

Dear students, Assalamualaikum.

I think by this time you have learned the basics of Mensuration, Pythagorean Theorem and Algebraic Expression. Now let us practice some important Creative Questions and MCQs as your Home Work. Practice these from tomorrow according to the routine I provided below. Try to solve these yourself. We will check our Home Works whether correct or not later on in a very simplified way.

Thank You.

Barkatul Alam Tipu Sir

(Subject: Mathematics)

<b>Vacation Home Work Routine (Mathematics : From 24/04/2020 to 30/04/2020)</b>					
Sl. No.	Date	Morning (1 Hour)		Evening (1 Hour)	
1	24/04/2020	CQ: 1 & 2 (Mensuration)	MCQ: 1-12 (Mensuration)	CQ: 3 & 4 (Mensuration)	MCQ: 13-24 (Mensuration)
2	25/04/2020	CQ: 5 & 6 (Mensuration)	MCQ: 25-36 (Mensuration)	CQ: 7 & 8 (Mensuration)	MCQ: 37-49 (Mensuration)
3	26/04/2020	CQ: 9,10 & 11 (Mensuration)		CQ: 12,13 & 14 (Mensuration)	
4	27/04/2020	CQ: 15 & 16 (Mensuration)		CQ: 1 & 2 (Pythagorean Th.)	
5	28/04/2020	CQ: 3 (Pythagorean Th.)	MCQ: 1-7 (Pythagorean Th.)	CQ: 4 (Pythagorean Th.)	MCQ: 8-14 (Pythagorean Th.)
6	29/04/2020	CQ: 5 (Pythagorean Th.)	MCQ: 15-21 (Pythagorean Th.)	CQ: 1-4 (Algebraic Exp.)	MCQ: 1-14 (Algebraic Exp.)
7	30/04/2020	CQ: 5-8 (Algebraic Exp.)	MCQ: 15-28 (Algebraic Exp.)	CQ: 9-11 (Algebraic Exp.)	MCQ: 29-42 (Algebraic Exp.)

## Mensuration

### Creative Questions:

**1.** The length of a rectangular garden is 4 times of its breadth and area of garden is 44100 sq. m. The area of a square size field is equal to the area of rectangular garden and there is a road of breadth 3 metre around the outside the square field.

- Convert 6250 metre into acres.
- Find the length and breadth of the rectangular garden.
- If the cost price of each sq. metre is Tk. 11 to plant the grass on the road, how much money will be spent?

**2.** The length and breadth of a pond are 60 metre and 40 metre respectively. The width of the bank is 4 metre and the depth of water is 8 metre.

- Determine the perimeter of the pond.
- How many stones are needed when 2 metre square shaped stone is set on the bank of the pond?
- A machine empties 0.3 cubic metre water per second. Determine how many hours will be needed to make the pond waterless by the machine.

**3.** There is a water tank having the height of 2 metres on the roof of Mr. Jaman's house. The capacity of the tank is 24,000 litres and the thickness of the wall is 250 mm.

- How many feet are there in 2.5 nautical miles?
- Find out the inside breadth of the tank when the inside length of the tank is 4 metres.
- Find out the total volume of four walls of the water tank.

**4.** The length, breadth and height of a tank are 4.50 metres, 2.50 metres and 1.50 metres respectively.

- The area of a field of a school is 3 acres. Express it in square metre.
- What is the capacity of the tank in litre?
- Determine the area of four walls of the tank.

**5.** On the roof of the house of Rupa, the capacity of containing water of rectangular tank is 13125 litres. The length of the tank is 3.5 metres and breadth is 2.5 metres. In front of her home the area of a rectangular garden is 10 acres and its length is 3 times of the breadth.

- a) The area of a triangle is 120 sq. cm. and the height is 12 cm. Find its base.
- b) Find the depth of the Tank.
- c) Find the perimeter of the garden.

**6.** Gold is 19.3 times heavier than water. The length of a rectangular gold bar is 4.4 cm, breadth is 3.2 cm. and height is 1.4 cm. An ornament is made by the given gold along with one-fourth copper of that gold. The market rate of gold is Tk. 3000 per gram, copper is Tk. 30 per gram and the making charge is Tk. 3000 to make the ornament.

- a) Find the volume of the gold bar.
- b) What is the weight of the gold bar in gram?
- c) Determine the Total value of the ornament.

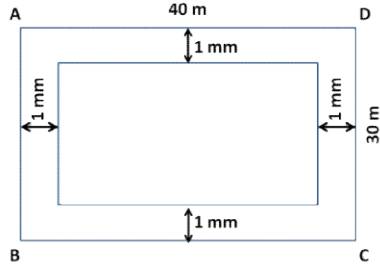
**7.** The length of a rectangular garden is twice of its breadth. An amount of Tk. 21600 is spent to plant grass at the rate of Tk. 6.75 per sq. metre. There are two cross-roads with 2 metres wide along its length and breadth to maintain the garden.

- a) Find the area of the garden.
- b) Find the length of the diagonal of the garden.
- c) Find the total area of two roads.

**8.** The inner length of 15 cm 2.4 mm, breadth 7 cm 6.2 mm and height 5 cm 8 mm of a small box.

- a) Find out the inner length in millimetre of iron box.
- b) evaluate the inner area of the whole face of the box.
- c) The length, breadth and height of a gold bar is 13.47 cm, 1.5 cm and 1 cm respectively. Find out the highest number of gold bar which can be kept in that box.

**9.**



In figure, ABCD is a rectangular garden and there is a 1 metre wide road inside around the garden.

- Determine the area of rectangular garden by triangle.
- Determine the area of the road.
- There is a 3 metres wide road around the outside of a square land which is equal to the area of the rectangular garden mentioned in the figure. How much money will be spent to planting grass at Tk. 700 per sq. metre?

**10.** The length of a pond is 54 metres and breadth is 36 metres and 50 centimeters. Its bank is 2.5 metres wide and depth is 6 metres.

- Find the perimeter of the pond.
- Find out the area of the bank of the pond.
- How much time is required to empty the pond, when 0.2 cubic metre water is emptied per second by a machine?

**11.** The length of a rectangular region is three times of its breadth. Tk. 955.50 is spent to set the tiles in it at the rate of Tk. 6.50 per square metre. There is a 2 metres wide road around the outside of that region.

- If the breadth is 'a' metre of the rectangular region, express its perimeter by 'a'.
- Determine the length and breadth of the rectangular region.
- Determine the area of the road.

**12.** The air is 0.00129 times heavier than the water. The length of floor, breadth of the floor and height of a house are 20 metre, 10 metre and 5 metre respectively.

- a) Find the area of the floor of the house.
- b) How many kilogram air are there in the house?
- c) Find the volume of the four walls of the house if the thickness of the wall is 12 cm.

**13.** The length of a house is two and a half times the breadth. To cover the house by carpet an amount of Tk. 6250 is spent at the rate of Tk. 25 per sq. metre of carpet. Height of the house is 5 metre.

- a) Express the area of house by 'x' variable.
- b) Find the length and breadth of the house.
- c) Air is 0.00129 times heavier than water. How many kilograms of air are there in the house?

**14.** The length of floor of a room is one and a half times of the width. The height of the room is 4 metres. An amount of Tk. 7500 is spent to cover the floor with 50 cm square stone.

- a) What is the width of the room in metres?
- b) What is the price of each square stone?
- c) What is the weight of water in kgs contained in a reservoir equal to the volume of the room?

**15.** The length of a house is 4 times its breadth. To cover the house by carpet an amount of Tk. 3200 is spent at the rate of Tk. 12.50 per sq. metre.

- a) Determine the area of the house.
- b) Find the length and breadth of the house.
- c) If the height of the house is 3 metres and thickness of the wall is 20 cm. Determine the volume of four walls.

**16.** A reservoir contains 12000 litres of water. The length of the reservoir is 2.50 metres and breadth is 2 metres.

- a) How many metres are there in 2 yard?
- b) Find the depth of the reservoir.
- c) How much money will be spent to colour the inner side of the reservoir at Tk. 25 per square metres?

### **MCQs**

**1.** 1 kilometre = what miles?

- a) 1.61
- b) 1.609
- c) 0.621
- d) 0.61

**2.** One nautical mile=?

- a) 4080 feet
- b) 5080 feet
- c) 6070 feet
- d) 6080 feet

**3.** How many feet long is the tap which is used to measure a large length?

- a) 30
- b) 10
- c) 300
- d) 100

**4.** 1 mile = How many km?

- a) 0.62
- b) 1.16
- c) 1.26
- d) 1.61

**5.** How many square metres are there in 1 square yard?

- a) 0.24 (Approx)
- b) 0.54 (Approx)
- c) 0.64 (Approx)
- d) 0.84 (Approx)

**6.** In which country the Metric System is used first?

- a) Greek
- b) England
- c) Japan
- d) France

**7.** How longer is nautical mile than mile in feet?

- a) 800
- b) 4320
- c) 5280
- d) 6080

**8.** What do you mean by 'Deca' in Greek language?

- a) 10 times
- b) 100 times
- c) one tenth
- d) one hundredth

**9.** The length of a rectangle is 330 yards and its breadth is one-third of length. What is the breadth of the rectangle in metres?

- a) 100.584
- b) 110.584
- c) 140.584
- d) 440.584

**10.** The word 'one tenth' comes from which language?

- a) Greek
- b) Latin
- c) Bangla
- d) English

**11.** The length of a small box is 15 cm, breadth 7 cm and height is 5 cm. What is the volume of the box?

- a) 27 cubic cm
- b) 35 cubic cm
- c) 105 cubic cm
- d) 525 cubic cm

**12.** If the base is 1.5m and height is 80 cm, then how much is the area of triangle in sq. metre?

- a) 0.6
- b) 1.2
- c) 60
- d) 120

**13.** Gold is 19.3 times heavier than water. The weight of 1 cubic centimetre water is 1 gram. What is the weight of 10 cubic centimetres gold in grams?

- a) 1
- b) 1.93
- c) 19.3
- d) 193

**14.** In which year metric system was first introduced in Bangladesh?

- a) 1st July, 1980
- b) 1st July, 1981
- c) 1st July, 1982
- d) 2nd July, 1980

**15.** What is the weight of 8000 litre pure water?

- a) 1 kg
- b) 8 kgs
- c) 8000 kgs
- d) 8000 gm

**16.** In case of measurement and units -

- i. 1 square yard = 9 square feet
- ii. 1 inch = 2.54 cm
- iii. 1 katha = 72 square yard

Which one is correct?

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and iii

**17.** The length of a rectangular region is 12 metres and the breadth is 5 metres. Then its -

- i. Perimeter 34 metres
- ii. Area 60 square metres
- iii. The length of a diagonal is 13 metres

Which one of the following is correct?

- a) i & ii
- b) i & iii
- c) ii & iii
- d) i, ii & iii

**18.** If the volume of a reservoir is 9 cubic metres, its length and breadth are 3 metres and 2 metres respectively, then its -

- i. height is 1.5 metres
- ii. area of base is 6 sq. metres
- iii. volume is 9000000 cubic cm.

Which one is correct?

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and ii

**19.** If length of a paper is 25 cm, breadth is 16 cm and thickness is 0.3 mm of a paper, then how much is the volume in cubic cm of such 10 papers?

- a) 0.008
- b) 8.00
- c) 80
- d) 800

**20.** The length of a box is 3 metres, breadth is 2 metres and height is 1.5 metres. What is the volume of the box?

- a) 9 cubic metres
- b) 9 sq. metres
- c) 6.5 metres
- d) 6 cubic metres

**21.** 1 katha equal to -

- i. 720 sq. feet
- ii. 80 sq. yard
- iii. 67.89 sq. metres (Approx.)

Which one of the following is correct?

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and iii

**22.** The length of a reservoir is 4 m, breadth is 3 m and height is 2 m. What is the volume of the reservoir in cubic centimetres?

- a) 24
- b) 2,400
- c) 2,40,000
- d) 2,40,00,000

**23.** Observe the following information -

- i. 1 inch = 2.54 cm (app.)
- ii. 1 cubic feet = 28.67 litre (app.)
- iii. 1 cubic metre = 10 stayer (app.)

Which one is correct?

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and iii

**24.** The length of a box is 3 metres, breadth is 2 metres and height is 1.5 metres. What is the volume of the box?

- a) 9 cubic m
- b) 9 sq. m
- c) 6.5 m
- d) 6 cubic m

**25.** 10 decimal = \_\_\_\_ sq. feet?

- a) 4346 sq. feet
- b) 4347 sq. feet
- c) 4356 sq. feet
- d) 4365 sq. feet

**26.** The perimeter of a square field is 8 yards. What is the area of the field in square feet?

- a) 12
- b) 24
- c) 36
- d) 64

**27.** Area of a rectangular garden is 300 sq. m. and its breadth is 15 m. What is the perimeter of the garden?

- a) 10 m
- b) 35 m
- c) 70 m
- d) 300 m

**28.** 2 miles equal to how many yards?

- a) 6080 yards
- b) 5280 yards
- c) 3520 yards
- d) 1760 yards

**29.** At 4 degree temperature the weight of 1 cc pure water is -

- a) 1 gm
- b) 100 gm
- c) 1000 gm
- d) 10000 gm

**30.** If the area of a rectangular garden is 714 sq. metre and its length is 34 metre, what is the perimeter of the garden?

- a) 55 metre
- b) 84 metre
- c) 110 metre
- d) 136 metre



- 31.** In metric system, 1 kilometre equals -
- 10 hectometre
  - 100 decametre
  - 1000 metre

Which one of the following is correct?

- i and ii
- i and iii
- ii and iii
- i, ii and iii

- 32.** If the volume of a reservoir is is 9 cubic metres, its length and breadth are 3 metres and 2 metres respectively then its -

- Height is 1.5 metres
- Area of base is 6 sq. metres
- Volume is 900000 cubic cm.

Which one is correct?

- i and ii
- ii and iii
- i and iii
- i, ii and iii

- 33.** In Greek language -

- deca means 10 times
- hecto means 100 times
- kilo means 1000 times

Which of the following is correct?

- i and ii
- ii and iii
- i and iii
- i, ii and iii

- 34.** What is the volume of a box with the length 3 metres, breadth 2 metres and height 1 metre 50centimeter?

- 6 cubic metres
- 6.5 cubic metres
- 7.5 cubic metres
- 9 cubic metres

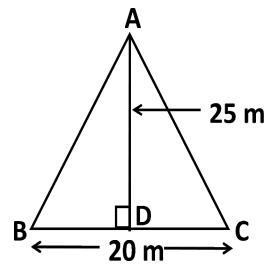
- 35.** If the length of a rectangle is 12 metres and its breadth is 5 metres then its -

- Perimeter is 34 metres
- Area is 60 sq. metres
- One of the diagonal is 13 metres

Which one is correct?

- i and ii
- i and iii
- ii and iii
- i, ii and iii

- 36.**



What is the area of  $\triangle ABC$ ?

- 22.5 sq. m
- 45 sq. m
- 250 sq. m
- 500 sq. m

- 37.** Which of the following is equal to 20 milligram?

- 2 centigram
- 2 decagram
- 2 decigram
- 2 hectogram

- 38.** 4 nautical mile = how many feet?

- 24320 feet
- 18280 feet
- 7040 feet
- 6960 feet

- 39.** 1 mile = ?

- 0.61 km
- 0.62 km
- 1.61 km
- 1.62 km

**40.** The length of a house is 3m, breadth is 2m and height is 1m. Air is 0.00129 times heavier than water. How many grams of air are there in the house?

- a) 0.774 gm
- b) 7.74 gm
- c) 77.4 gm
- d) 7740 gm

**41.** The length of a side of a cubical tank is 5 metre. Which is the volume of the tank?

- a) 125 cubic metres
- b) 25 cubic metres
- c) 20 cubic metres
- d) 15 cubic metres

**42.** In which temperature the weight of 1 cubic centimeter of pure water is 1 gram?

- a)  $100^{\circ}$  C
- b)  $1^{\circ}$  C
- c)  $4^{\circ}$  F
- d)  $4^{\circ}$  C

**43.** What is the weight of 250 milliliters water in kg?

- a) 0.25
- b) 0.50
- c) 25
- d) 250

**44.** The area of a rectangular garden is 400 sq. metre and length is 25 metre, then what is its perimeter?

- a) 25m
- b) 41m
- c) 82m
- d) 100m

**45.** If the perimeter of a square ABCD is 'a' unit, then what is the area of it in sq. unit?

- a)  $a^2/2$
- b)  $a^2/4$
- c)  $a^2/8$
- d)  $a^2/16$

**46.** 100 Katha = what sq. m. (App.)?

- a) 5589
- b) 5889
- c) 6089
- d) 6689

**47.** 2 Bigha = how many square yards?

- a) 720
- b) 1440
- c) 1600
- d) 3200

**48.** 1 acre = ?

- a) 2026.86 sq. metres (approx)
- b) 4046.86 sq. metres (approx)
- c) 5046.86 sq. metres (approx)
- d) 6046.86 sq. metres (approx)

**49.** What is the meaning of 'Hecto' in Greek language?

- a) 10 times
- b) 100 times
- c) times
- d) times

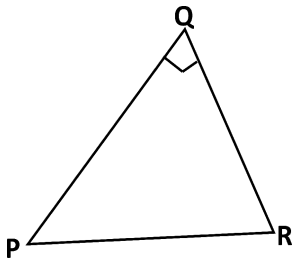
## Pythagorean Theorem

### Creative Questions:

**1.** In  $\triangle PMN$ ,  $\angle M = 1$  right angle.

- If  $PN = 13$  cm and  $PM = 5$  cm, find the length of  $MN$ .
- If  $D$  is the midpoint of  $MN$ , prove that  $PN^2 = PD^2 + 3DN^2$
- If  $D$  and  $E$  are the midpoints of  $MN$  and  $PM$  respectively, prove that  $4(PD^2 + NE^2) = 5PN^2$

**2.**



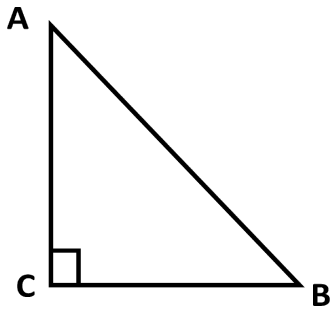
- Find the area of a circular garden of diameter 12m.
- In the light of the stem prove the Pythagoras Theorem.
- If in the triangle of the figure,  $N$  is a point on  $QR$ , prove that ,

$$PR^2 + QN^2 = PN^2 + QR^2$$

**3.**  $\triangle PQR$  is a right-angled triangle where  $\angle PQR = 90^\circ$

- Verify the triangle whose sides are 6 cm, 8 cm and 10 cm is right angled triangle or not.
- According to the stem proof Pythagoras theorem.
- If  $PE$  and  $RF$  are two medians of the triangle, prove that  $5PR^2 = 4(PE^2 + RF^2)$

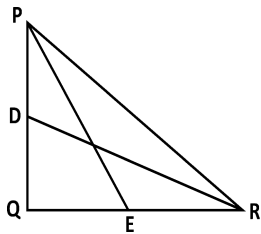
**4.**



In the figure, in  $\triangle ABC$ ,  $\angle C = 90^\circ$ .

- Write down two characteristics of a right angled triangle.
- Prove that,  $AB^2 = AC^2 + BC^2$
- If P and Q are the middle points of AB and AC respectively, prove that  $PQ \parallel BC$  and  $PQ = \frac{1}{2} BC$ .

**5.**

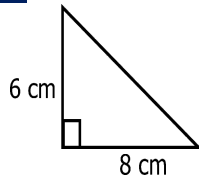


In figure,  $PR^2 = PQ^2 + QR^2$ .

- If the two adjacent sides of a right angle triangle are 5 cm and 6 cm respectively, find the area of the triangle.
- According to the stem prove that  $\angle PQR = 90^\circ$ .
- In  $\triangle PQR$ , if  $\angle Q =$  right angle, D and E are mid-points of PQ and QR, prove that  $5PR^2 = 4(PE^2 + RD^2)$ .

## MCQs

1. What is the area of the triangle in  $\text{cm}^2$  ?



- a) 12
- b) 24
- c) 36
- d) 48

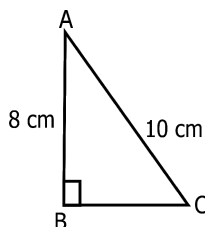
2. By which of the following length right angle triangle can be drawn?

- a) 4, 5, 6
- b) 6, 8, 10
- c) 7, 9, 11
- d) 5, 10, 15

3. If the difference of the two acute angles of a right angled triangle is  $25^\circ$ , then what is the value of the smallest angle in degree?

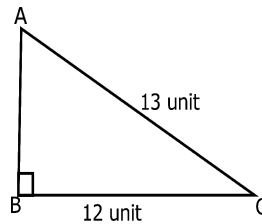
- a) 65
- b) 57.5
- c) 32.5
- d) 45

4. In the figure  $BC = ?$



- a) 6 cm
- b) 12 cm
- c) 13 cm
- d) 14 cm

5.



What is the area of  $\Delta ABC$  in sq. unit?

- a) 156
- b) 78
- c) 60
- d) 30

6. Three sides are given. In which case of the following a triangle is possible to draw?

- a) 4 cm, 7 cm, and 13 cm
- b) 3 cm, 5 cm, and 8 cm
- c) 3 cm, 6 cm, and 10 cm
- d) 6 cm, 8 cm, and 10 cm

7. What is the length of the diagonal of a square with one side is 1 unit?

- a) unit
- b) 1.41 unit
- c) 2.01 unit
- d) 4.00 unit

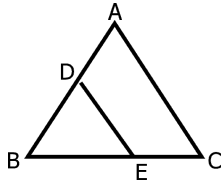
8. Which of the following measurement of sides is possible to draw a right angle triangle?

- a) 3, 4, 5
- b) 4, 4, 5
- c) 6, 7, 8
- d) 1, 6, 7

9. If the base of a triangle is 18 cm and the area is 108 sq. cm, what will be the height?

- a) 3 cm
- b) 6 cm
- c) 12 cm
- d) 24 cm

**10.**



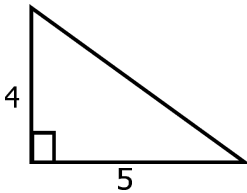
In the figure, D and E are the mid-points of AB and BC respectively. Then --

- i.  $DE \parallel AC$
- ii.  $DE = \frac{1}{2} AC$
- iii.  $BD = BE$

Which of the following is correct?

- a) i & ii
- b) i & iii
- c) ii & iii
- d) i, ii & iii

**11.** In  $\triangle ABC$  --

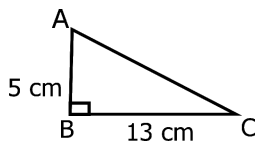


- i. Area = 10 sq. unit
- ii.  $AC = \sqrt{41}$  unit
- iii.  $AB^2 = AC^2 + BC^2$

Which one is correct?

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and iii

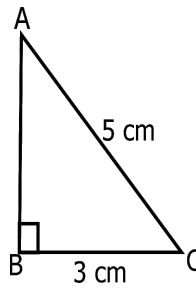
**12.**



What is the length of the side AC in cm?

- a) 8
- b) 12
- c) 18
- d) 144

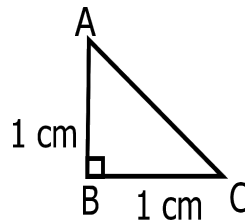
**13.**



In figure, what is the value of AB?

- a) 2 cm
- b) 3 cm
- c) 4 cm
- d) 8 cm

**14.**



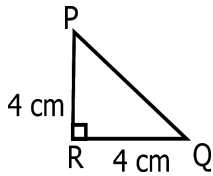
In the above figure --

- i.  $\angle A = 45^\circ$
- ii.  $AC = \sqrt{2}$  cm
- iii. Area of  $\triangle ABC$  is 1 sq. cm.

Which one of the following is correct?

- a) i & ii
- b) ii & iii
- c) i & iii
- d) i, ii & iii
- a)

**15.**



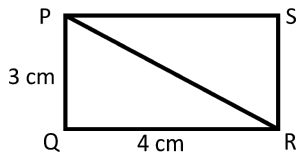
In the above figure --

- $\angle PQR = 45^\circ$
- $PQ = 4\sqrt{2}$  cm
- The area of  $\triangle PQR$  is 16 sq. cm.

Which one is correct?

- i and ii
- i and iii
- ii and iii
- i, ii and iii

**16.**



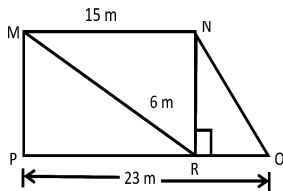
In figure PQRS is a rectangle, its --

- Length of diagonal is 5 cm
- Area is 12 sq. cm
- Perimeter is 14 cm

Which one is correct?

- i and ii
- i and iii
- ii and iii
- i, ii and iii

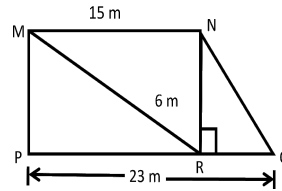
**17.**



What is the length of ON?

- 9 m
- 10 m
- 14 m
- 17 m

**18.**



What is the area of MNOP?

- 44 sq. metres
- 76 sq. metres
- 114 sq. metres
- 228 sq. metres

**19.** If BC is hypotenuse of triangle ABC

- $\angle A =$  right angle
- $\angle B$  and  $\angle C$  are acute angle
- $\angle B + \angle C = 90^\circ$

Which of the following is correct?

- i & ii
- i & iii
- ii & iii
- i, ii & iii

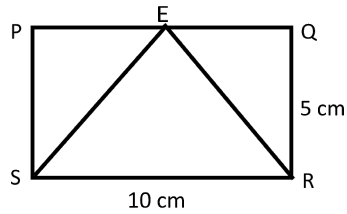
**20.** If the length of the side of a square is 4 metres, then its --

- Area = 16 sq. metres
- Length of the diagonal = 8 metres
- Perimeter = 16 metres

Which of the following is correct?

- i and ii
- i and iii
- ii and iii
- i, ii and iii

**21.**



In the figure, PQRS is rectangular. If E is the mid-point of PQ --

- i.  $\triangle PES \cong \triangle QER$
- ii. Rectangular PQRS = 2  $\triangle ESR$
- iii.  $\triangle ESR = 25$  sq. metre

Which of the following is correct?

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and iii

**Algebraic Expression**

**Creative Questions:**

**1.**

$$P = \frac{a^3 - b^3 - 3ab(a-b)}{(a+b)^2 - 4ab}, Q = \frac{(a-b)^2 + 4ab}{a^3 + b^3 + 3ab(a+b)}$$

Are two algebraic fractions,

a) Resolve into factors of  $m^4 + m^2 + 1$

b) Simplify:  $\frac{a}{(a-b)} \times (P \div Q)$

c) Prove that,  $(\frac{1}{P} - \frac{1}{Q})(a^2 - b^2) = 2b$



## 2.

$$A = \frac{x^2 - 5x - 14}{x^2 - 4x - 21}, B = \frac{x + 2}{x^2 + 7x + 12}, C = \frac{4x}{x^2 - 9}$$

a) Determine the difference from

$$\frac{a}{x-1} \times \frac{2x}{x^2-1}$$

b)  $A \div B \times C = ?$

c) Express A, B and C in the form of the common denominator.

## 3.

$$P = \frac{a+b}{a-b}, Q = \frac{a-b}{a+b}, R = \frac{2a}{a^2-b^2}$$

a) Find the value of  $\frac{x}{x-y} - \frac{x}{x+y}$

b) Express P, Q, R as the fraction of the common denominators.

c) Simplify  $'(P + Q) \div (P - Q)'$ .

## 4.

$$A = \frac{(a-b)^2 + 2ab}{(a-b)(a^2 + 2ab + b^2)}, B = \frac{a^3 + b^3}{(a+b)^3(a^2 - b^2)},$$

$$C = \frac{a^3 - b^3}{a^4 - b^4}$$

a) Determine the value of  $\left(\frac{1}{x} - \frac{1}{y}\right) \div \left(\frac{1}{y} - \frac{1}{x}\right)$

b) Express A, B and C in the form of common denominator

c) Prove that,  $A \div B \times C = \frac{(a^2 + ab + b^2)}{(a^2 - ab + b^2)}$

## 5.

$P = a^2 - 2a - 8$ ,  $Q = a^2 - 3a - 10$  and  $R = a^2 - 8a + 15$  are three algebraic expressions.

- Factorize 'R'.
- Turn  $\frac{1}{P}$ ,  $\frac{1}{Q}$ ,  $\frac{1}{R}$  into the fraction with a common denominator.
- Show that,  $P \times \frac{a-5}{Q} \div \frac{R}{a-3} = \frac{a-4}{a-5}$

## 6.

$$A = \frac{(x-y)^2 + 4xy}{(a^3 - b^3) - 3ab(a-b)}, B = \frac{x^3 + y^3 + 3xy(x+y)}{(a+b)^2 - 4ab}$$

$$C = \frac{2x}{x^2 + 6x + 5}, D = \frac{2y}{x^3 + 125}$$

a) Divide  $\left(1 + \frac{2}{x}\right)$  by  $\left(1 - \frac{4}{x^2}\right)$

b) Simplify:  $A \div B \times \frac{ab - b^2}{xy - y^2}$

c) Express C and D in the form of a common denominators.

## 7.

$$A = \frac{3x}{x^2 + 3x - 4}, B = \frac{2x}{x^2 - 1} + \frac{x}{x^2 + 5x + 4}$$

$C = 3a^2 + a - 10$ ,  $D = a^3 + 8$  and  $E = 2a^2 + 9a + 10$  are

Five algebraic expressions.

a) Express  $\frac{x^3 - 1}{x^3 + x^2 + x}$  in the lowest form

b) Simplify:  $A + B$

c) Express  $\frac{1}{C}$ ,  $\frac{1}{D}$ ,  $\frac{1}{E}$  in the form of a common denominators.

**8.**

$$A = \frac{(p - q)^2 + 4pq}{p^3 - q^3 - 3pq(p - q)}, \quad B = \frac{p^3 + q^3 + 3pq(p + q)}{(p + q)^2 - 4pq},$$

$$C = x^3 + y^3 \text{ and } D = x^3 - y^3$$

a) Express the lowest form:  $\frac{a^2 + 2a - 15}{a^2 - 9}$

b) Simplify:  $A \div B$

c) Express the fractions  $\frac{X}{C}$  and  $\frac{Y}{D}$  with common denominator

**9.**

$$A = x^2 - 5x + 6, \quad B = x^2 - 9 \text{ and } C = x^2 + 4x + 3$$

a) Express  $\frac{C}{x^2 + x}$  in the lowest form.

b) Simplify:  $\frac{1}{A} + \frac{1}{B}$

c) Express  $\frac{1}{A}$ ,  $\frac{1}{B}$  and  $\frac{1}{C}$  in the form of common denominator.

**10.**

$M = x^2 - 3x + 2$ ,  $N = x^2 - 5x + 6$  and  $K = x^2 - 4x + 3$  are three algebraic expressions.

a) Express  $\frac{M}{x - 2}$  in the lowest form.

b) Simplify:  $\frac{1}{M} + \frac{1}{N} + \frac{1}{K}$

c) Express  $\frac{1}{M}$ ,  $\frac{1}{N}$ ,  $\frac{1}{K}$  in the form of the common denominator.

## 11.

$$A = 6p^2 - p - 1, B = 4p^2 - 1, C = p^3 - q^3 \text{ and } D = p^4 + p^2q^2 + q^4$$

a) Find the sum:  $\frac{x-2}{x} + \frac{x-2}{2}$

b) Simplify:  $\left(\frac{1}{A} + \frac{1}{B}\right) \div \frac{5p+2}{(4p^2-1)(3p+1)}$

c) Express  $\frac{1}{C}$ ,  $\frac{1}{D}$  in the form of the common denominator.

## MCOs

- Which one of the following is the square of  $(x - 3y)$  ?
  - $x^2 + 6xy + 9y^2$
  - $x^2 - 6xy + 9y^2$
  - $x^2 + 6xy - 9y^2$
  - $x^2 - 6xy - 9y^2$
- Which one is the square of  $(x + 2y)$  ?
  - $x^2 + 2xy + y^2$
  - $x^2 + 4xy + 4y^2$
  - $x^2 + 2xy + 4y^2$
  - $x^2 + xy + y^2$
- Which is the difference of the square of  $(x + 6)$  and  $(x + 4)$  ?
  - $x^2 - 6^2$
  - $x^2 - 4^2$
  - $(x)^2 - (10)^2$
  - $(x + 5)^2 - (1)^2$
- If  $x^2 + \frac{1}{x^2} = 1$ , what is the value of  $x + \frac{1}{x}$  ?
  - $\sqrt{2}$
  - $\sqrt{3}$
  - 2
  - 3
- Which one is the square of the algebraic expression  $a + b - c$  ?
  - $a^2 + b^2 + c^2$
  - $a^2 + b^2 + c^2 + 2ab - 2bc + 2ca$
  - $a^2 + b^2 + c^2 + 2ab - 2bc - 2ca$
  - $a^2 + b^2 + c^2 + 2ab + 2bc - 2ca$
- What is the value of  $(a^{-1/a})^2$ , if  $a + \frac{1}{a} = 4$  ?
  - 8
  - 12
  - 16
  - 20
- If  $a + \frac{1}{a} = 3$ , then which is the value of  $a^2 + \frac{1}{a^2}$  ?
  - 5
  - 7
  - 11
  - 13
- If  $a - b = 5$  and  $ab = 3$  then what is the value of  $a^2 + b^2$  ?
  - 13
  - 19
  - 31
  - 37

**9.** if  $x + \frac{1}{x} = 2$ , then which one of the following is the value of  $x - \frac{1}{x}$  ?

- a) 0
- b) 1
- c) 2
- d) 3

**10.** If  $a + b = 7$  and  $a - b = 3$ , then which one of the following is the value of  $a^2 + b^2$  ?

- a) 20
- b) 29
- c) 40
- d) 58

**11.** Which one of the following is correct of expression of  $(y + 4)(y + 2)$  as the difference of two square?

- a)  $(y + 3)^2 - 1$
- b)  $(y + 4)^2 - 1$
- c)  $(y + 2)^2 - 1$
- d)  $(x - 3)^2 - 1$

**12.** If  $x = p + \frac{1}{p}$  and  $y = p - \frac{1}{p}$  then  $(x + y)^2 = ?$

- a)  $2p$
- b)  $4p$
- c)  $2p^2$
- d)  $4p^2$

**13.** If  $a^4 + \frac{1}{a^4} = 119$  then  $a^2 + \frac{1}{a^2} = ?$

- a) 11
- b)  $\sqrt{119}$
- c) 13
- d) 19

**14.** If  $x - \frac{1}{x} = 6$ , what is the value of  $(x + \frac{1}{x})^2$  ?

- a) 32
- b) 38
- c) 40
- d) 44

**15.** If  $a + b = 5$ ,  $a - b = 4$ ,  $a^2 - b^2 = ?$

- a) 9
- b) 10
- c) 15
- d) 20

**16.** If  $a^2 - 1 = 5a$ , what is the value of  $a^2 + \frac{1}{a^2}$  ?

- a) 21
- b) 23
- c) 25
- d) 27

**17.** If  $x + \frac{1}{x} = 2$ , which one is the value of  $x^3 + \frac{1}{x^3}$  ?

- a) 0
- b) 2
- c) 12
- d) 14

**18.** Which one is the cubic value of  $x^3 + 2$  ?

- a)  $x^6 + 8$
- b)  $x^9 + 8$
- c)  $x^6 + 4x^3 + 4$
- d)  $x^9 + 6x^6 + 12x^3 + 8$

**19.** If  $x - \frac{1}{x} = 1$ , which one of the following is the value of  $x^3 - \frac{1}{x^3}$  ?

- a) 4
- b) 6
- c) 7
- d) 8

**20.** If  $a^3 - b^3 = 36$ ,  $a - b = 3$ , then  $ab = ?$

- a) -1
- b) 0
- c) 1
- d) 3

**21.** If  $x + y = 2$ ,  $x^3 + y^3 + 6xy = ?$

- a) -8
- b) 0
- c) 8
- d) 10

**22.** If  $x + \frac{1}{x} = 2$ , then which one is the value of  $(x^3 + \frac{1}{x^3})^2$  ?

- a) 0
- b) 2
- c) 12
- d) 14

**23.** Which one of the following will be right if we express  $(3x - 7)(7 + 3x)$  in the form of the difference between two squares?

- a)  $3x^2 - 49$
- b)  $(3x)^2 - (49)^2$
- c)  $9x^2 - 7$
- d)  $9x^2 - 49$

**24.** Which one of the following is the H.C.F. of  $x^2y + xy^2$  and  $x^3 + y^3$  ?

- a)  $x + y$
- b)  $x(x + y)$
- c)  $x^2 + y^2$
- d)  $x^3 + y^3$

**25.** Which one is the H.C.F. of  $x^3 + x^2y$ ,  $x^2y + xy^2$  and  $x^3 + y^3$ ?

- a)  $x + y$
- b)  $x(x + y)$
- c)  $x^2(x + y)$
- d)  $xy(x + y)$

**26.** Which of the following is the H.C.F. of  $(a^3 + b^3)$  and  $(a^3 - b^3)$  ?

- a) 1
- b)  $a - b$
- c)  $a + b$
- d)  $a^2 + ab + b^2$

**27.** What is the HCF of  $x^2 - 4$ ,  $x^2(x - 2)$  and  $x^2y - 2xy$ ?

- a)  $x - 2$
- b)  $x + 2$
- c)  $x(x - 2)$
- d)  $(x + 2)(x - 2)$

**28.** H.C.F. of  $a^3 - b^3$  and  $a^3 + b^3$  is --

- a)  $a - b$
- b)  $a + b$
- c) 0
- d) 1

**29.** Which one of the following is the H.C.F. of  $a + b$ ,  $a^2 + ab$  and  $a^2 - b^2$  ?

- a)  $a(a - b)$
- b)  $a - b$
- c)  $a(a^2 - b^2)$
- d)  $a^2 - b^2$

**30.** Which is the L.C.M. of  $4ab^2x^3$ ,  $9a^3c$  and  $12a^3bc^4x$  ?

- a)  $36a^3b^2c^4x^3$
- b)  $36a^3b^3c^4$
- c)  $36ab^3c^4x$
- d)  $a^3b^2c^4x$

**31.** Which one of the following is the L.C.M. of  $x^2 - 9$  and  $x^2 - 3x$  ?

- a)  $x^2 - 3x$
- b)  $x^2 - 9$
- c)  $x + 3$
- d)  $x(x^2 - 9)$

**32.** What is the L.C.M. of  $a - b$ ,  $a^2 - ab$  and  $a^2 - b^2$  ?

- a)  $a(a - b)$
- b)  $a - b$
- c)  $a(a^2 - b^2)$
- d)  $a^2 - b^2$

**33.** Which one of the following is the H.C.F. of  $a + b$ ,  $a^2 + ab$ ,  $a^2 - b^2$  ?

- a)  $a(a - b)$
- b)  $a - b$
- c)  $a(a^2 - b^2)$
- d)  $a^2 - b^2$

**35.** Which one of the following is the L.C.M. of  $x^2 - 9$  and  $x^2 - 3x$  ?

- a)  $x^2 - 3x$
- b)  $x^2 - 9$
- c)  $x + 3$
- d)  $x(x^2 - 9)$

**34.** What is the L.C.M. of  $4ab^2x^3$ ,  $9a^3c$  and  $12a^3bc^4x$  ?

- a)  $36a^3b^2c^4x^3$
- b)  $36a^3b^3c^4$
- c)  $36ab^3c^4x$
- d)  $a^3b^2c^4x$

**36.** What is the L.C.M. of  $a - b$ ,  $a^2 - ab$  and  $a^2 - b^2$  ?

- a)  $a(a - b)$
- b)  $a - b$
- c)  $a(a^2 - b^2)$
- d)  $a^2 - b^2$

**37.**

Which one of the following is the lowest value of  $\frac{x^2 - 7x + 12}{x^2 - 6x + 9}$  ?

- a)  $\frac{x - 4}{x - 3}$
- b)  $\frac{x + 4}{x - 3}$
- c)  $\frac{x - 4}{x + 3}$
- d)  $\frac{x + 4}{x + 3}$

**38.**

Which one of the following is the lowest value of  $\frac{x^3 + 3x^2}{x^2 - 9}$  ?

- a)  $\frac{x^2}{x - 3}$
- b)  $\frac{x^2}{x + 3}$
- c)  $\frac{x}{x - 3}$
- d)  $\frac{x + 3}{x - 3}$

**39.**

What is the simplified form of  $\frac{x - y}{x} - \frac{x + y}{y}$  ?

- a)  $-\frac{(x^2 + y^2)}{xy}$
- b)  $-\frac{(x^2 - y^2)}{xy}$
- c)  $\frac{(x - y)^2}{xy}$
- d)  $\frac{(x - y)^2}{xy}$

**40.**

Which one of the following is the lowest form of  $\frac{x^2-1}{x+1}$  ?

- a)  $x$       b)  $x+1$       c)  $x-1$       d)  $x^2+1$

**41.**

What one of the following is the lowest value of  $\frac{x^3+3x^2}{x^2-9}$  ?

- a)  $\frac{x^2}{x-3}$       b)  $\frac{x^2}{x+3}$       c)  $\frac{x}{x-3}$       d)  $\frac{x+3}{x-3}$

**42.**

Which one of the following is the lowest value of  $\frac{x^2-7x+12}{x^2-9x+20}$  ?

- a)  $\frac{x-3}{x-5}$       b)  $\frac{x-1}{x-5}$       c)  $\frac{x-2}{x-3}$       d)  $\frac{x-2}{x-5}$