Year 10 Summer Work

Topic	Hint	Completed
Cumulative frequency	Add up the frequencies (running total)	
Histograms	Frequency density = frequency / class width	
Solving equations	Change the subject – same steps as solving equations	
Expand and Factorise	Expand – draw the grid Factorise–opposite of expanding	
Circles and sectors	Do the full circle then divide by 360 and multiply by the angle	
Compound interest	The amount changes each year	
Reverse percentages	The % change has already happened	
Probability trees	Multiply along the branches	
Averages from a table	Do midpoint x frequency	

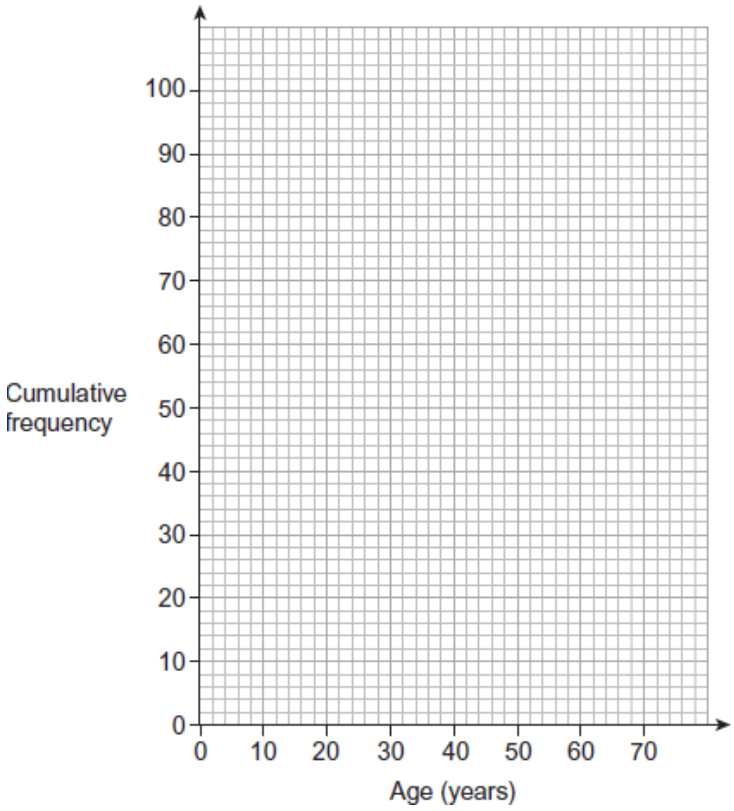
Grade 6

Q1.

The table shows information about the ages of 100 rugby supporters.

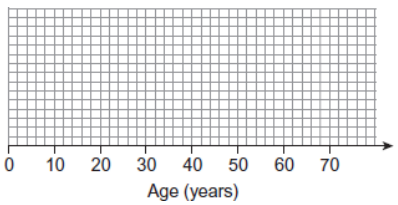
Age, a (years)	Frequency
$5 \leq a < 15$	12
$15 \leq a < 20$	11
$20 \leq a < 40$	25
$40 \leq a < 55$	39
$55 \leq a < 70$	13

(a) Plot a cumulative frequency diagram for the data.



(4)

(b) The youngest supporter is 8 years old.
The oldest supporter is 69 years old.
Draw a box plot for the data.



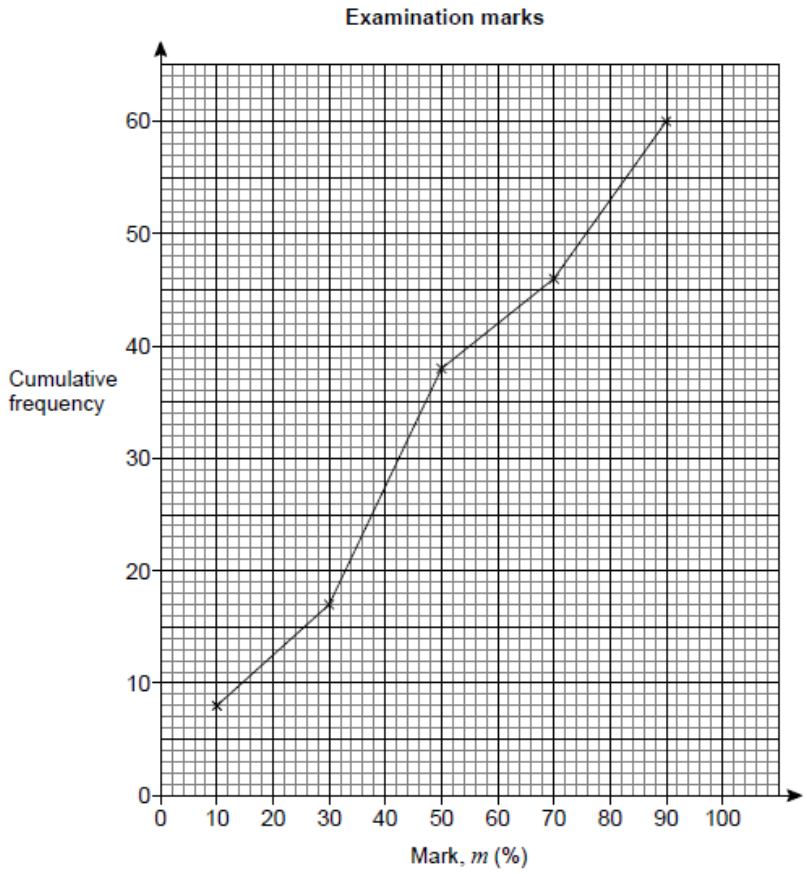
(3)
(Total 7 marks)

Q2.

Here are the examination marks for 60 pupils.

mark, m (%)	Frequency
$0 \leq m < 20$	8
$20 \leq m < 40$	9
$40 \leq m < 60$	21
$60 \leq m < 60$	10
$80 \leq m < 100$	12

Molly drew this cumulative frequency graph to show the data.



Make **two** criticisms of Molly's graph.

Criticism 1 .....

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Criticism 2 .....

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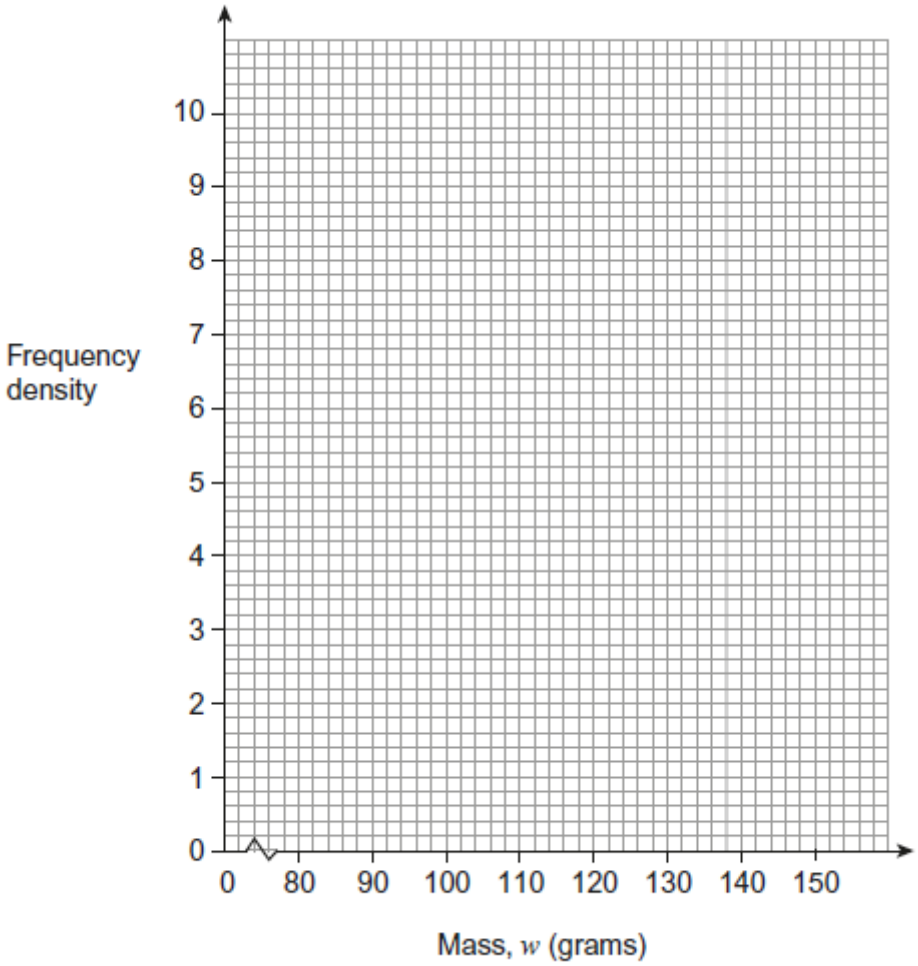
(Total 2 marks)

Q3. The table shows information about the masses of 400 hamsters.

Mass, *w* (grams)	**Frequency**
$80 < w \leq 100$	100
$100 < w \leq 115$	150
$115 < w \leq 125$	90
$125 < w \leq 150$	60

Draw a histogram for the data.



(Total 4 marks)

Q4.(a) Rearrange the formula to make w the subject of $y = 3w + 8$

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Answer .....

(2)

(b) Solve $5(x + 4) = 3x + 23$

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x = ...

(3)
(Total 5 marks)

Q5. Solve $7x – 9 = 3x + 23$

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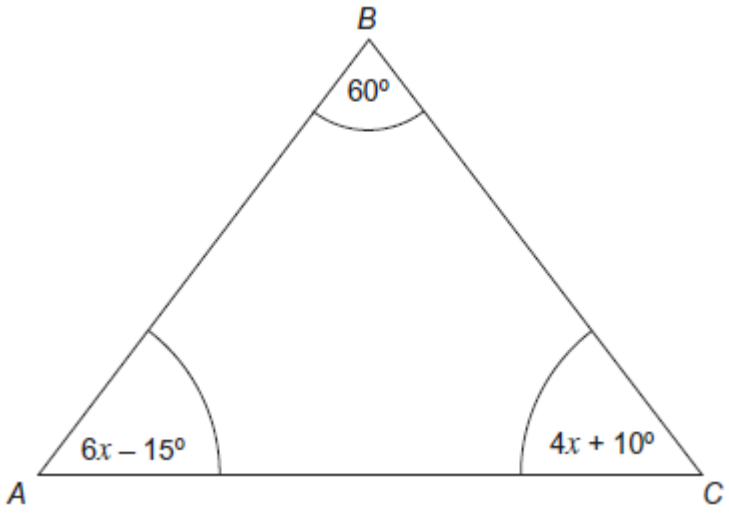
x = ...

(Total 3 marks)

Q6. Show that *ABC* is an equilateral triangle.

Not drawn accurately



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(Total 5 marks)

Q7.(a) Expand $w(w - 4)$

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Answer .....

(2)

(b) Factorise $8t + 24$

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Answer .....

(1)

(c) Expand and simplify $(y + 7)(y - 2)$

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Answer .....

(2)

(Total 5 marks)

Q8. Expand and simplify $(2x - 3y)(4x - 5y)$

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Answer .....

(Total 3 marks)

Q9.

Expand and simplify $(t + 4)^3$

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Answer.....

(Total 3 marks)

Q10.(a) Factorise $x^2 + 10x + 24$

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Answer .....

(2)

(b) Hence or otherwise, solve $x^2 + 10x + 24 = 0$

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Answer .....

(1)

(Total 3 marks)

Q11.

(a) Expand and simplify $(2x + 1)(x - 3)$

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Answer .....

(2)

(b) Factorise $y^2 + 2y - 24$

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Answer .....

(2)

(c) Simplify $(2xy^3)^5$

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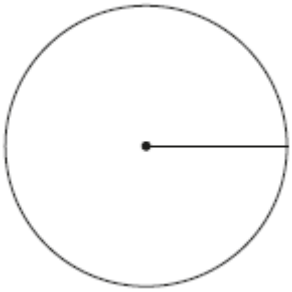
Answer .....

(2)
(Total 6 marks)

Q12.(a) The radius of this circle is 2.5 cm

Not drawn accurately



Work out the area.
Give your answer to 1 significant figure..

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Answer ..... cm^3

(3)

(b) The diameter of this semicircle is 16 cm

Not drawn accurately

Work out the perimeter of the semicircle.

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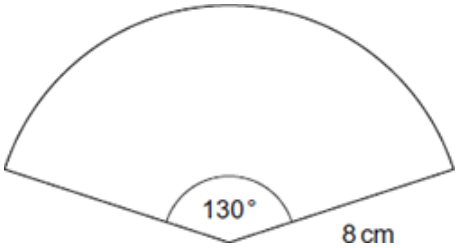
Answer .....

(3)
(Total 6 marks)

Q13. The diagram shows a sector of a circle.

Not drawn accurately



Work out the area of the sector.
Give your answer to a suitable degree of accuracy.

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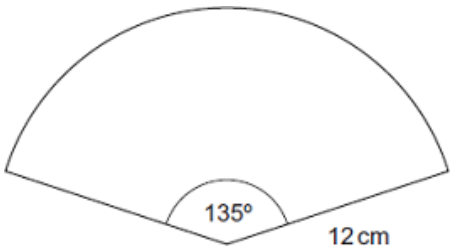
Answer ..... cm^2

(Total 4 marks)

Q14. The diagram shows a sector of a circle, radius 12 cm.

Not drawn accurately



Show that the perimeter of the sector is greater than 52 cm.

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(Total 3 marks)

Q15. David invests £5000 in a savings account.
The account pays 3.2% compound interest per year.

Work out the value of his investment after 3 years.
Give your answer to the nearest penny.

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Answer £ .....

(Total 4 marks)

Q16. £1800 is invested at 4% compound interest per year.

How many years will it take for the investment to be worth £2000?

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Answer ..... years

(Total 4 marks)

Q17.
An amount increased by 10% to 517.

What was the original amount?

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Answer .....

(Total 3 marks)

Q18.

Work out the price of the car before it was reduced.

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Answer £ .....

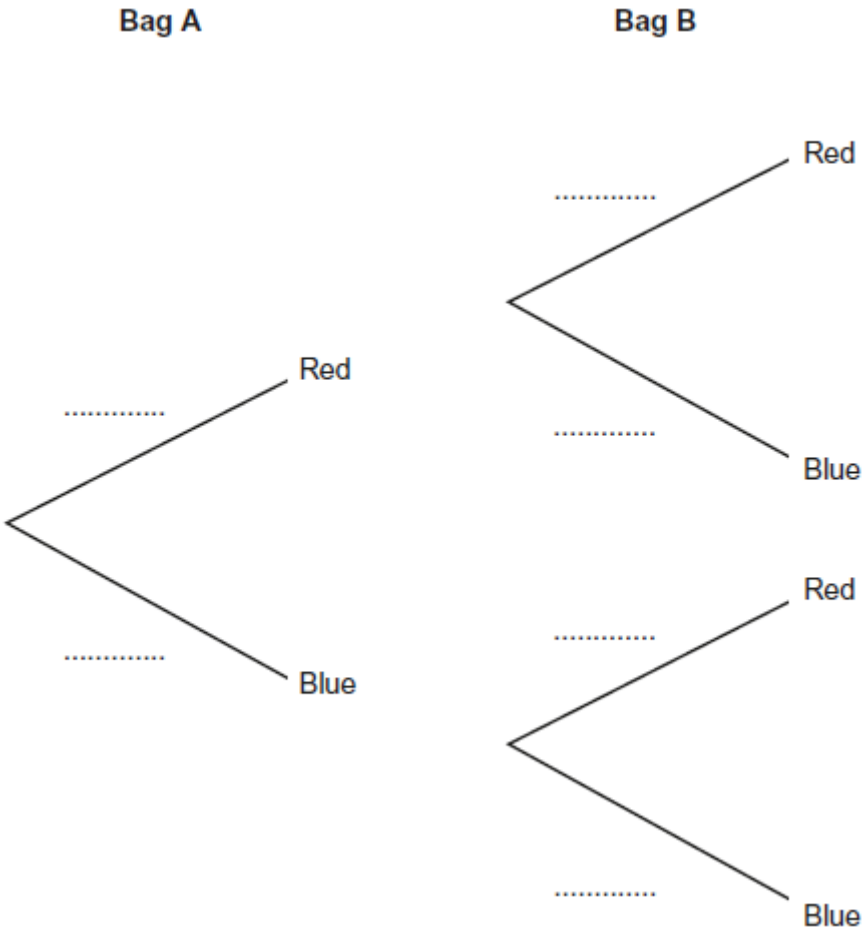
(Total 3 marks)

Q19. Bag A contains 3 red balls and 7 blue balls.

Bag B contains 8 red balls and 2 blue balls.

A ball is picked at random from each bag.

(a) Complete the tree diagram to show all the probabilities.



(3)

(b) Work out the probability of picking a **red** ball from Bag A and a **blue** ball from Bag B.

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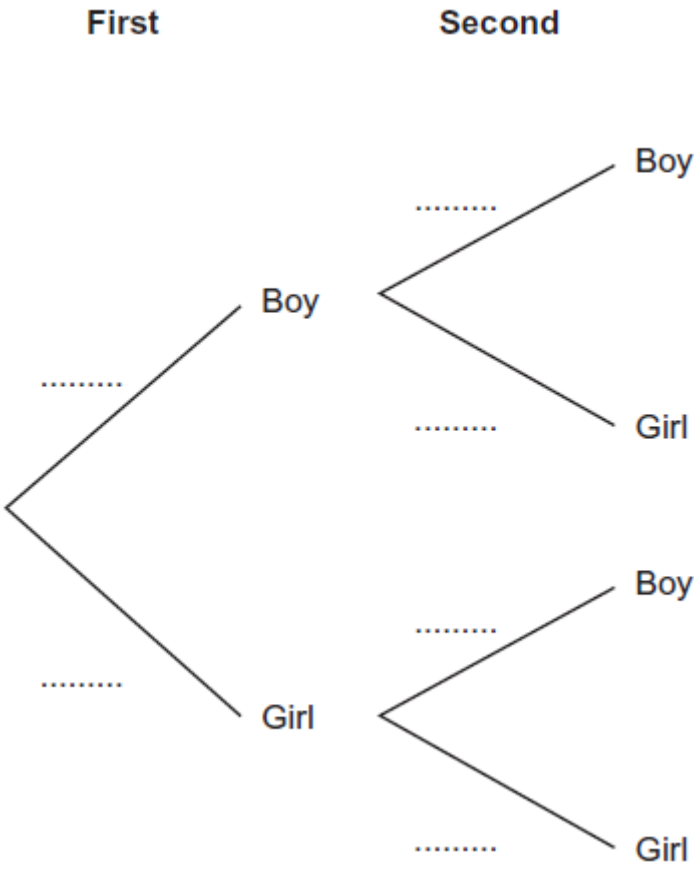
Answer .....

(2)

(Total 5 marks)

Q20. A team has 7 boys and 3 girls.
Stevie chooses two of the team at random.

(a) Complete the probability tree diagram.



(3)

(b) Work out the probability that he chooses one boy and one girl.

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Answer .....

(3)
(Total 6 marks)

Q21. The table shows information about the pay per hour of 40 people.

Pay per hour, x (£)	**Frequency**		
$5 < x \leq 15$	14		
$15 < x \leq 25$	12		
$25 < x \leq 35$	11		
$35 < x \leq 45$	2		
$45 < x \leq 55$	1		
	Total = 40		

(a) Which group contains the median pay per hour?

Circle your answer.

$5 < x \leq 15$ $15 < x \leq 25$ $25 < x \leq 35$ $35 < x \leq 45$ $45 < x \leq 55$

(1)

(b) Work out an estimate of the mean pay per hour.

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Answer £ .....

(4)

(Total 5 marks)

Q22. A small building company has 10 employees.
The table shows their monthly salaries.

Job	Number of employees	Monthly salary
Labourer	5	£1200
Driver	3	£1400
Supervisor	1	£2500
Manager	1	£13 500

(a) What is the modal monthly salary?

Answer £ .....

(1)

(b) The median monthly salary is £1300
Explain why.

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(1)

(c) The mean monthly salary is £2620

Give a reason why the mean is not the best average to use for the 10 employees.

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(1)
(Total 3 marks)