Preca College **Entrance Exam - July 2007**

MATHEMATICS

2 hours

Name and Surname: _____ **Index number:** _____

Answer all questions. Any working must be shown on this paper

SECTION A: Each question in this section carries 6 marks.

1. (a) Fill in the table below

Fraction	Percentage	Decimal
	20 %	0.2
$\frac{5}{8}$		
$\frac{13}{10}$		1.3

(b) Write the following in ascending order

$1\frac{1}{5}$, 1.3, 1.24, $1\frac{1}{8}$

Ans: _____

(c) Write the following in standard form:

(i) 279800 = _____ (ii) 0.038 = _____

2. (a) A straight line graph passes through the two points (0,5) and (3, -4)

(i) Write down the equation of this line: _____

(ii) If another straight line graph is parallel to the first line, but passes through (0, -2), write down the equation of this line: _____

(b) The equation of a straight line is $y = mx + c$. When $x = 1$, $y = 6$ and when $x = 3$, $y = 10$. Form two equations for m and c and hence find the equation of the line.

$m =$ _____ and $c =$ _____

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3. (a) Factorise the following

(i) $x^2 + 13x + 40$ (ii) $4x^2 - 16y^2$

Ans: _____ Ans: _____

(b) Expand the following

(i) $(x - 3)^2$ (ii) $(2a - 9)(3a + 5)$

Ans: _____ Ans: _____

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4. (a) A number p satisfies the following inequality $\frac{1}{5} < p < \frac{2}{3}$. Write down any two possible values for p.

$p =$ _____ and $p =$ _____

(b) Solve the following pair of inequalities and then find the range of values of x that satisfies both inequalities. Illustrate your answer on a number line.

$3 + x \leq 2$ and $4 - 3x \leq 1$

SECTION B: Each question in this section carries 7 marks.

1. (a) Calculate the following: (i) $2^4 =$ _____ (ii) $\sqrt{81} =$ _____

(b) Write down all the factors of 30: _____

(c) Write down the LCM of 16 and 20: _____

(d) Write down all the prime factors between 15 and 30: _____

(e) Write down the HCF of 24 and 40: _____

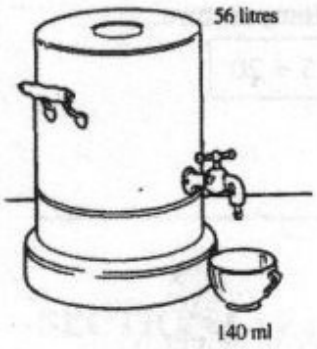
2. (a) Fill in the blanks of the following sentences by rewriting the measurements given in the brackets at the end of the sentence with the units on the line.

(i) The Eiffel Tower is _____ **km** tall. (300 m)

(ii) Some species of lizards can grow up to _____ **m** long. (375 cm)

(iii) A family car can weigh up to _____ **g**. (1050 kg)

(iv) The blue whale can weigh up to _____ **kg**. (130 t)

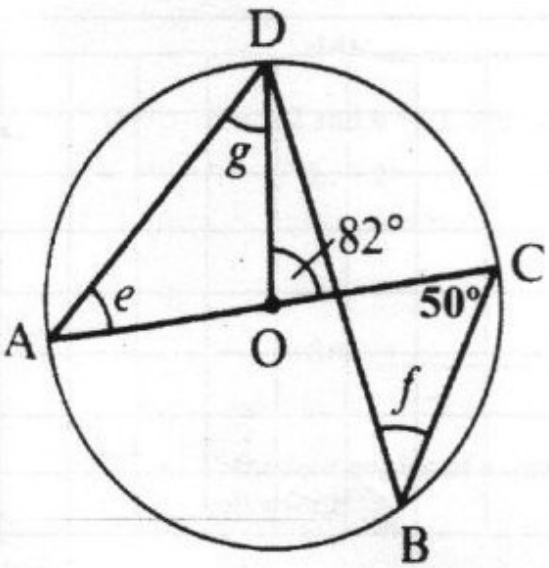


(b) An urn containing 56 litres of water is used to fill cups of capacity 140 ml. How many cups can be filled?

Ans: _____

3. The figure below shows a circle centre O. AC passes through the centre

Work out the sizes of the following angles and *give reasons for your answers.*



(i) Angle *e*:

(ii) Angle *f*:

(iii) Angle *g*:

4. (a) Calculate the following

(i) $-2 + 5 - (-2) =$ Ans: _____

(ii) $3(-4) - (-6) =$ Ans: _____

(iii) $10 - (3 + 7) - 5 =$ Ans: _____

(iv) $15 + (4 - 7 - 8) + 3 =$ Ans: _____

(b) The temperature inside a house is 15°C.
The temperature outside is 20 degrees lower.

One of the following calculations is correct to find the outside temperature:

$-20 - 15$	$15 - 20$	$-15 - 20$	$-15 + 20$

What is the outside temperature? Ans: _____

(c) An airplane is 100 m above sea level.
A submarine is 50 m below sea level.

One of the following calculations is correct to find the difference in height between the airplane and the submarine:

100 - 50	50 - 100	100 - (- 50)	-100 - 50

What is the difference in metres between the airplane and the submarine?

Ans: _____

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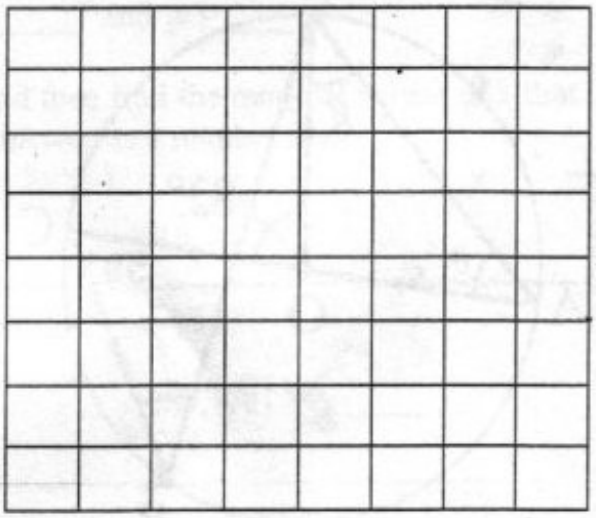
5. On the square grid, draw an appropriate x and y-axis, such that x varies from –4 to 4 and the y-axis varies from –4 to 4

Then, plot the following points on the grid

A (-3, -4) B (0, -1)

C (2, 1) D (3, 2)



(a) What do you notice about these four points?

_____

_____

(b) From the graph, give the coordinates of any two other points which are on the same line: E (___ , ____) and F (___, ___)

(c) Write down the missing coordinate of the following points and which are also on the same line as the previous points:

(i) G(___ , 20)

(ii) H (a , _____)

SECTION C: Each question in this section carries 8 marks.

1. (a) Simplify the following

(i) $2x - x + y - 3y$ (ii) $2pq - p + q + 3pq - 5p$

Ans: _____ *Ans:* _____

(b) If $a = 2$ and $b = -3$, then work out the following:

(i) $2a + b$ (ii) $4a - 2(a - b)$

Ans: _____ Ans: _____

(c) If the four angles of a quadrilateral are x, x, $3x$ and $4x$, write down an equation and solve for x.

Ans: _____

(d) Solve the following equation:

$$3(x-2) = 2x+7$$

Ans: _____

2.

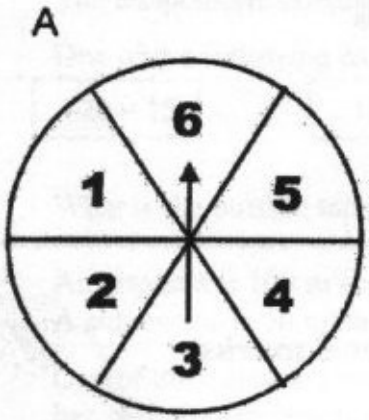


Figure 1

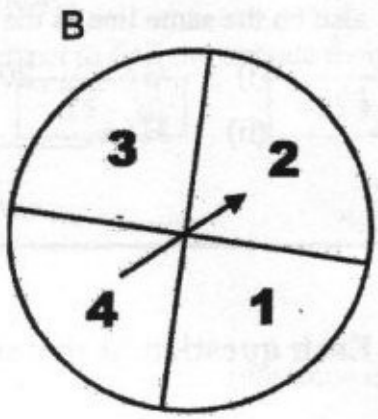


Figure 2

Figure 1 and 2 show two spinners A and B, respectively.
When the arrow on spinner A is spun it is equally likely to stop on any of the numbers 1, 2, 3, 4, 5 or 6.

Similarly the arrow on spinner B is equally likely to stop on 1, 2, 3 or 4.

(a) Complete the possibility space below, showing all the possible totals when both arrows are spun

		Spinner A					
		1	**2**	**3**	**4**	**5**	**6**
Spinner B	**1**	2					
	2			5			
	3					8	
	4						

(b) What is the probability of the two spinners giving a total of:

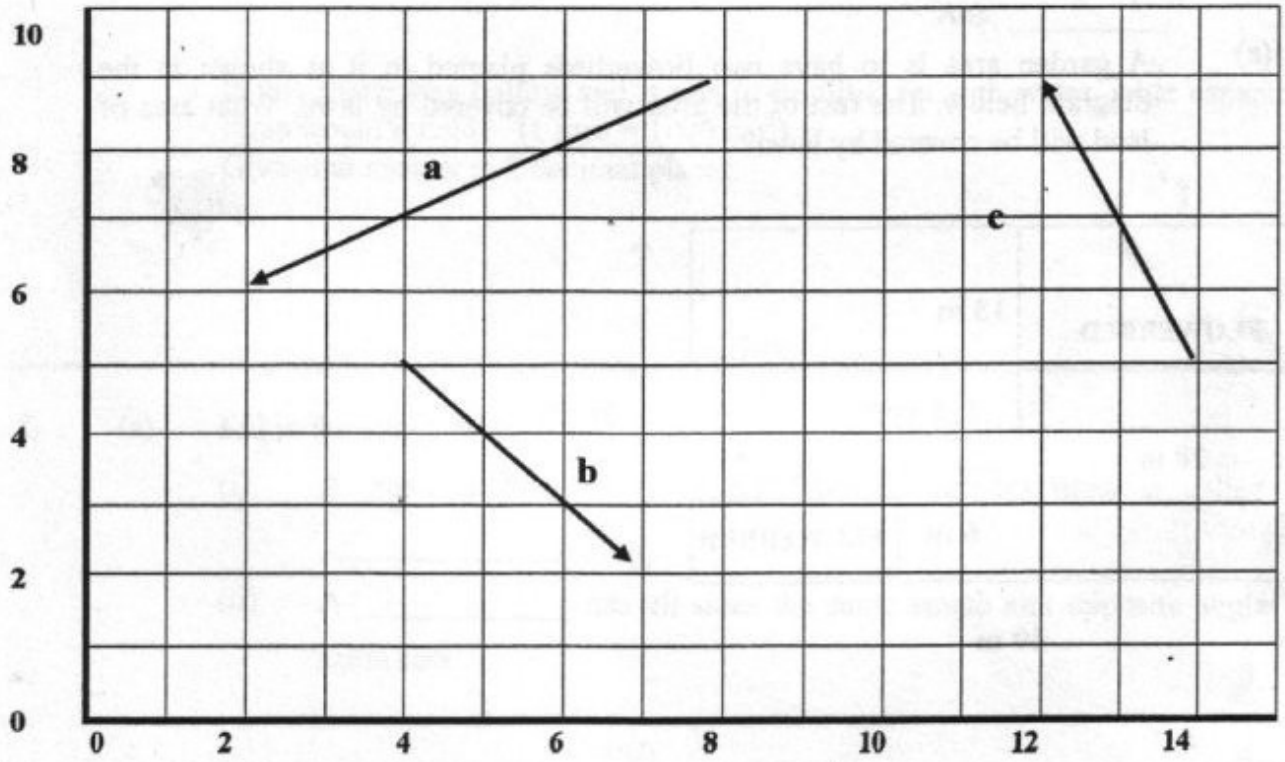
(i) 8 (ii) 5

(c) What is the probability of:

(i) Obtaining a multiple of 3 on both spinners.

(ii) Obtaining a multiple of 3 on one spinner only.

3.



(a) Write down the vectors in the form $\begin{pmatrix} p \\ q \end{pmatrix}$

a = **b** = **c** =

(b) Write down the following in the form $\begin{pmatrix} p \\ q \end{pmatrix}$ and draw the vectors:

(i) **d** starts at (1,5) and ends at (3, 9). So, **d** =

(ii) **e** starts at (13, 2) and ends at (8,4). So, **e** =

(c) If $\mathbf{f} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ starts at (12, 9) and its end coordinates are (____, ____)

(d) If $\mathbf{g} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ ends at (8, 8), and its starting coordinates are (____, ____)

(e) Using the above vectors, find the following:

(i) $\mathbf{a} + \mathbf{b} + \mathbf{c} =$

(ii) $2\mathbf{f} - 3\mathbf{g} - \mathbf{d} + \mathbf{e} =$

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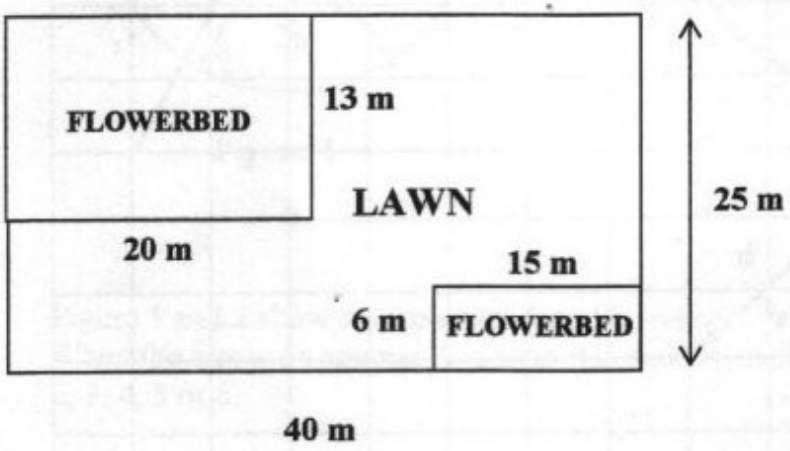
4. (a) A garden area is to have two flowerbeds planted in it as shown in the diagram below. The rest of the area will be covered by lawn. What area of land will be covered by lawn?

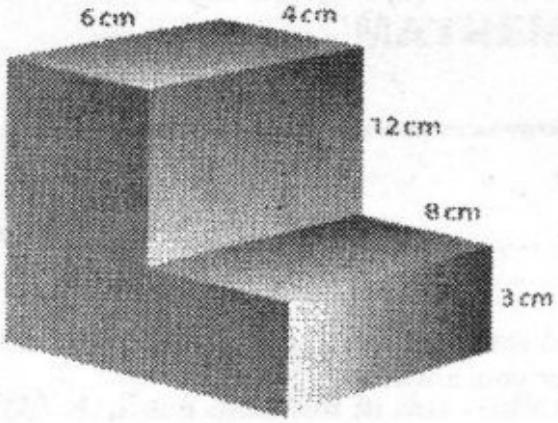


Ans: _____

If the lawn is bought in large rolls of length 10 m and width 2 m each roll, how many rolls would be needed to cover the whole lawn area?

Ans: _____

(b) Calculate the volume of the solid shape below



Ans: _____

If this shape was hollow and it was to be filled up with water, what capacity in litres would it hold? (1 litre = 1000 cm^3)
Give your answer to 2 decimal places.

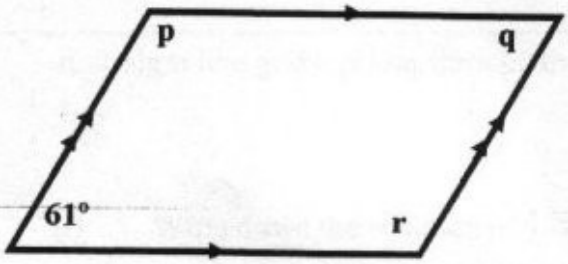
Ans: _____

5. (a) Fill in the blanks with one word

(i) A quadrilateral with only one pair of parallel lines is called a - _____.

(ii) A _____ has all sides the same length and opposite angles the same size.

(b) Find the missing angles of the parallelogram and give reasons for your answers.



p = _____

Reason: _____

q = _____

Reason: _____

r = _____

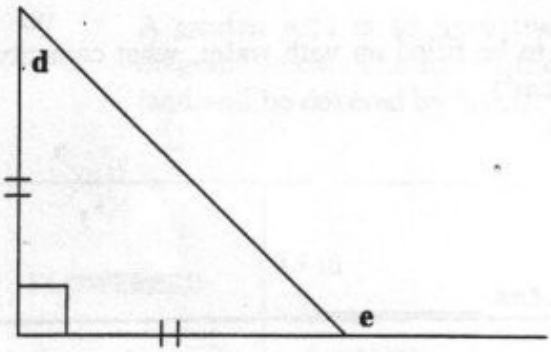
Reason: _____

(c) Draw the angles required on the lines provided. Label each angle with its size.

(i) Reflex angle

(ii) Acute angle

(b) Find angles *d* and *e* and <u>give reasons</u> for your answers



d = _____

Reason:

e = _____

Reason: