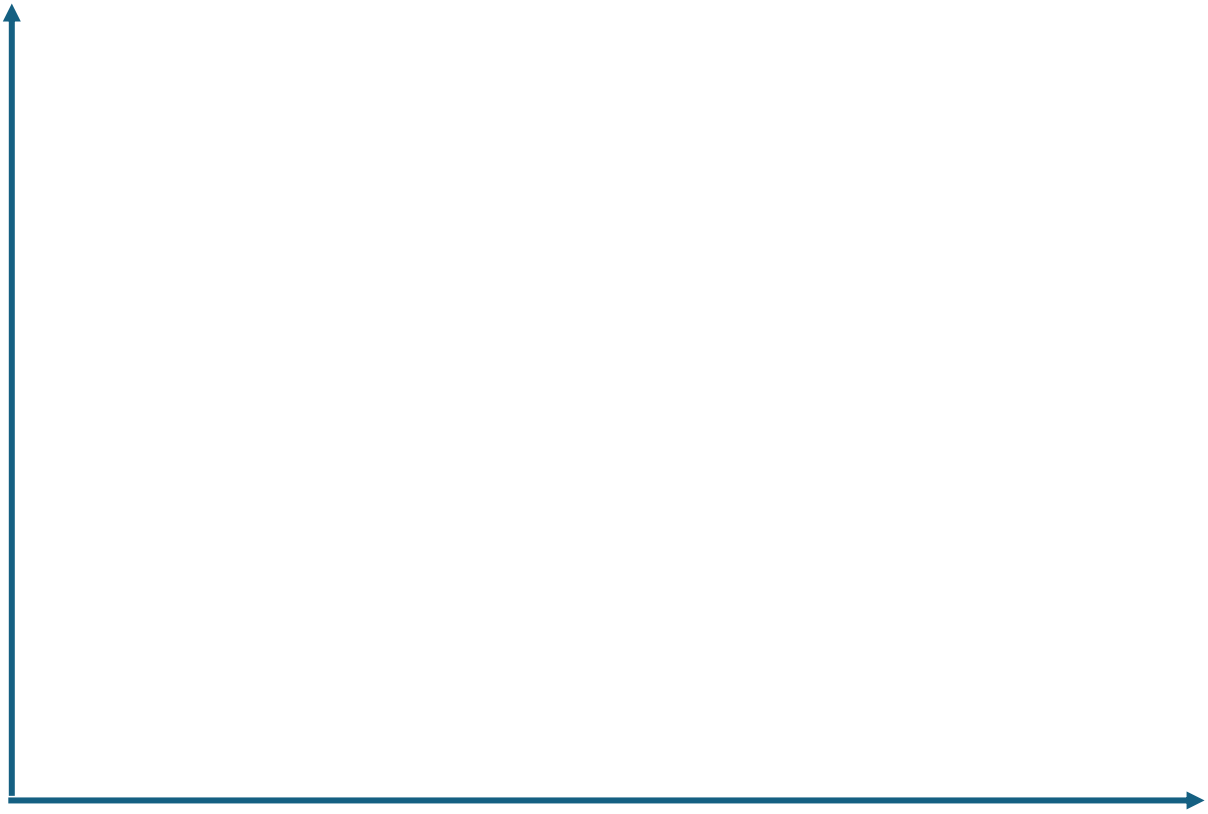
Value	£0-£1000	£1 000-5 000	£5 000-£20 000	£20 000-£100 000
Frequency	10	25	6	1

Question 10

Draw a labelled Histogram for each set of data. Ensure this is done accurately! Remember to think carefully about how you label the x-axis…

Money Spent in a clothes shop.

Money Spent (£)	Frequency	Frequency Density
$0 \leq £ < 20$	40	
$20 \leq £ < 30$	50	
$30 \leq £ < 40$	55	
$40 \leq £ < 50$	40	
$50 \leq £ < 100$	50	



Question 11

The table shows information about the number of hours that 260 students spent revising for an exam.

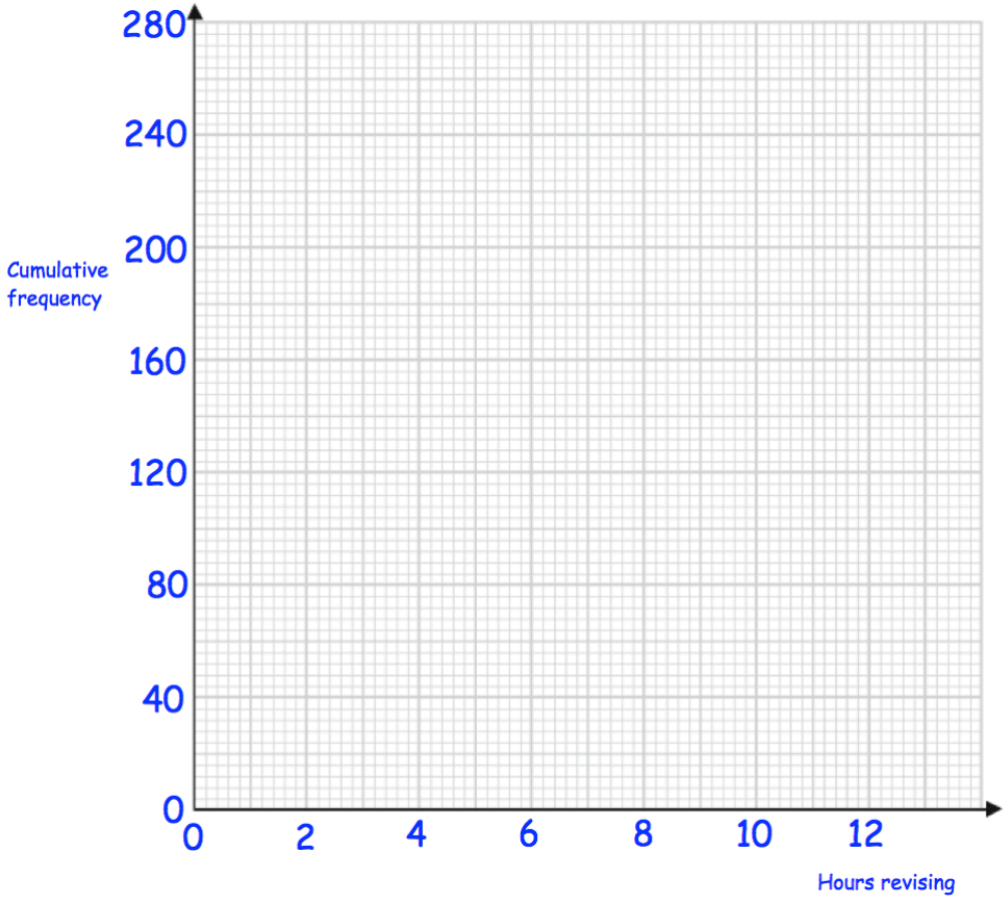
Number of hours (h)	Frequency
$0<h\leq 2$	20
$2<h\leq 4$	32
$4<h\leq 6$	48
$6<h\leq 8$	120
$8<h\leq 10$	24
$10<h\leq 12$	16

(a) Complete the cumulative frequency table.

Number of hours (h)	Cumulative frequency
$0<h\leq 2$	
$0<h\leq 4$	
$0<h\leq 6$	
$0<h\leq 8$	
$0<h\leq 10$	
$0<h\leq 12$	

(1)

(b) On the grid on the following page, draw a cumulative frequency graph for your table.



(c) Use your graph to find an estimate for the median number of hours spent revising.

.....hours
(1)

(d) Use your graph to find an estimate for the number of students who spent **less** than 3 hours revising.

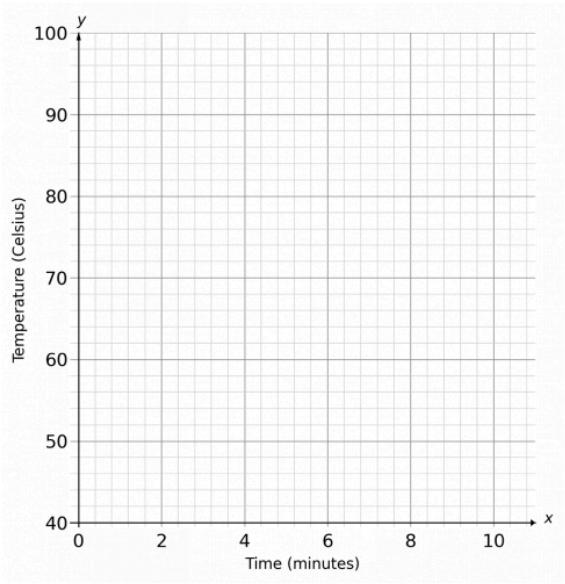
.....
(2)

Question 12

Question 3: The temperature of a cup of tea is recorded over time. The results are shown in the table below:

Time (mins)	0	1	2	4	5	8	10
Temp (°C)	95	89	81	76	72	55	45

a) Draw a scatter graph for the above data.



[3 marks]

b) Describe the correlation between the time and the temperature of the cup of tea.

[1 mark]

c) Describe the relationship shown in the scatter graph.

[1 mark]

d) What is the estimate for the temperature of a cup of tea after 6 minutes?

[1 mark]

e) Explain why it might not be appropriate to use the scatter graph to best estimate the temperature of a cup of tea after 45 minutes.

[1 mark]

Question 13

Draw 2 box plots on the same diagram, using the information on the length of time 2 different types of lightbulb last. Then, answer the questions below.

Speedy Light:
Lowest Value – 1200 hours
Lower Quartile – 1500 hours
Median – 1700 hours
Upper Quartile – 1800 hours
Highest Value – 2800 hours

Ultrabulb:
Lowest Value – 1050 hours
Median – 1400 hours
Upper Quartile – 1900 hours
Range – 1100 hours
Interquartile range – 750 hours

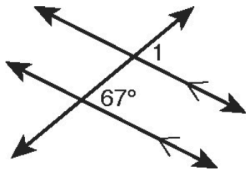
a) Draw **2 box** plot for the information given

b) Look at the medians and interquartile ranges – use these to compare the different types of bulb. Which would you be most likely to use and why?

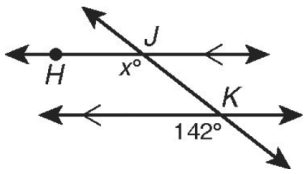
c) What is the probability of a random speedylight bulb lasting more than 1800 hours?

Question 14

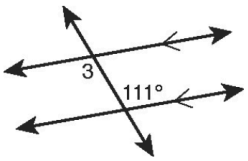
Find each angle measure:

1. 

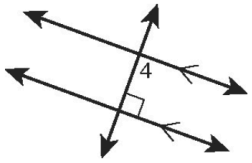
m∠1 _____

2. 

m∠*HJK* _____

3. 

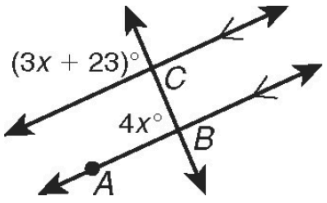
m∠3 _____

4. 

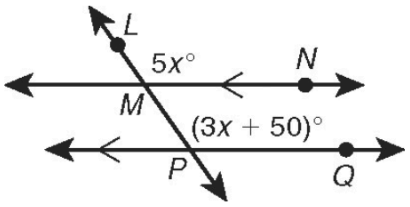
m∠4 _____

Question 15

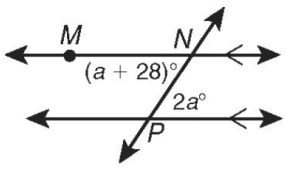
Solve for x, then find the measure of the angle given:

7. 

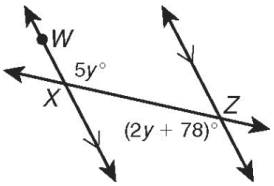
m∠*ABC* _____

8. 

m∠*MPQ* _____

9. 

m∠*MNP*_____

10. 

m∠*WXZ* _____

Question 16

A school cafeteria offers 3 types of sandwiches (ham, turkey, and veggie) and 2 types of drinks (water and soda).

a) If a student randomly selects one sandwich and one drink, what is the probability they choose a turkey sandwich and a soda?

b) The cafeteria is running a promotion where, if a student chooses a ham sandwich, they must choose water. If a student selects a sandwich first, what is the probability they will end up with a ham sandwich and water?

c) The cafeteria runs a simulation by observing the choices of 100 students. They find that 30 students chose a veggie sandwich, and 50 chose soda. Based on this simulation, what is the estimated probability that a randomly chosen student selects a veggie sandwich and a soda?

Question 17:

A bag contains 7 red marbles, 5 green marbles, and 3 blue marbles. A student randomly selects two marbles from the bag.

a) What is the probability that both marbles drawn are green if the first marble **is put back into the bag** before drawing the second?

b) What is the probability that both marbles drawn are green if the first marble **is not put back** into the bag before drawing the second?

Question 18:

A farmer is planting crops in two fields. Field 1 has a 70% chance of growing wheat and a 30% chance of growing corn. Field 2 has a 60% chance of growing wheat and a 40% chance of growing corn.

a) What is the probability that both fields will grow wheat?

b) If Field 1 grows wheat and this increases the likelihood that Field 2 will also grow wheat to 80%, what is the probability that both fields will grow wheat under this new condition?

c) If the farmer plants crops in 200 fields, how many fields are expected to grow corn based on the original probabilities?