

Year 10 Spring Higher Assessment

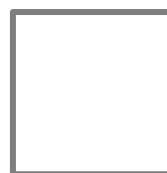
Mathematics

Name _____

Date _____

Time allowed 55 minutes

The maximum mark for this paper is **50**



Instructions

- Use black ink or black ball-point pen
- Calculator allowed
- Draw diagrams in pencil
- Answer all questions
- You must answer the questions in the spaces provided
- Do all rough work in this booklet
- Cross through any work you do not want to be marked
- You must keep working until the end of the 55 minutes

Information

- The results of this assessment will be reported back to parents/carers.
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Test Analysis

Question		My Mark	Max Mark	Hegarty
1	Simplifying Indices		1	107
2	Standard Form		1	123
3	Changing units		1	702
4	Parts of a Circle		1	592
5	Equation of a Circle		1	314
6	Use Trigonometry to calculate missing angles		2	511
7	Finding the mean from a grouped frequency table		4	418
8	Density & Volume		4	726
9	Area of Sectors and Triangles		6	546
10	Simplifying Indices		2	175
11	Distance Time Graphs		4	874
12	Mean Problem		3	407
13	Volume of Sphere problem		3	580
14	Drawing Cumulative Frequency Graphs		5	437
15	Pie Chart Problem		5	429
16	Understanding Histograms		2	442
17	Equation of a Tangent		4	320
18	Simplifying Expressions		1	156

Q1.

Simplify $(5^2)^4$

Circle your answer.

5^6

5^8

25^6

25^8

(Total 1 mark)

Q2.

Which of these values of n makes 2.7×10^n a cube number?

Circle your answer.

0

1

2

3

(Total 1 mark)

Q3.

Circle the volume that is the same as 15 cm^3

$15\,000 \text{ mm}^3$

1.5 mm^3

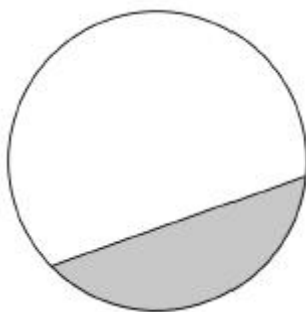
0.0015 mm^3

150 mm^3

(Total 1 mark)

Q4.

Here is a circle.



Circle the word that describes the shaded part.

segment

chord

sector

arc

(Total 1 mark)

Q5.

Work out the diameter of the circle $x^2 + y^2 = 64$

Circle your answer.

8

16

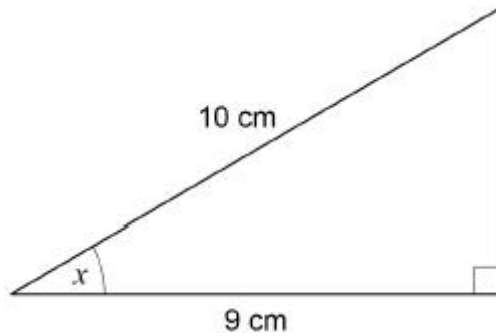
32

128

(Total 1 mark)

Q6.

Use trigonometry to work out the size of angle x .



Not drawn
accurately

Answer _____ degrees
(Total 2 marks)

Q7.

Here is some information about 20 trains leaving a station.

Number of minutes late, t	Number of trains	Midpoint	
$0 \leq t < 5$	12		
$5 \leq t < 10$	7		
$10 \leq t < 15$	1		
$t \geq 15$	0		

(a) Work out an estimate of the mean number of minutes late.

Answer _____ minutes

(3)

(b) The station manager looks at the information in more detail.

Number of minutes late, t	Number of trains
$0 \leq t < 2$	12
$2 \leq t < 4$	0
$4 \leq t < 6$	7
$6 \leq t < 8$	0
$8 \leq t < 10$	0
$10 \leq t < 12$	1

He works out an estimate of the mean using this information.

How does his estimate compare with the answer to part (a)?

Tick **one** box.

Higher than part (a)

Same as part (a)

Lower than part (a)

Not possible to tell

(1)
(Total 4 marks)

Q8.

Some concrete has volume 3.8 m^3

- (a) The density of the concrete is 2400 kg/m^3

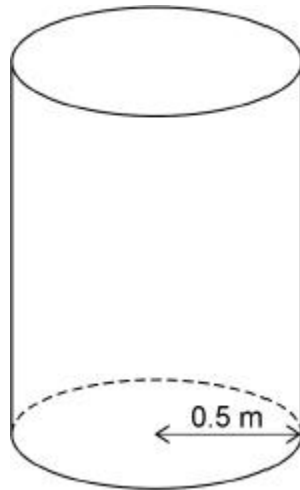
Work out the mass of the concrete.

Answer _____ kg

(2)

- (b) The 3.8 m^3 of concrete is made into the shape of a cylinder.

The base has radius 0.5 metres.



Work out the height of the cylinder.

Answer _____ m

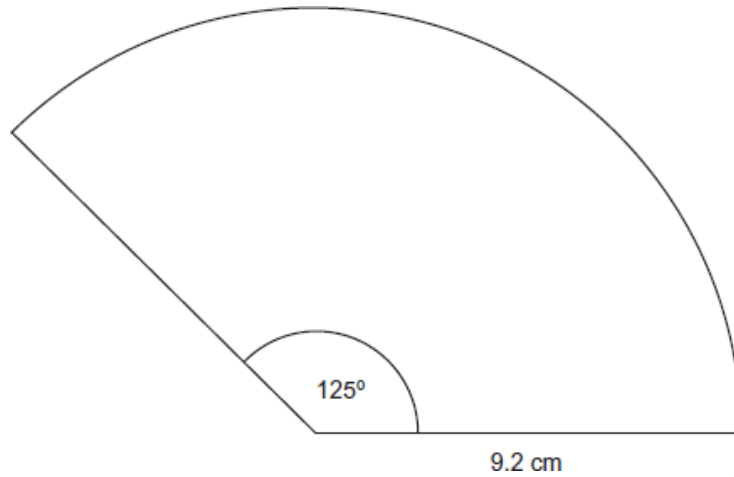
(2)

(Total 4 marks)

Q9.

The diagram shows a sector of a circle with radius 9.2 cm

Not drawn accurately



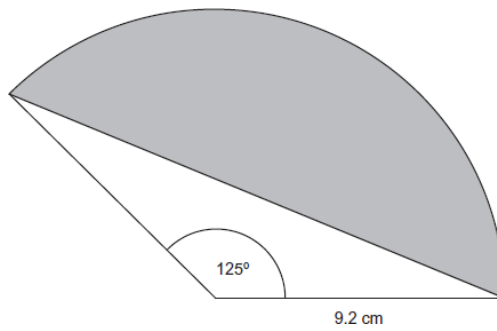
(a) Work out the area of the sector.

Answer _____ cm^2

(3)

(b) Work out the area of the shaded segment.

Not drawn accurately



Answer _____ cm^2

(3)

(Total 6 marks)

Q10.

$(a^r b)^4 = 16r^{20}$ where a and b are positive integers.

Work out a and b

$a =$ _____ $b =$ _____

(Total 2 marks)

Q11.

Lily goes on a car journey.

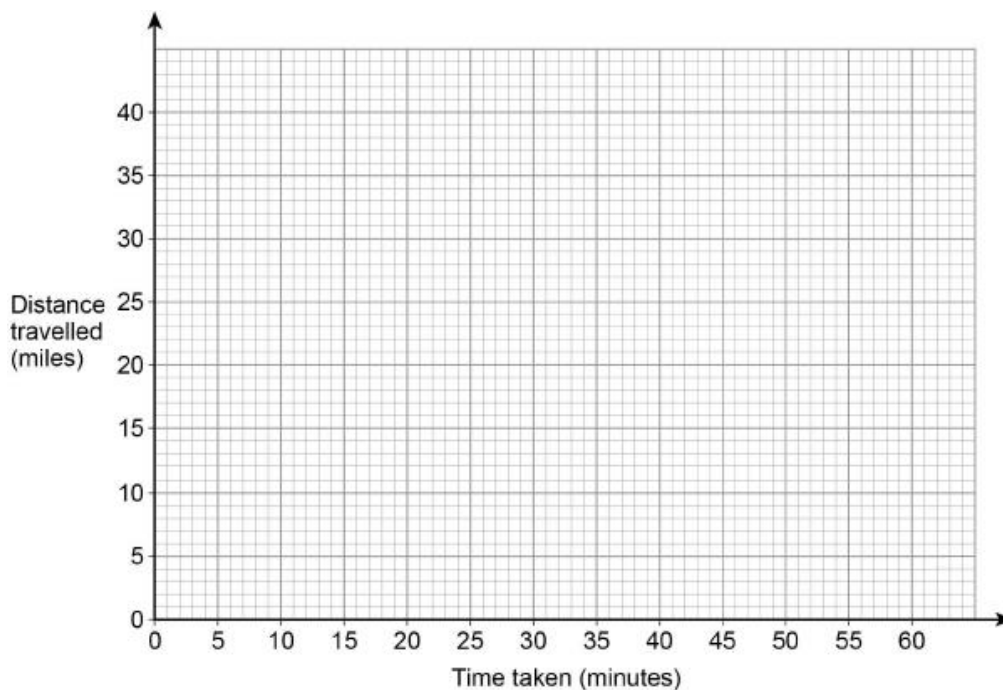
For the first 30 minutes her average speed is 40 miles per hour.

She then stops for 15 minutes.

She then completes the journey at an average speed of 60 miles per hour.

The total journey time is 1 hour.

(a) Draw a distance-time graph for her journey.



(3)

(b) Write down the average speed for the total journey.

Answer _____ mph

(1)

(Total 4 marks)

Q12.

The mean mass of a squad of 19 hockey players is 82 kg

A player of mass 93 kg joins the squad.

Work out the mean mass of the squad now.

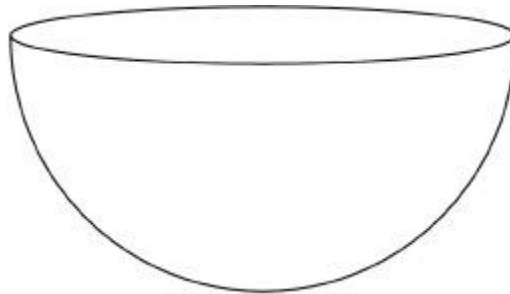
Answer _____ kg

(Total 3 marks)

Q13.

Volume of a sphere = $\frac{4}{3}\pi r^3$ where r is the radius

A container is a hemisphere of radius 30 cm



Sand fills the container at a rate of 4000 cm³ per minute.

Does it take **less than** a quarter of an hour to fill the container?

You **must** show your working.

Answer _____

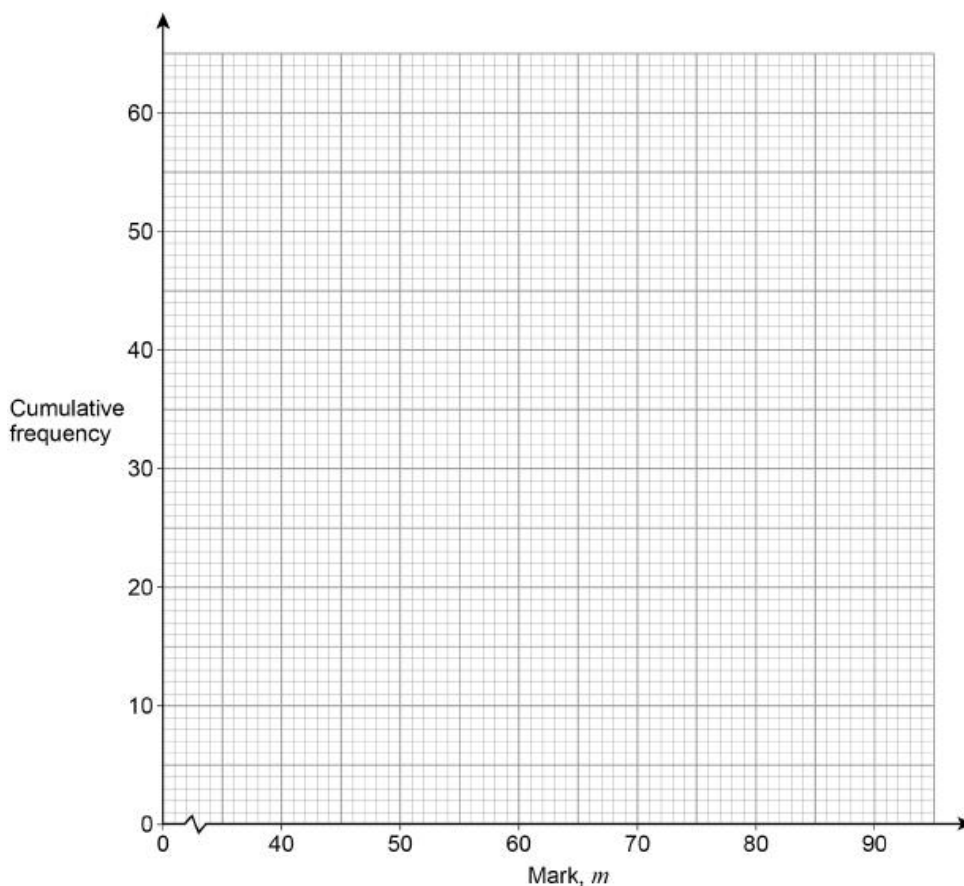
(Total 3 marks)

Q14.

Here is some information about the marks of 60 students in a test.

Mark, m	Frequency		
$40 < m \leq 50$	9		
$50 < m \leq 60$	16		
$60 < m \leq 70$	20		
$70 < m \leq 80$	8		
$80 < m \leq 90$	7		

(a) on the grid, draw a cumulative frequency graph.



(3)

(b) Use your graph to estimate the lowest mark of the top 20% of students.

Answer _____

(2)

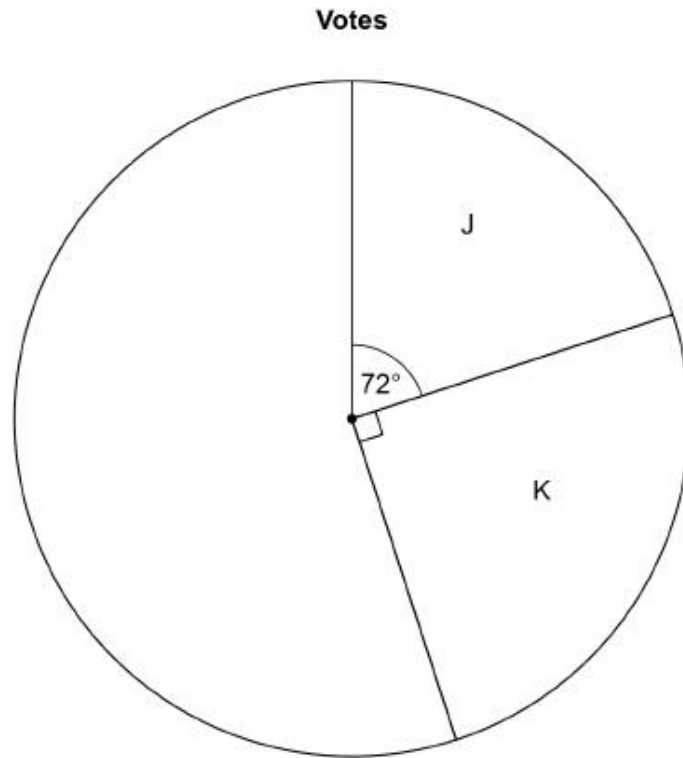
(Total 5 marks)

Q15.

In an election there were four candidates, J, K, L and M.

Fran is drawing a pie chart to show the results.

The sectors for J and K have been drawn.



- (a) Twice as many people voted for L as voted for M.

Complete the pie chart.

(3)

- (b) Altogether, 16 200 people voted.

How many voted for J?

Answer _____

(2)

(Total 5 marks)

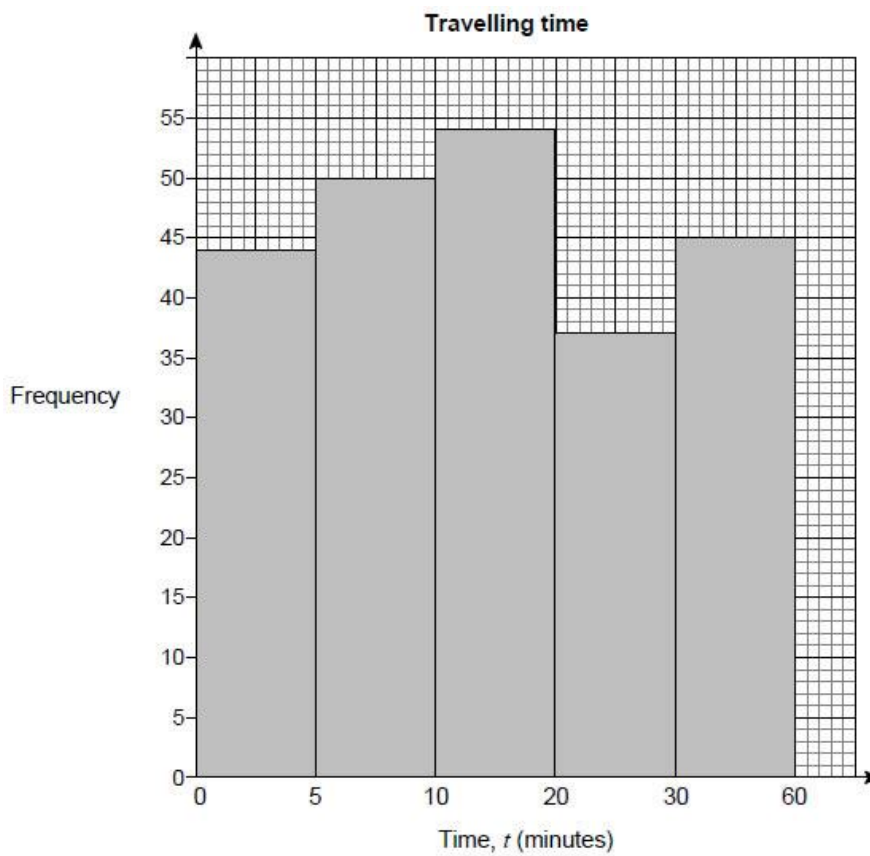
Q16.

Joe asked 230 students how long it took them to travel to school.

The results are shown in the table.

Travelling time, t (minutes)	Number of students
$0 < t \leq 5$	44
$5 < t \leq 10$	50
$10 < t \leq 20$	54
$20 < t \leq 30$	37
$30 < t \leq 60$	45

This is Joe's attempt to draw a histogram to show the data.



Make **two** criticisms of his histogram.

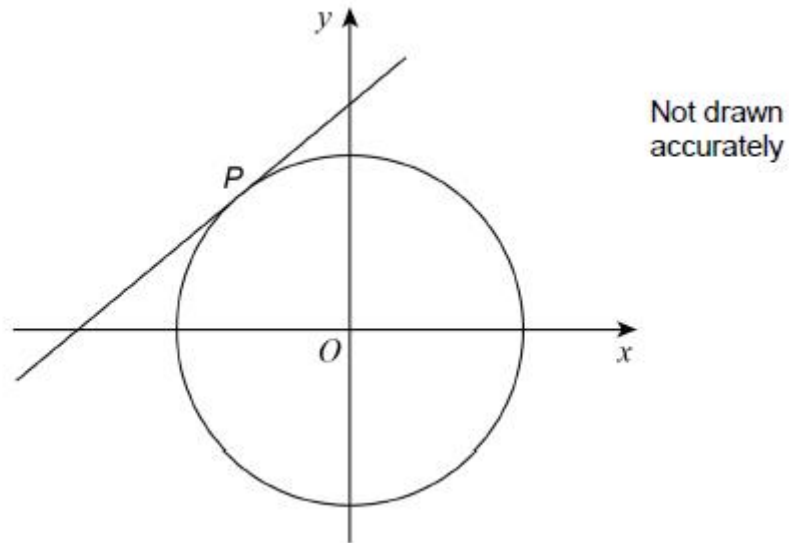
Criticism 1 _____

Criticism 2 _____

(Total 2 marks)

Q17.

$P(-1, 4)$ is a point on a circle, centre O



Work out the equation of the tangent to the circle at P .

Give your answer in the form $y = mx + c$

Answer _____

(Total 4 marks)

Q18.

Simplify $8x - 3 + 6x$

Circle your answer.

$2x - 3$

$11x$

$5 + 6x$

$14x - 3$

(Total 1 mark)

END OF TEST