1. (a) Without the use of a calculator, evaluate:

$1.358^2 - 0.358^2$

(b) Factorise the following algebraic expression:

$a^2x - 12by - 3xb + 4a^2y$

Ans: (a) _____ [2]

(b) _____ [3]

---

2. Simplify the following:

(a) $\frac{x+2y}{3} - \frac{2x-3y}{6}$

(b) $\frac{4}{x-y} - \frac{1}{y-x}$

Ans: (a) _____ [1]

(b) _____ [2]

---

3. (a) Solve the following simultaneous equations:

$$6x = 16 + y$$
$$3x + 2y = -12$$

(b) The difference between two numbers is 10 and their sum is equal to four times the smaller number. What are the numbers?

Ans: (a) _____ [2]

(b) _____ [2]

---

4. Simplify the following:

(a) $(ab^2c^3)^2$

(b) $(-p^3q)^2$

(c) $\left(\frac{4}{5}\right)^{-2}$

Ans: (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

---

5. Simplify the following algebraic expressions:

(a) $\dfrac{9x^2-30xy+25y^2}{9x^2-25y^2}$

(b) $\left(\dfrac{1}{x^3}-\dfrac{1}{x}\right)\div\left(\dfrac{1}{x}-\dfrac{1}{x^2}\right)$

Ans: (a) _____ [2]

(b) _____ [3]

---

6. Solve the following quadratic equations:

(a) $7x^2-11x-30=0$

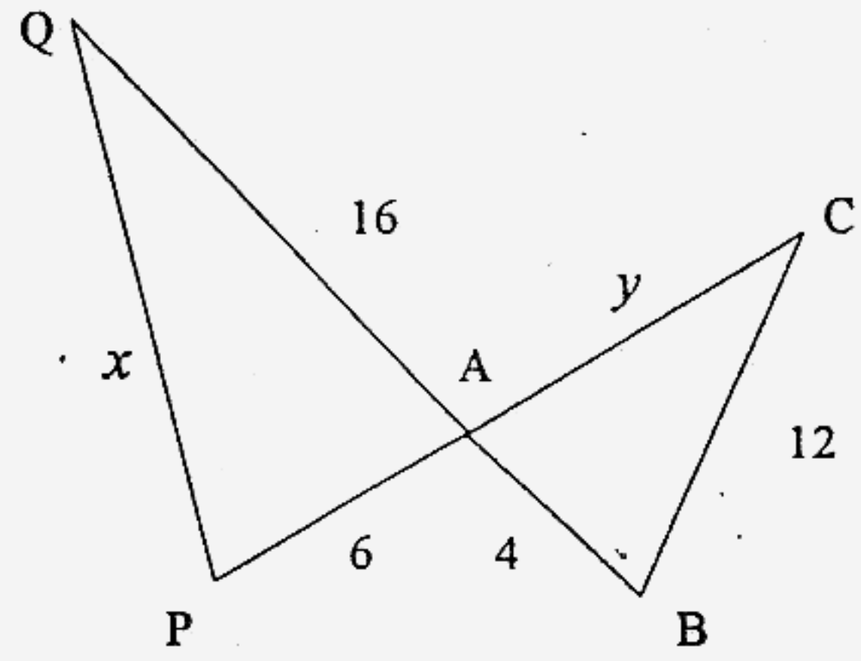
(b) $6(x-1)^2=16-8x$

Ans: (a) _____ [2]

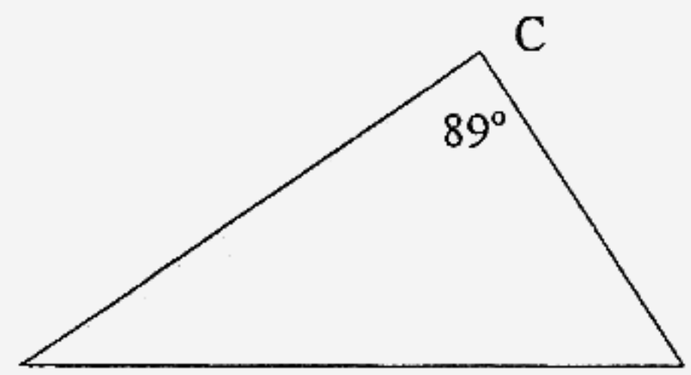
(b) _____ [3]

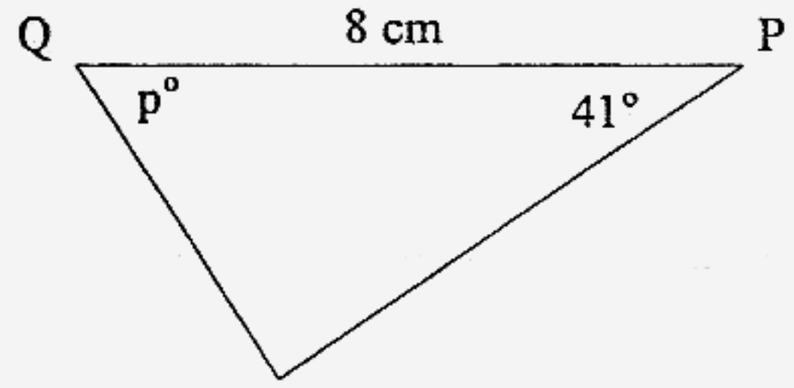
---

7. (a) ΔABC is similar to ΔAPQ. Calculate the value of x and y in cm.



(b) Given that $\Delta ABC \equiv \Delta PQR$, find the value of p and q.





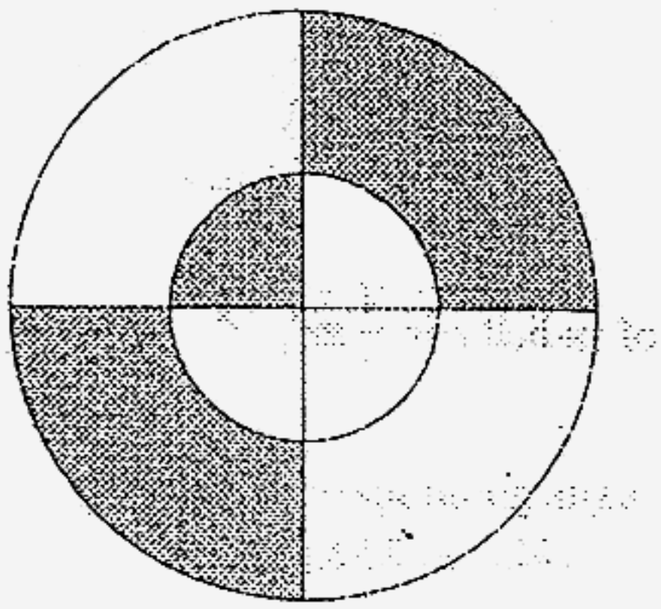
Ans: (a) x = _____ [1]

y = _____ [1]

$\angle p$ = _____ [1]

q = _____ [1]

8. The radii of the concentric circles are 2 *cm* and 5 *cm*. Find the area of the shaded regions, giving your answer in terms of π.



Ans: _____ [4]

---

9. A map is drawn to a scale of 1 : 250000.

(a) Calculate the distance, in *cm*, between two towns on the map if they are 15 *km* apart.

(b) A field is represented by a rectangle with dimensions 6 *cm* by 8 *cm* on the map. What is the actual area of the field in km^2?

Ans: (a) _____ [2]

(b) _____ [2]

---

10. The following table shows the distribution of number of children per family in a sample of 30 households.

No. of children in a household	0	1	2	3	4	5	6
No. of households	5	6	4	10	3	1	1

Find: (a) the mean, (b) the median, (c) the mode.

Ans: (a) mean = _____ [1]

(b) median = _____ [1]

(c) mode = _____ [1]

---

11. If $\varepsilon = x \leq 9,\ x \in Z^+$, $A =$ multiples of 3 , $B =$ prime numbers

Find:

(a) c such that $c \in A$ and $c \notin B$.

(b) Set D such that $D = A \cup B$.

(c) Set E such that $E = A \cap B$.

Ans: (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

---

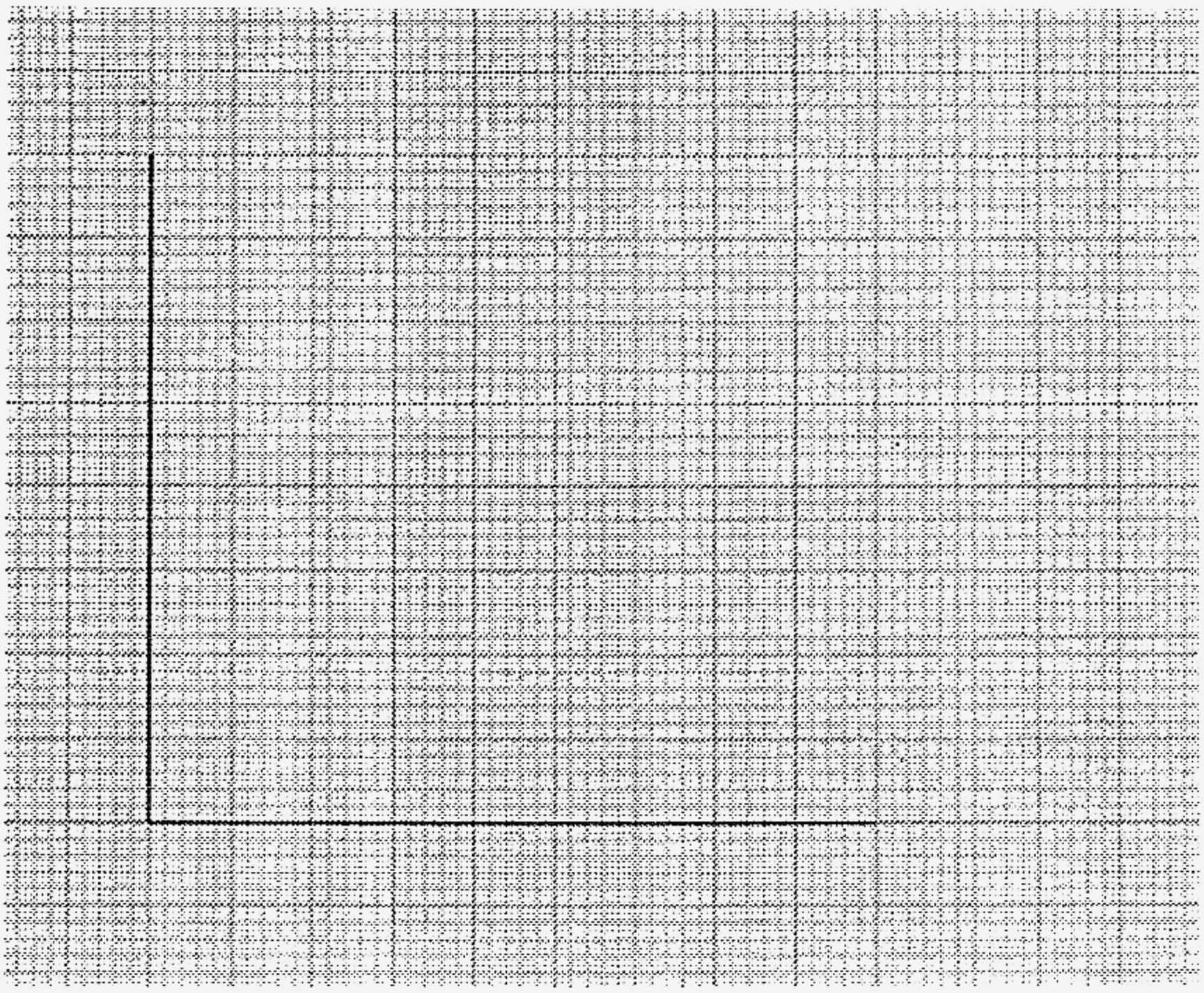
12. In a health survey, thirty old people were asked how many times they had visited a doctor last year. The number of visits was given below:

1	0	0	2	3	1	1	0	2	4
5	1	2	0	2	0	1	3	2	4
3	0	1	1	2	3	2	1	0	1

(a) Complete the frequency table below: [1]

No of visits	0	1	2	3	4	5
Frequency		9				1

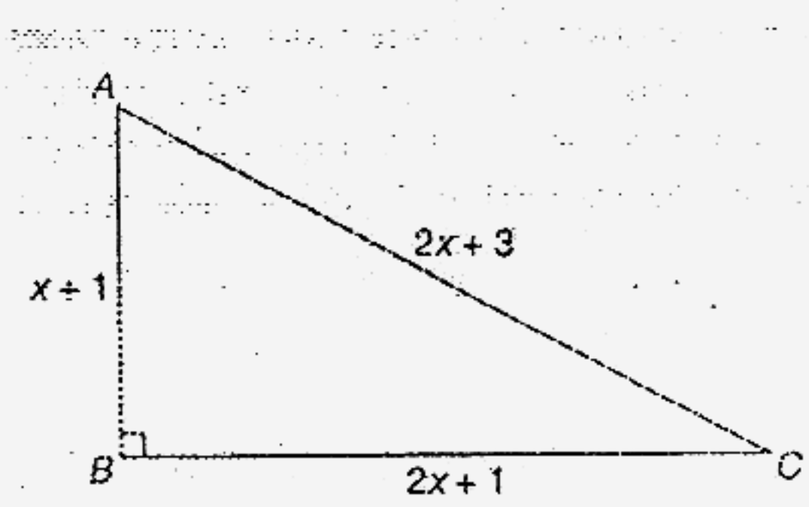
(b) Draw a histogram to represent the above. [2]



13. The diagram shows triangle ABC in which $\angle ABC = 90°$, $AB = (x+1)\ cm$, $BC = (2x+1)\ cm$ and $AC = (2x+3)\ cm$.

(a) Use Pythagoras' Theorem to form an equation in x and show that it reduces to $x^2 - 6x - 7 = 0$.

(b) Solve the equation $x^2 - 6x - 7 = 0$ and hence calculate the area of triangle ABC.



Ans: (a) _____ [2]

(b) _____ [2]

==@@@ End of Paper 1 @@@==

Section A: [42 marks]

Answer **ALL** questions in this section.

Important: Please take note that you are to arrange the questions in the following order:

Questions **1** to **3** → Staple together and submit as '**Set A**'
Questions **4** to **6** → Staple together and submit as '**Set B**'
Questions **7** to **9** → Staple together and submit as '**Set C**'

Set A: Questions 1 to 3

1. (a) (i) Simplify the following algebraic fractions:

$$\frac{18a^4b^4}{7x^2y^3} \div \frac{6a^2b^3}{14xy^2}$$ [2]

(ii) Make b the subject of the formula below:

$$a = \frac{b^2+3}{8}$$ [2]

(b) A cyclist is traveling from Town A to Town C. He travels for 50 km, at a constant speed of x km/h, until he reaches the point B, where his bicycle chain breaks. He then walks the remaining 6 km from B to C at a constant speed of $(x-16)$ km/h. Given that the total time for the whole journey from A to C is 4 $hours$, write down an equation in x and solve to obtain his cycling speed. [4]

---

2. A, B and C are vertices of a triangle. Given that A $(4,0)$, B $(0,3)$, C lies on the $x-axis$, and the equation of BC is $3y+4x=9$, find

(a) the equation of AB in the form of $y=mx+c$, [2]

(b) the coordinates of C, [1]

(c) the area of triangle ABC. [1]

---

3. (a) In a survey, every member of a group of women was asked how many children she had.
The table below illustrates the results of this survey.
Find the mean, median and mode. [3]

No. of children per woman	0	1	2	3	4
No. of women	5	6	8	3	1

(b) Another woman was surveyed and she had x number of children. Find

(i) the maximum value for x if the median is now changed to 1.5. [1]

(ii) the value of x if the mean is changed to 1.625. [1]

Set B: Questions 4 to 6

4. (a) Which of the following set-builder notation best describes the objects in the set:
Biology, Chemistry, Physics ?

(A) S = s:s is a science subject
(B) S = s:s is a subject taught in secondary schools
(C) S = s:s is a science subject taught in secondary schools
(D) S = s:s is a subject that is taught also in a laboratory

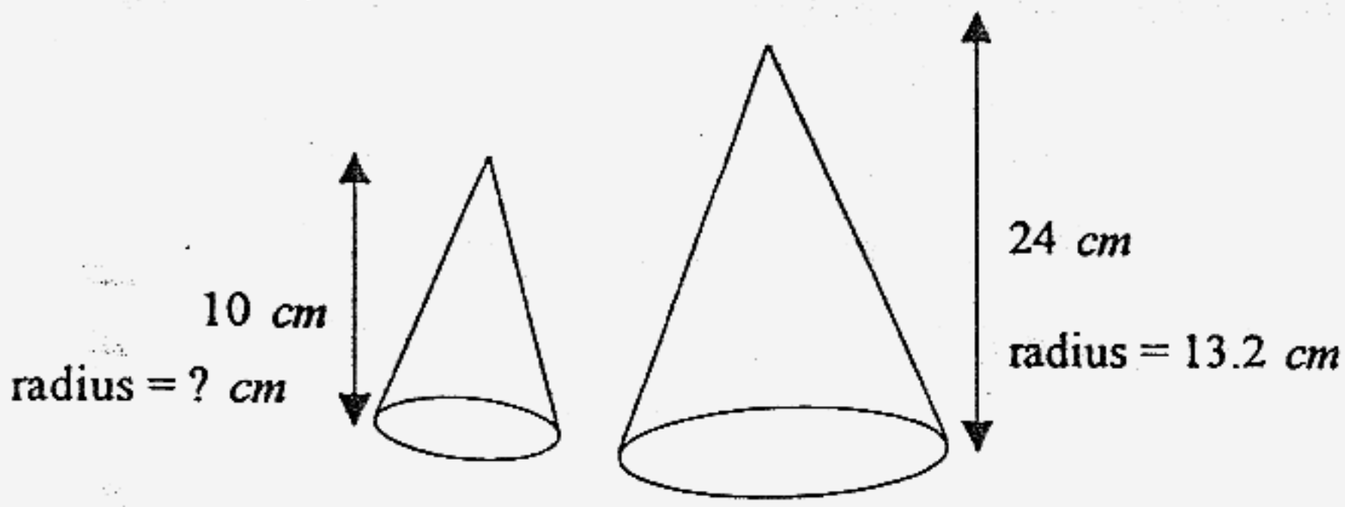
Write down your chosen answer. [1]

Explain why you choose the above answer. [2]

(b) The length of a rectangle is greater than its breadth by 2 *cm*. If the length is increased by 4 *cm* and the breadth decreased by 3 *cm*, the area remains the same. Find the length and breadth of the rectangle. [4]

---

5. Two similar cones are shown below.



If the height of the smaller cone is 10 *cm* and the height of the larger cone is 24 *cm*, Calculate:

(a) the radius of the smaller cone if the radius of the larger cone is 13.2 *cm*; [2]

(b) the circumference of the larger cone if the circumference of the smaller cone is 35 *cm*. [2]

---

6. Using 1 *cm* for 1 *unit* for the $x-axis$ and 2 *cm* for 5 *units* for the $y-axis$, draw the graph of the equation $y=3x^2-7x+1$ for $-1\le x\le 4$.

x	-1	0	1	2	3	4
y	11		–3		7	21

Hence solve the equation $3x^2-7x+1=0$ [4]

From the above graph, solve for $3x^2-7x-4=0$ [2]

Set C: Questions 7 to 9

7. (a) The lengths of the parallel sides of a trapezium are $(x+3)$ *cm* and $(x+9)$ *cm* and its height is $(3x-4)$ *cm*. If its area is 80 cm^2, find the value of x. [4]

(b) Given that 4 *cm* on a map represents 3 *km* on the ground.

(i) Find the R.F. of the map. [2]

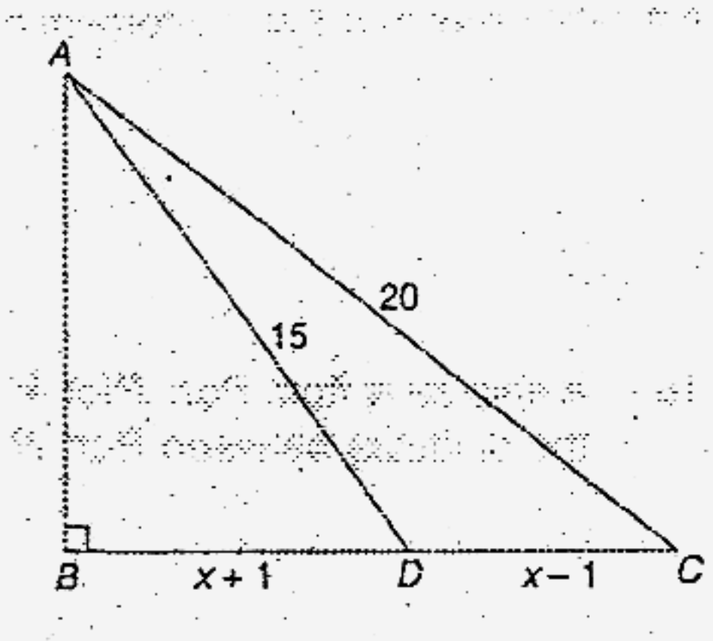
(ii) Calculate in cm^2, the area of a town council on a map, given that its actual area is 32.4 km^2. [2]

Section B: [8 marks]

Answer **ALL** questions in this section.

---

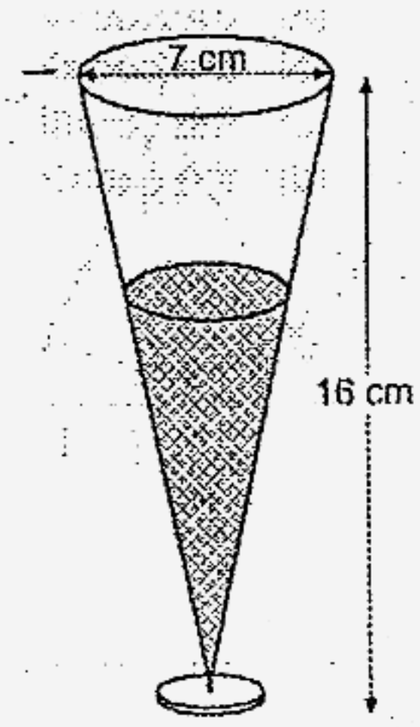
8. (a) In the right-angled triangle ABC, D is a point on BC. Given that $AD = 15\ cm$, $AC = 20\ cm$, $BD = (x+1)\ cm$ and $DC = (x-1)\ cm$, find the value of:



(i) x. [2]

(ii) AB [2]

(b) The diagram shows a conical glass of height $16\ cm$. The diameter of its rim is $7\ cm$. Some spherical jellies with radius $1.2\ cm$ are to be added until the liquid in the glass reaches its brim. If there is already $86.6\ cm^2$ of liquid in the glass, find the least number of jellies needed to fill the glass. (Take $\pi = \frac{22}{7}$). [4]



Bonus Question:

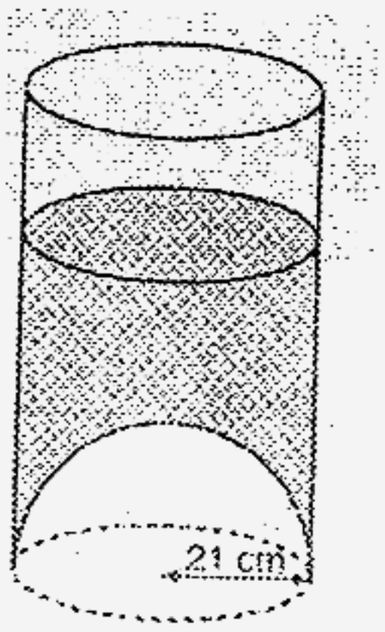
9. (a) A cylindrical tank with a hollow hemispherical base of radius 21 *cm* contains 40 *litres* of water. What is the height of the water level in the tank?

(Take $\pi = \frac{22}{7}$ and leave your answer correct to 2 *decimal places*). [2]

(b) The water in the tank was then drained through a valve at a rate of 1.8 *litres* *per minute* till 6 *hemispherical* containers at *internal diameter* 28 *cm* are exactly filled.

(i) Find the time needed to exactly fill up the 6 *hemispherical* containers. Take $\pi = \frac{22}{7}$ and leave your answer corrected to the nearest minute. [2]

(ii) How many *litres* of water are left in the tank? [1]



==@@@ End of Paper 2 @@@==

Answers for 2 Express Maths Paper 1

1(a)	1.716	9(a)	6 cm
(b)	$(x+4y)(a^2-3b)$	9(b)	300 km^2
2(a)	$\frac{7y}{6}$	10(a)	2.23 $(2\frac{7}{30})$
2(b)	$\frac{5}{x-y}$	10(b)	2.5
		10(c)	3
3(a)	$x=\frac{4}{3}, y=-8$		
3(b)	5 and 15	11(a)	6 or 9
		11(b)	D = 2,3,5,6,7,9
4(a)	$a^2b^4c^6$	11(c)	E = 3
4(b)	p^6q^2		
4(c)	$\frac{25}{16}$ or $1\frac{9}{16}$	12(a)	7 , 9 , 7 , 4 , 2 , 1
5(a)	$\frac{3x-5y}{3x+5y}$	13(b)	$x=7$ or -1 (N.A.)
5(b)	$-\frac{1+x}{x}$		AB = 8 cm
			BC = 15 cm
6(a)	$x=-\frac{10}{7}$ or 3		Area of ΔABC = 60 cm^2
6(b) –	$x=\frac{5}{3}$ or -1		
7(a)	$x=18$ cm $y=10\frac{2}{3}$ or 10.67 cm		
7(b)	$\angle p=50°$ $q=8$ cm		
8	$11\frac{1}{2}\pi$ cm^2		

Answers for 2 Express Maths Paper 2

1(a)(i)	$\frac{6a^2b}{xy}$	8(a)(i)	$x=-\frac{22}{3}$ or 8
1(a)(ii)	$b=\pm\sqrt{8a-3}$	8(a)(ii)	AB = 12 *cm*
1(b)	$x=10$ (n.a.) or 20 speed = 20 *km/hr*	8(b)	16 spherical jellies
2(a)	$y=-\frac{3}{4}x+3$	9(a)	42.86 *cm*
2(b)	$C:(2\frac{1}{4},0)$ or (2.25 , 0)	9(b)(i)	19 *min*
2(c)	$2\frac{5}{8}$ *cm*^{2} (2.625 *cm*^{2})	9(b)(ii)	5.504 *litres*
3(a)	Mean = 1.52 Median = 2 Mode = 2		
3(b)(i)	Median = 1.5		
3(b)(ii)	$x=4$		
4(a)	Choice : C		
4(b)	Length = 20 *cm* Breadth = 18 *cm*		
5(a)	$x=5.5$ *cm*		
5(b)	$y=84$ *cm*		
6	1,. -1		
—	$x=0.2$ and 2.2		
	$x=-0.5$ and 2.8		
7(a)	$x=-8\frac{2}{3}$ (n.a.) or 4		
7(b)(i)	R.F. $=\frac{1}{75000}$		
7(b)(ii)	57.6 *cm*^{2}		