“Mind Your Maths” Number 6
Year 10 Exam Revision

You may use a calculator
Marks Available : 60

Question 1

Expand the brackets and, where possible, simplify your answer;

(i) $(x - 16)(x - 28)$ **(ii)** $(15x + 11)^2$

(iii) $x^7(x^5 - 13x^8)$ **(iv)** $(5x^2)^3 - (10x^3)^2$

[8 marks]

Question 2

One letter tile is to be picked at random from the following twelve;

I	N	S	T	I	T	U	T	I	O	N	S

Giving your answers as fractions in as simple a form as possible. what is the probability that it is;

(i) the letter O,

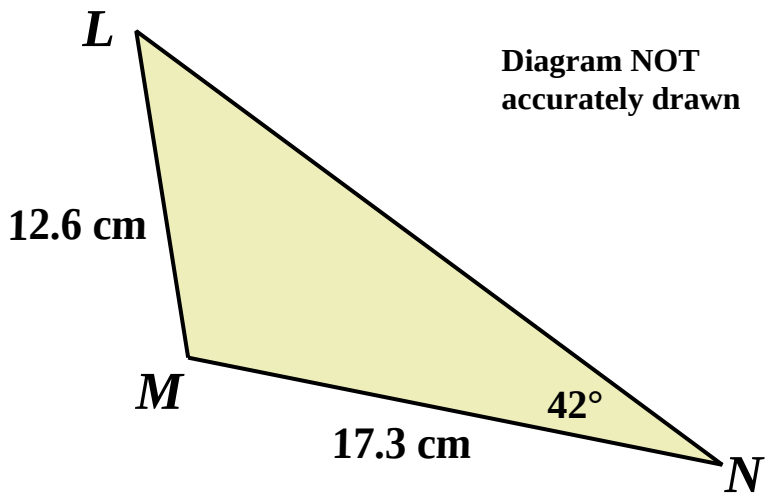
(ii) a letter S,

(iii) a vowel,

(iv) not a letter T ?

[4 marks]

Question 3



The diagram shows a triangle *LMN*, where *LMN* is an obtuse angle.

(i) When an angle is described as being obtuse, what can you say about it ?

[1 mark]

(ii) Work out the area of triangle *LMN*.

Hints : $\frac{\sin L}{l} = \frac{\sin N}{n}$ (The upside down version of the sine rule)

: $Area\ \Delta = \frac{1}{2} l\, n \sin M$

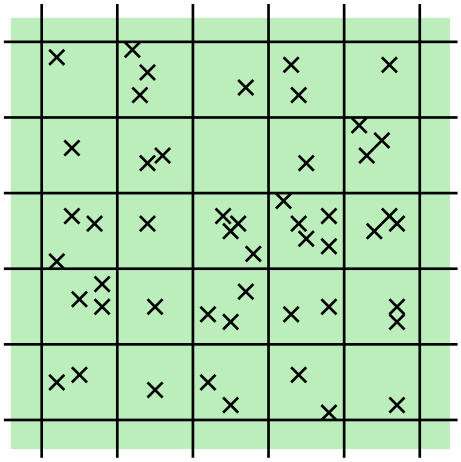
[5 marks]

Question 4

Dr Arachno, a Biologist, has divided up an area of a field into 25 squares, each measurung 1 m by 1 m.

In each square he records the occurance of a certain species of spider.

His results are shown on the map below where each × indicates a spider found.



(i) Complete the table to show how many times each Spider Count ocurred;

Spider Count	0	1	2	3	4	5	6
Squares							

[4 marks]

(ii) Determine the mean number of spiders per m^2.

[4 marks]

Question 5

The distance to Alpha Centauri is 25 277 120 000 000 miles.

The speed of light is 186 000 miles per second.

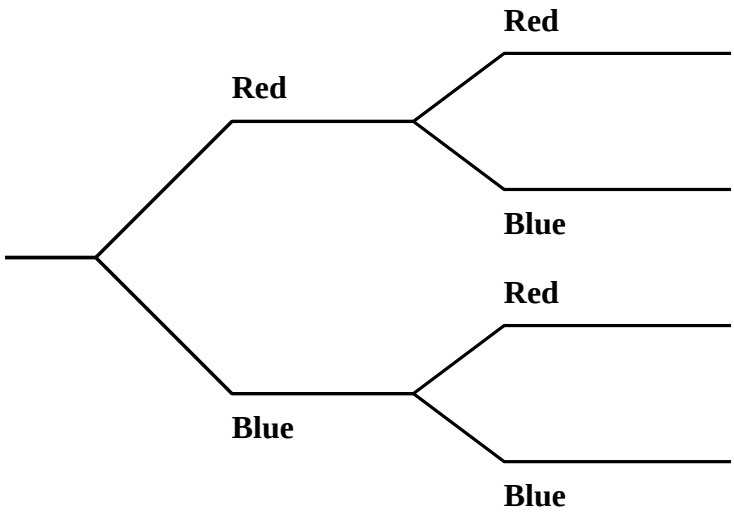
Calculate the time taken for light from Alpha Centauri to reach the Earth.

Give your answer correct to the nearest year.

[4 marks]

Question 6

A bag contains 5 red and 7 blue marbles.
First one, and then a second marble is removed from the bag.
A tree diagram to illustrate the possibilities is shown below.



Determine the probability that;

(i) The first marble is red.

[1 mark]

(ii) Both marbles are red.

[2 marks]

(iii) Both marbles are the same colour.

[3 marks]

(iv) The second marble is red.

[3 marks]

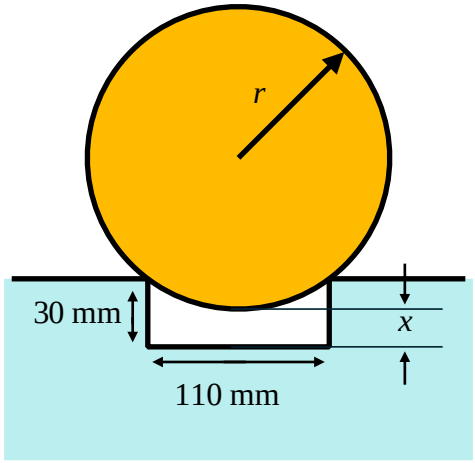
Question 7

$$f(x) = \frac{5x + 2}{3}$$

Find $f^{-1}(x)$

[3 marks]

Question 8



The diagram shows a ball of radius, *r*, 73 mm rolling along a groove of width 110 mm and depth 30 mm. Calculate the length marked *x*.

[6 marks]

Question 9

The diagram shows a number square with a T marked in outline on it.
The number at the centre of the top row gives the T-number.
The T-number of the T shown is T-13.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

The T can be TRANSLATED to other positions on the number square.
In each position it must cover five numbers on the number square.

(i) What is the smallest possible T-number ?

[1 mark]

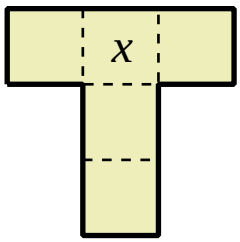
(ii) What is the biggest possible T-number ?

[1 mark]

(iii) Find the sum of the numbers within the T-13 outline.

[1 mark]

(iv) On the diagram below write, in each square in terms of x, an expression for that square's number.



[3 marks]

(v) What is the sum, in terms of x, of the numbers within the T-x outline ?

[2 marks]

(vi) Which T-number has an outline within which the numbers sum of 355 ?

[2 marks]

(vii) Explain why no T-number exists within which the numbers sum to 135.

[2 marks]

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