Date:
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Subject : Maths

BLE ~ 2081 (2025)

Kathmandu Metropolitan City

Answer Sheet

Q.N. 1 Ans

Sol^n.

(a) Here
$A = \{2, 5\}$
$B = \{5, 7\}$
So, the set A and B are overlapping.

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(b) Here,
The two proper subsets that can be made from set $B = \{5, 7\}$ are:-
$\{5\}, \{7\}$

Q.N. 2 Ans

Sol^n.

(a) Here,
The number 8848.86 is a rational number.

(b) Here,
The height of Mt. Everest = 8848.86 meter
Now,
1m = 100 cm
$\therefore 8848.86\text{m} = 8848.86 \times 100\text{ cm}$

$= 884886 \text{ cm}$

The scientific notation of 884886 is

$= 8.84886 \times 10^5$ Ans

(c) Here,

$8848 = 240343_5$

5	8848	– 3
5	1769	– 4
5	353	– 3
5	70	– 0
5	14	– 4
5	2	– 2
	0	

$\therefore 8848 = 240343_5$ proved

Q.N. 3 Ans

Sol^n

(a) The difference between direct and indirect variation are:-

Direct Variation	Indirect Variation
* When one quantity increases, the other also increases and one quantity decreases other also decreases.	* When one quantity increases, the other quantity decreases and vice-versa.
Eg:- More time you work, more money you earn.	Eg:- More speed less time to reach

(b) Here,
Divide Rs.50,00,000 in the ratio of 3:2, as;
Let x be the common ratio. Then,
$3x + 2x = \text{Rs. } 50,00,000$
or, $5x = \text{Rs. } 50,00,000$
or, $x = \frac{\text{Rs. } 5000000}{5}$
$\therefore x = \text{Rs. } 10,00,000$
Now,
Ramnaresh invested in the factory
$= 3x$
$= 3 \times \text{Rs. } 1000000$
$= \text{Rs. } 30,00,000$

(C) Here,
Mahesh invested in the factory
$= 2x$
$= 2 \times \text{Rs. } 1000000$
$= \text{Rs. } 20,00,000$
Now,
principal (P) = Rs. 20,00,000
Time (T) = 2 yrs.
Rate of interest (R) = 10 %.
Simple interest (SI) = ?
We know that,
$SI = \frac{PTR}{100}$
$= \frac{2000000 \times 2 \times 10}{100}$
$= \text{Rs. } 4,00,000$

Thus, He received Rs. 4,00,000 simple interest after 2 years.

(d) Here,

$3 : 2 = x : 500$

or, $\frac{3}{2} = \frac{x}{500}$

or, $x = \frac{3}{2} \times 500$

$\therefore x = 750$ Ans

Thus, the value of x is 750.

Q.N. 4 Ans.

Sol^{n}.

(a) Here,

Cost price (CP) = Rs. 25000

Then,

The marked price of the machine is

= Rs. 25000 + 20% of Rs. 25000

= Rs. 25000 + $\frac{20}{100} \times$ Rs. 25000

= Rs. 25000 + Rs. 5000

= Rs. 30,000 Ans

(b) Here,
CP = Rs. 25000
Loss = Rs. 1000
SP = ?
We have,
SP = CP − Loss
= Rs. 25000 − Rs. 1000
= Rs. 24000
Also,
Discount (D) = MP − SP
= Rs. 30000 − Rs. 24000
= Rs. 6000
Now,
Discount % (D%) = $\frac{D}{MP} \times 100\%$

$= \frac{6000}{30000} \times 100\%$

$= 20\%$

Thus, the discount percentage is 20%.

(c) Here,
CP = Rs. 25000
profit = Rs. 2000
∴ SP = CP + profit
= Rs. 25000 + Rs. 2000
= Rs. 27000
Now,
Discount = MP − SP

$= RS.30000 - RS.27000$

$= RS.3000$

Again,

$$\text{Discount \%} = \frac{D}{MP} \times 100\%$$

$$= \frac{3000}{30000} \times 100\%$$

$$= 10\%$$

Thus, If he wants to earn a profit of RS. 2000 by selling the machine then, 10% discount should be maintained.

Q.N. 5 Ans

Sol^{n}.

(a) Here,
The formula to find the area of parallelogram is

A = base x height

(b) Here,
Radius of semi-circle (r) = $\frac{\text{diameter}}{2}$

$$= \frac{13}{2}$$

$$= 6.5 \text{ cm}$$

Now,
Area of semi-circle (A_1) = $\frac{\pi r^2}{2}$

$$= \frac{3.14 \times 6.5^2}{2}$$

$$= \frac{3.14 \times 42.25}{2}$$

$$= \frac{132.665}{2}$$

$$= 66.33 \text{ cm}^2$$

(C) Here,
In right angled triangle ADB
AD = 5cm
AB = 13cm
We have
Area of Right angled triangle ADB

$$(A_2) = \frac{1}{2} \times AD \times AB$$

$$= \frac{1}{2} \times 5 \times 13$$

$$= \frac{65}{2}$$

$$= 32.5 \text{ cm}^2$$

Thus, the area of right angled triangle ADB is less than the area of semi circle by

$$= A_1 - A_2$$
$$= 66.33 \text{cm}^2 - 32.5 \text{cm}^2$$
$$= 33.83 \text{ cm}^2$$

(d) Here,
In a parallelogram ABCD,
AB = base = 13cm
AD = height = 5cm
Now,
Area of □ABCD is
= base × height
= 13cm × 5cm
= 65cm²
Also,
Area of right angle triangle ADB
= 32.5cm²
So,
Area of □ABCD = 2 × Area of ΔADB
= 2 × 32.5cm²
= 65cm²

Thus,
It is clear that, the area of parallelogram ABCD is double the area of triangle ADB. Because, they are standing on same base AB.

Q.N. 6 Ans

(a) Here,
The expanded form of $(a-b)^2$ is
$= a^2 - 2ab + b^2$

(b) Here,

$$x^{p(a-b)} \times x^{p(b-c)} \times x^{p(c-a)}$$

$$= x^{p(a-b)+p(b-c)+p(c-a)}$$

$$= x^{pa-pb+pb-pc+pc-pa}$$

$$= x^0$$

$$= 1 \quad \text{Ans}$$

Q.N. 7 Ans

Sol^{n}.

(a) Here,
Breadth of garden (b) = x meter
$\therefore$ Length of garden (l) = 4 meter more than breadth
= $(x+4)$ meter

(b) Here,
Area of garden (A) = $96\,m^2$
Now,
$l \times b = 96\,m^2$
or, $(x+4) \times x = 96\,m^2$
or, $x^2+4x = 96$
or, $x^2+4x-96 = 0$

or, $x^2+(12-8)x-96=0$
or, $x^2+12x-8x-96=0$
or, $x(x+12)-8(x+12)=0$
or, $(x+12)(x-8)=0$
Either,
$\Rightarrow x+12=0$ $\Rightarrow x-8=0$
$\therefore x=-12$ $\therefore x=8$
(-ve not possible)
Now,
$\Rightarrow x=8$ m
$\Rightarrow x+4=8+4=12$ m

Thus, the length and breadth of the garden are 12m and 8m resp.

Q.N. 8 Ans

Sol^{n}

(a) Here,
$2x^2+xy-2x-y$
$=2x^2-2x+xy-y$
$=2x(x-1)+y(x-1)$
$=(x-1)(2x+y)$

(b) Here,
$$\frac{1}{x-3}-\frac{x-3}{x^2-9}$$
$$=\frac{1}{x-3}-\frac{x-3}{x^2-3^2}$$

$$= \frac{1}{x-3} - \frac{(x-3)}{(x+3)(x-3)}$$

$$= \frac{1}{x-3} - \frac{1}{x+3}$$

$$= \frac{1 \times (x+3) - 1 \times (x-3)}{(x-3)(x+3)}$$

$$= \frac{x+3-x+3}{x^2-3^2}$$

$$= \frac{6}{x^2-9} \quad \text{Ans}$$

Q.N. 9 Ans

Sol^{n}.

(a) We use the following formula to find the distance between two points (x_1, y_1) and (x_2, y_2) is

$$D = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$

(b) Here,
Given points:
$B(5,5)$ and $C(-1,3)$
$\Rightarrow (x_1, y_1) = (5,5)$
$(x_2, y_2) = (-1,3)$

Now,
The distance between B and C is

$$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(-1-5)^2 + (3-5)^2}$$

$$= \sqrt{(-6)^2 + (-2)^2}$$

$$= \sqrt{36+4}$$

$$= \sqrt{40}$$

$$= 2\sqrt{5} \text{ units}$$

Thus,
the length of BC is $2\sqrt{5}$ units.

(c) Here,
Given points;
A(4, -2), B(5, 5), C(-1, 3)
Rotate the ΔABC a quarter turn in positive direction ($+90^\circ$ Rotation)

$$P(x, y) \longrightarrow P'(-y, x)$$

So,

$$A(4, -2) \longrightarrow A'(2, 4)$$
$$B(5, 5) \longrightarrow B'(-5, 5)$$
$$C(-1, 3) \longrightarrow C'(-3, -1)$$

(d) Here,

Given:- Two triangles of different measurement

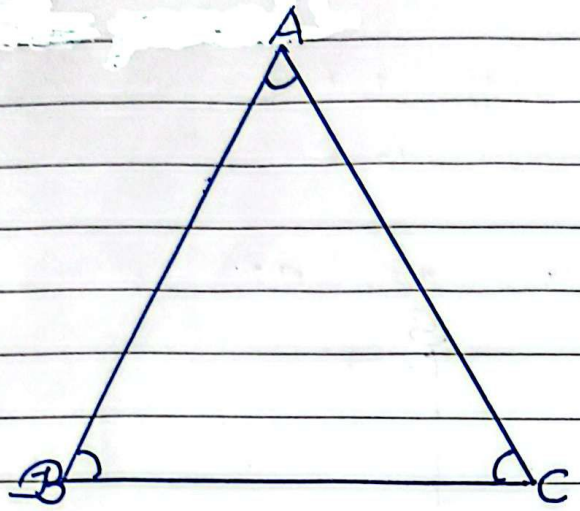


Fig (a)

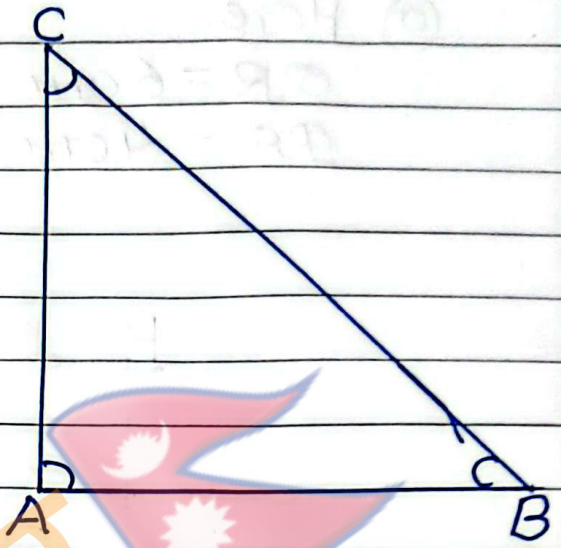


Fig (b)

To be prove:-

$$\angle A + \angle B + \angle C = 180^\circ$$

Observation:-

Fig.	$\angle A$	$\angle B$	$\angle C$	Result
(a)	56°	63°	61°	$\angle A+\angle B+\angle C = 180^\circ$
(b)	90°	42°	48°	$\angle A+\angle B+\angle C = 180^\circ$

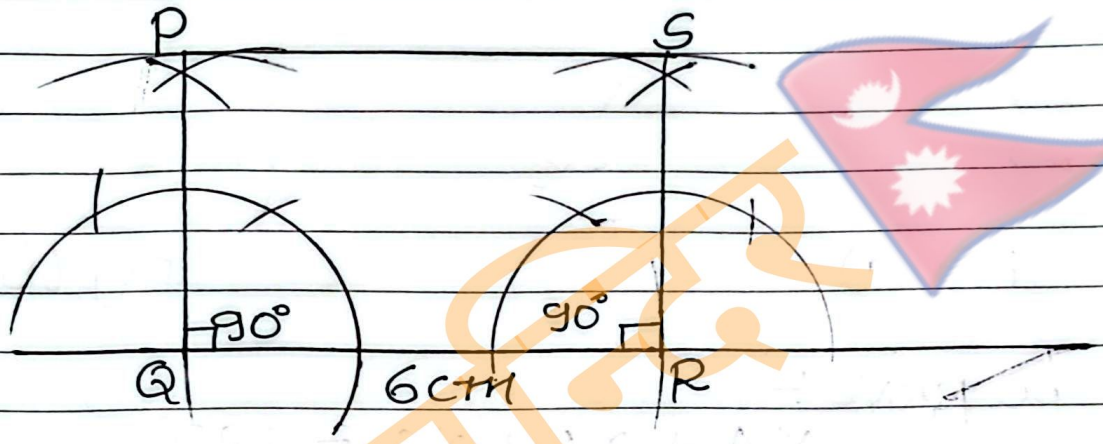
Conclusion:- From the above experiment, we conclude that the sum of interior angles of a triangle is 180°.

proved

Q.N. 10 Ans

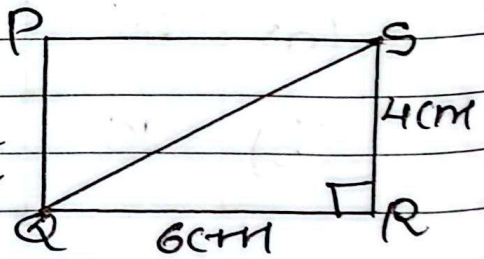
Sol^{n}.

(a) Here,
QR = 6 cm
RS = 4 cm



We construct the rectangle PQRS using compass according to the given dimensions.

(b) Here,
In a rectangle PQRS, ΔPQS and ΔQRS are congruent to each other because they have a common side QS and the angles $\angle PQR$ and $\angle QRS$ both are 90°.



So, they are congruent by SAS rule of congruency.

Q.N. 11 Ans

Sol^{n}.

(a) Here,

Scale :- 1cm = 5km

PQ = 8cm

= 8 × 5km

= 40km

Bearing of Q from P = 110°

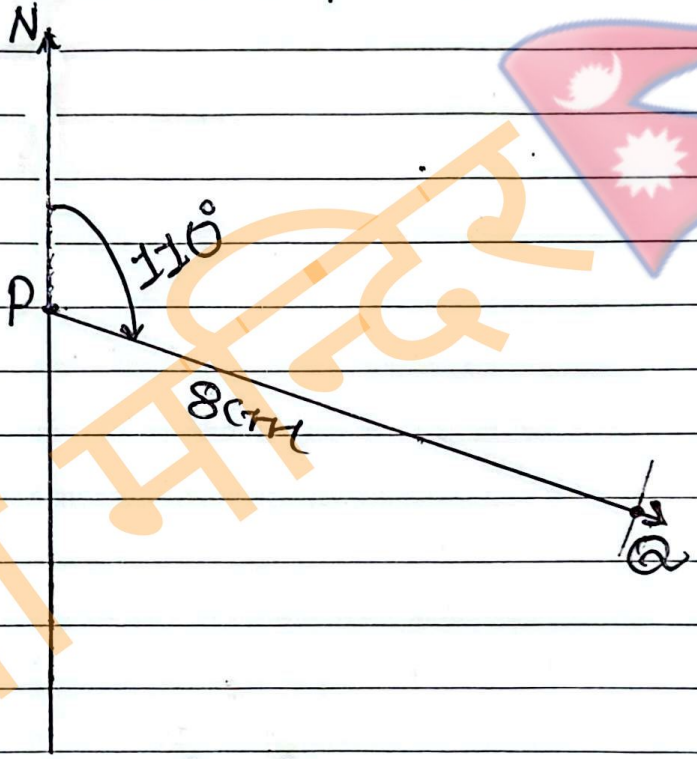


Fig:- Bearing of Q from P

(b) Here,

The bearing of Q from P = 110°

Now,

The bearing of P from Q is

= 180° + 180°

= 290°

Thus, the bearing of P from Q is different than the bearing of Q from P by 180°.

(Because reverse bearings are always 180° different)

Q.N. 12 Ans,

Soln.

(a) Here,
23, 30, 25, 26, 23, 28, 27

The mode from the above data is
= 23 (Most repeated)

(b) Here,
$X = 23, 30, 25, 26, 23, 28, 27$
$\Sigma X = 23+30+25+26+23+28+27$
$= 182$
$N = 7$
Now,
Average marks $(\bar{X}) = \frac{\Sigma X}{N}$
$= \frac{182}{7}$
$= 26$
Thus, the average marks is 26.

(c) Median divides the given data into two equal parts because it is the middle value.

The End

Thank You!!!

[Set 1]

Kathmandu Metropolitan City

BASIC LEVEL EXAMINATION - 2081

Class: 8 Full Marks: 50

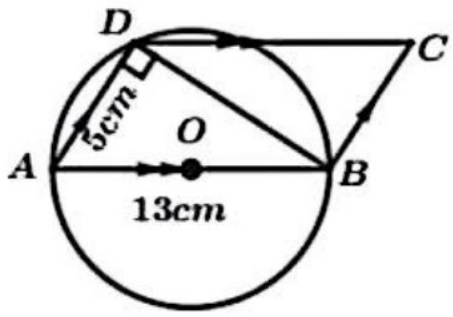
Sub: Compulsory Mathematics Time: 2 hr.

सबै प्रश्नहरू अनिवार्य छन् । (All questions are compulsory.)

1. समूह A = {2, 5} र समूह B = {5, 7} दिइएको छ । (Set A = {2, 5} and set B = {5, 7} are given.)
   (a) समूह A र समूह B अर्लाग्गिएका वा खाँप्टिएका कस्ता समूह हुन् ? लेख्नुहोस् । (Are sets A and B overlapping or disjoint? Write it.) [1]
   (b) समूह B बाट बन्ने कुनै दुई ओटा उपयुक्त उपसमूह लेख्नुहोस् । (Write any two proper subsets that can be made from set B.) [2]
2. इ.सं. 2020 डिसेम्बर 8 का दिन घोषणा गरिएअनुसार विश्वको सर्वोच्च शिखर सगरमाथाको उचाइ 8848.86 मिटर थियो । (As announced on December 8, 2020, the height of Mount Everest, the highest peak in the world, was 8848.86 meter.)
   (a) सङ्ख्या 8848.86 आनुपातिक वा अनानुपातिक कस्तो सङ्ख्या हो, लेख्नुहोस् । (Write whether the number 8848.86 is a rational or irrational number.) [1]
   (b) सगरमाथाको उचाइलाई सेन्टिमिटरमा रूपान्तरण गरी वैज्ञानिक सङ्केतमा लेख्नुहोस् । (Convert the height of Mt. Everest in centimeter and write in scientific notation.) [2]
   (c) प्रमाणित गर्नुहोस् । (Prove that): $8848 = 240343_5$ [2]
3. दुई जना साथी रामनरेश र महेशले 3: 2 को अनुपातमा रू.50,00,000 एउटा उद्योगमा लगानी गरेछन् । (Two friends, Ramnaresh and Mahesh invested Rs.50,00,000 in a factory in the ratio of 3: 2.)
   (a) प्रत्यक्ष र अप्रत्यक्ष विचरणमा के फरक छ ? एउटा फरक लेख्नुहोस् । (What is the difference in direct and indirect variation? Write one difference.) [1]
   (b) रामनरेशले उद्योगमा कति रकम लगानी गरेका रहेछन् ? पत्ता लगाउनुहोस् । (How much amount has Ramnaresh invested in the factory? Find it.) [1]
   (c) महेशले उद्योगमा लगानी गरेको रकमलाई वार्षिक 10% व्याजदरमा कुनै एउटा बैङ्कमा जम्मा गरेको भए 2 वर्षपछि कति साधारण ब्याज पाउन सकिन्थ्यो ? गणना गर्नुहोस् । (If Mahesh had deposited the amount invested in the industry in a bank at an annual interest rate of 10%, how much simple interest would he have received after 2 years? Calculate.) [2]
   (d) यदि 3: 2 = x: 500 भए x को मान पत्ता लगाउनुहोस् । (If 3: 2 = x: 500, find the value of x.) [1]

4. अशिमले एउटा मेसिन रू.25,000 मा किनेछन् र त्यसको मूल्यमा 20% बढाइ अङ्कित मूल्य कायम गरेछन् । उनले उक्त मेसिनमा केही रकम छुटसहित बेच्दा रू.1,000 नोक्सान भएछ । (Ashim bought a machine for Rs.25,000 and fixed the market price by increasing 20% on its price. He made a loss of Rs.1,000 after selling the machine with some discount amount.)
   (a) मेसिनको अङ्कित मूल्य पत्ता लगाउनुहोस् । (Find the marked price of the machine.) [1]
   (b) उक्त मेसिन कति प्रतिशत छुटमा बेचिएको रहेछ ? पत्ता लगाउनुहोस् । (At how much discount percentage was the machine sold? Find out.) [2]
   (c) यदि अशिमले उक्त मेसिन बेच्दा रू.2,000 नाफा कमाउन चाह्यो भने छुटको दर कति कायम गरिनुपर्छ ? (If Ashim wants to earn a profit of Rs.2,000 by selling the machine, what discount rate should be maintained?) [1]

5. दिइएको चित्रमा, ABCD एउटा समानान्तर चतुर्भुज हो । जहाँ, 13 से.मि. व्यास भएको वर्धवृत्तमा उचाइ AD = 5 से.मि. भएको समकोणी त्रिभुज ADB बनेको छ । (In the figure, ABCD is a parallelogram where a right angled triangle ADB with height AD = 5 cm is formed on the semicircle having diameter 13 cm.)



   (a) समानान्तर चतुर्भुजको क्षेत्रफल पत्ता लगाउने सूत्र लेख्नुहोस् । (Write the formula to find the area of parallelogram.) [1]
   (b) उक्त अर्धवृत्तको क्षेत्रफल पत्ता लगाउनुहोस् । (Find the area of the semicircle.) [1]
   (c) अर्धवृत्तको क्षेत्रफल भन्दा समकोणी त्रिभुज ADB को क्षेत्रफल कतिले कम छ ? गणना गर्नुहोस् । (By how much is area of right angled triangle ADB less than the area of semi-circle? Calculate it.) [2]
   (d) के समानान्तर चतुर्भुज ABCD को क्षेत्रफल त्रिभुज ADB को क्षेत्रफलको दोब्बर हुन्छ ? तर्कपूर्ण जवाफ दिनुहोस् । (Is the area of parallelogram ABCD double the area of triangle ADB? logical answer.) [1]

6. (a) $(a - b)^2$ को विस्तारित रूप लेख्नुहोस् । (Write the expanded form of $(a - b)^2$.) [1]
   (b) सरल गर्नुहोस् । (Simplify): $x^{p(a-b)} \times x^{p(b-c)} \times x^{p(c-a)}$ [2]

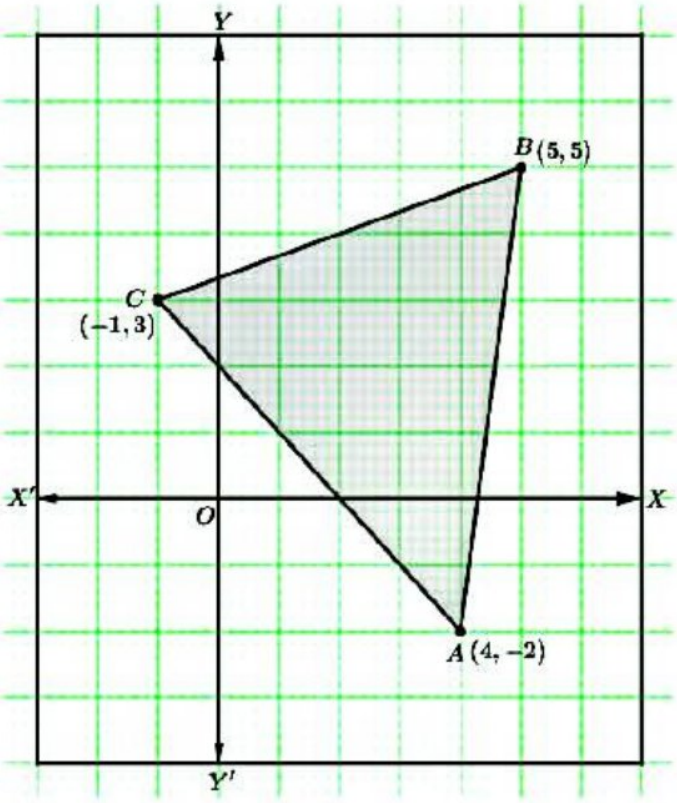
7. एउटा आयताकार बगैचाको लम्बाइ चौडाइभन्दा 4 मिटरले बढी छ । उक्त बगैचाको जम्मा क्षेत्रफल 96 वर्गमिटर छ । (A rectangular garden has length 4 meter more than its breadth. The area of the garden is 96 square meter.)
   (a) उक्त बगैचाको चौडाइ x मिटर भए लम्बाइ कति हुन्छ ? x को रूपमा लेख्नुहोस् । (If the breadth of the garden is x meters, what is the length? Write in terms of x.) [1]

(b) उक्त बगैंचाको लम्बाइ र चौडाइ कति हुन्छ ? वर्ग समीकरण बनाई पत्ता लगाउनुहोस् । (What are the length and breadth of the garden? Find by making quadratic equation.) [2]

8. (a) खण्डीकरण गर्नुहोस् । (Factorize) : $2x^2 + xy - 2x - y$ [2]

(b) सरल गर्नुहोस् । (Simplify) $\frac{1}{x-3} - \frac{x-3}{x^2-9}$ [2]

9. दिइएको ग्राफमा त्रिभुज ABC देखाइएको छ । (In the given graph, triangle ABC is shown.)



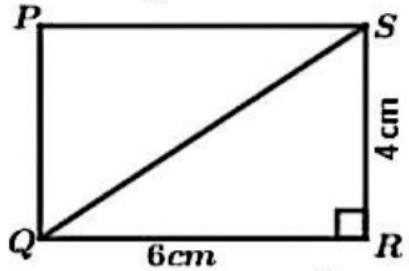
(a) दुई बिन्दुबीचको दुरी पत्ता लगाउन कुन सूत्र प्रयोग गर्नुहुन्छ ? लेख्नुहोस् । (Which formula do you use to find the distance between two points? Write it.) [1]

(b) भुजा BC को लम्बाइ पत्ता लगाउनुहोस् । (Find the length of side BC.) [2]

(c) त्रिभुज ABC लाई धनात्मक दिशामा एक चौथाई परिक्रमण गर्नुहोस् र प्रतिबिम्बित त्रिभुजका शीर्षबिन्दुको निर्देशाङ्क लेख्नुहोस् । (Rotate the triangle ABC a quarter turn in the positive direction and write the coordinates of the vertices of image triangle.) [2]

(d) त्रिभुजका भित्री कोणको योगफल 180° हुन्छ भनी प्रयोगात्मक रूपमा प्रमाणित गर्नुहोस् । (फरक फरक नापका दुई त्रिभुज आवश्यक छन् । (Experimentally verify that the sum of interior angles of a triangle is 180°. (Two triangles of different measurements are required.)) [3]

10. चित्रमा, PQRS एउटा आयत हो, जसमा लम्बाइ QR = 6 से.मि. र चौडाइ RS = 4 से.मि. छ । (In the figure PQRS is a rectangle in which length QR = 6 cm and breadth RS = 4 cm.)



(a) कम्पासको प्रयोग गरी दिइएको नापको आधारमा आयत PQRS को रचना गर्नुहोस् । (Construct the rectangle PQRS using compass according to the given dimensions.) [3]

(b) के ΔQPS र ΔQRS एक आपसमा अनुरुप छन् ? कारण सहित लेख्नुहोस् । (Are ΔQPS and ΔQRS congruent to each other? Write with reason.) [1]

11. 1 से.मी. = 5 कि.मी. को नक्साङ्कनमा बिन्दु P बाट 8 से.मी. पर रहेको बिन्दु Q को दिशास्थिति 110° छ । (A point Q, which is 8 cm away from a point P has a bearing of 110° in the scale 1 cm = 5 km.)
    (a) माथिको सन्दर्भअनुसारको दिशास्थिति रेखाङ्कन गर्नुहोस् । (Draw the bearing according to the above context.) [1]
    (b) बिन्दु Q बाट बिन्दु P को दिशास्थिति र बिन्दु P बाट बिन्दु Q को दिशास्थिति बिच तुलना गर्नुहोस् । (Compare the bearing of P from point Q and bearing of Q from P.) [2]
12. कक्षा आठका 7 जना विद्यार्थीले प्रथम त्रैमासिक परीक्षामा गणित विषयमा प्राप्त गरेका अङ्कहरू दिइएका छन् । (The following are the marks obtained by 7 students of grade eight in first terminal examination in mathematics):
    23, 30, 25, 26, 23, 28, 27
    (a) माथिको तथ्याङ्कबाट रीत पत्ता लगाउनुहोस् । (Find the mode from the above data.) [1]
    (b) 7 जना विद्यार्थीले प्रथम त्रैमासिक परीक्षामा पाएको औसत प्राप्ताङ्क कति हुन्छ ? पत्ता लगाउनुहोस् । (What is the average marks obtained by the 7 students in first terminal examination? Find it.) [1]
    (c) मध्यक, माध्यिका र रीतमध्ये कुनले दिइएको तथ्याङ्कलाई बराबर दुई भागमा विभाजन गर्छ ? कारणसहित लेख्नुहोस् । (Which among mean, median and mode divides the given data in two equal parts? Write with reason.) [1]

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