1 CBSE

1.1 geometry

1. In what ratio, does x-axis divide the line segment joining the points $A(3,6)$ and $B(-12,-3)$?

   (a) $1:2$

   (b) $1:4$

   (c) $4:1$

   (d) $2:1$

2. In the given figureFig. 2 PQ is tangent to the circle centered at O. If $\angle AOB = 95^\circ$, then the measure of $\angle ABQ$ will be

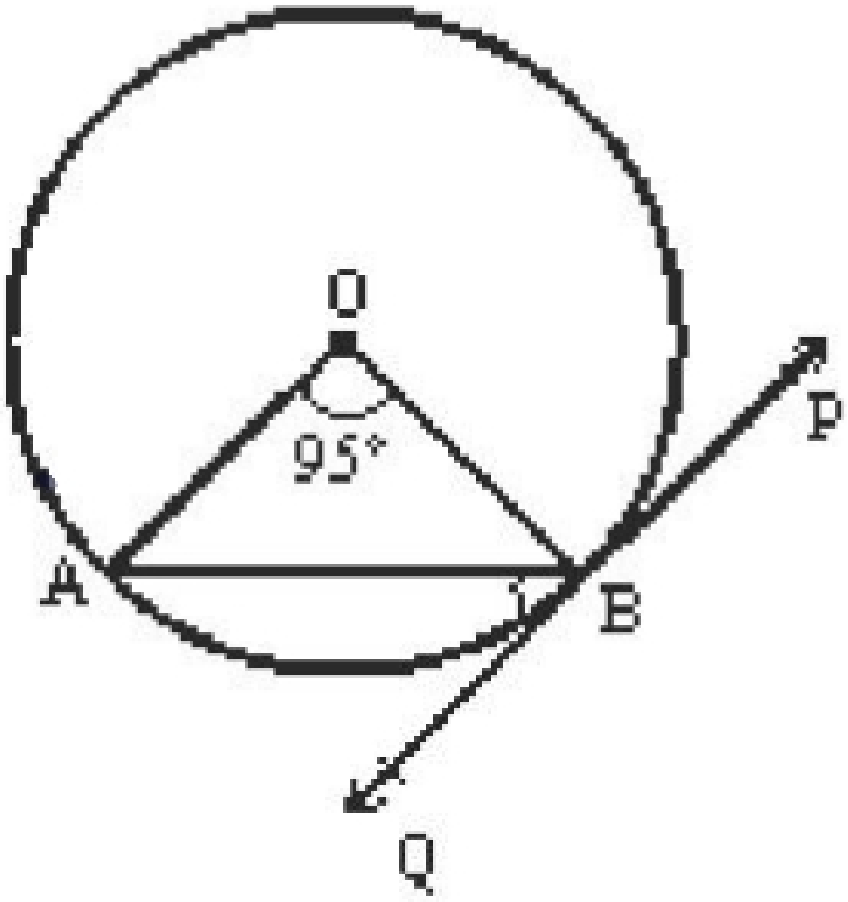

Figure 1: circle with triangle

3. Curved surface area of a cylinder of height $5cm$ is $94.2cm^2$. Radius of the cylinder is (Take$\pi = 3.14$)

   (a) $2cm$

   (b) $3cm$

   (c) $2.9cm$

   (d) $6cm$

4. The curved surface area of a cone having height $24cm$ and radius $7cm$, is

   (a) $528cm^2$

   (b) $1056cm^2$

(c) $550cm^2$

(d) $500cm^2$

5. The distance between the points $(0, 2\sqrt{5})$ and $(-2\sqrt{5}, 0)$ is

   (a) $2\sqrt{10}$ units

   (b) $4\sqrt{10}$ units

   (c) $2\sqrt{20}$ units

   (d) 0

6. **Assertion (A)**: Point P $(0, 2)$ is the point of intersection of y-axis with the line $3x + 2y = 4$
   Reason (R): The distance of point p $(0, 2)$ from x-axis is 2 units.

7. **Assertion (A)**: The perimeter of ΔABC is a rational number.
   Reason (R): The sum of the squares of two rational numbers is always rational.

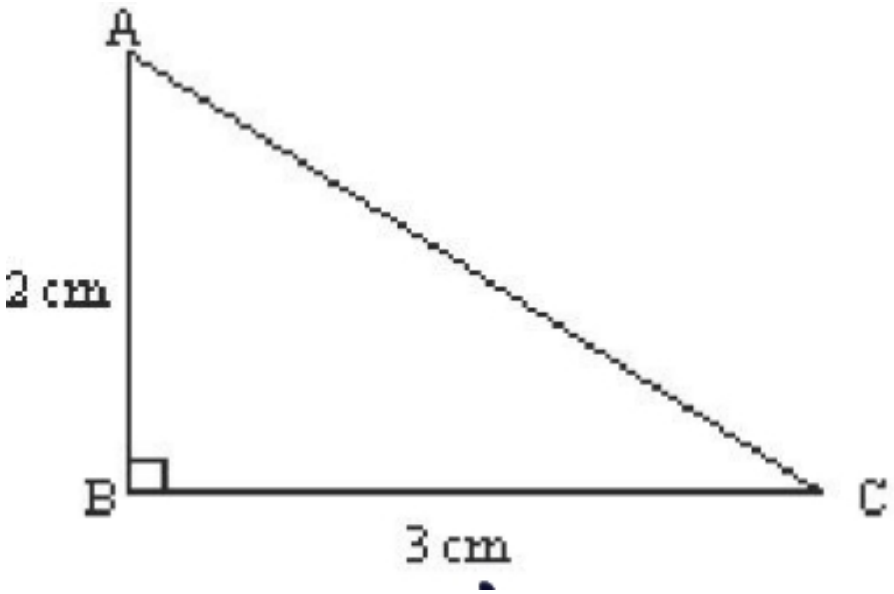

Figure 2: Triangle ABC

8. In the given figureFig. 8 XZ is parallel to BC. $AZ = 3cm$, $ZC = 2cm$, $BM = 3cm$, and $MC = 5cm$. Find the length of XY.

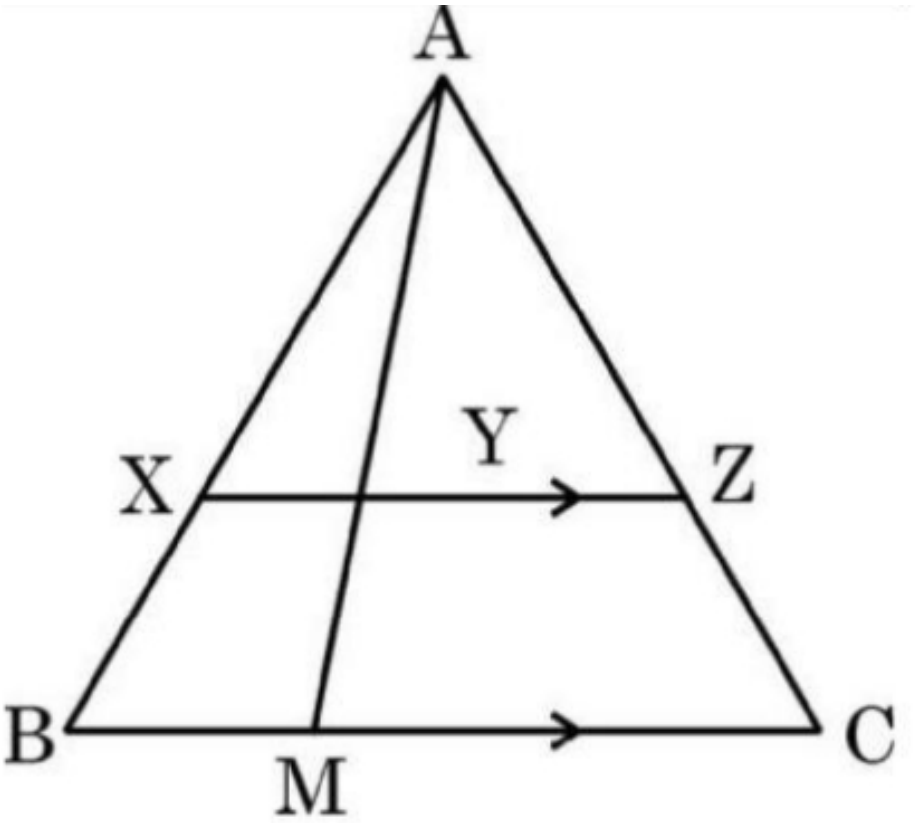

Figure 3: Multiple Triangels

9. If $(-5, 3)$ and $(5, 3)$ are two vertices of an equilateral triangle, then find coordinates of the third vertex, given that the origin lies inside the triangle. (Take $\sqrt{3} = 1.7$)

10. Two tangents TP and TQ are drawn to a circle with center O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$

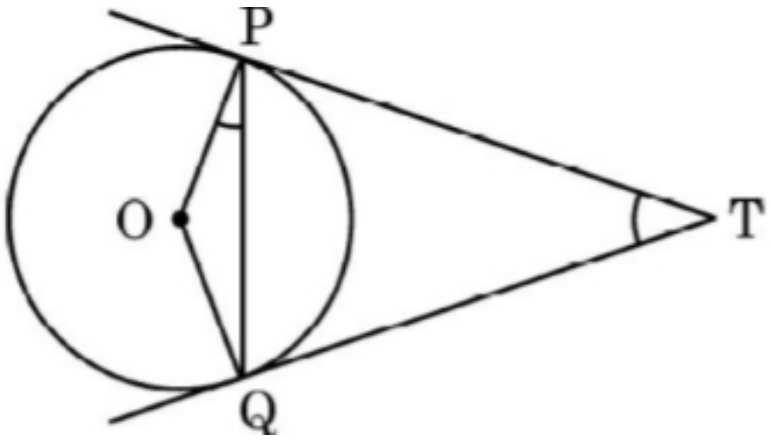

Figure 4: circle open triangle PQT

11. In the given figureFig. 11 a circle is inscribed in a quadrilateral $ABCD$ in which $\angle B = 90°$. If $AD = 17cm$, $AB = 20cm$, and $DS = 3cm$, then find the radius of the circle.

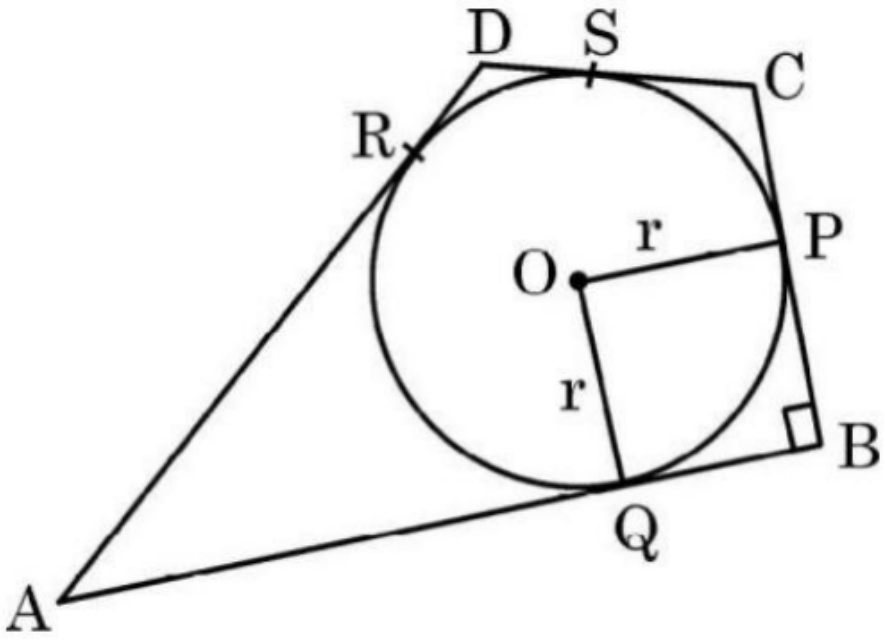

Figure 5: Quadrilateral circle

12. A room is in the form of a cylinder surmounted by a hemi-spherical dome. The base radius of the hemisphere is one-half the height of the cylindrical part. Find the total height of the room if it contains $(\frac{1408}{21})$ m^3 of air.(Take$\pi = \frac{22}{7}$)

13. An empty cone is of radius $3cm$ and height $12cm$. Ice-cream is filled in it so that the lower part of the cone, which is $(\frac{1}{6})^t h$ of the volume of the cone, is unfilled, but a hemisphere is formed on the top. Find the volume of the ice-cream. (Take $\pi = 3.14$)

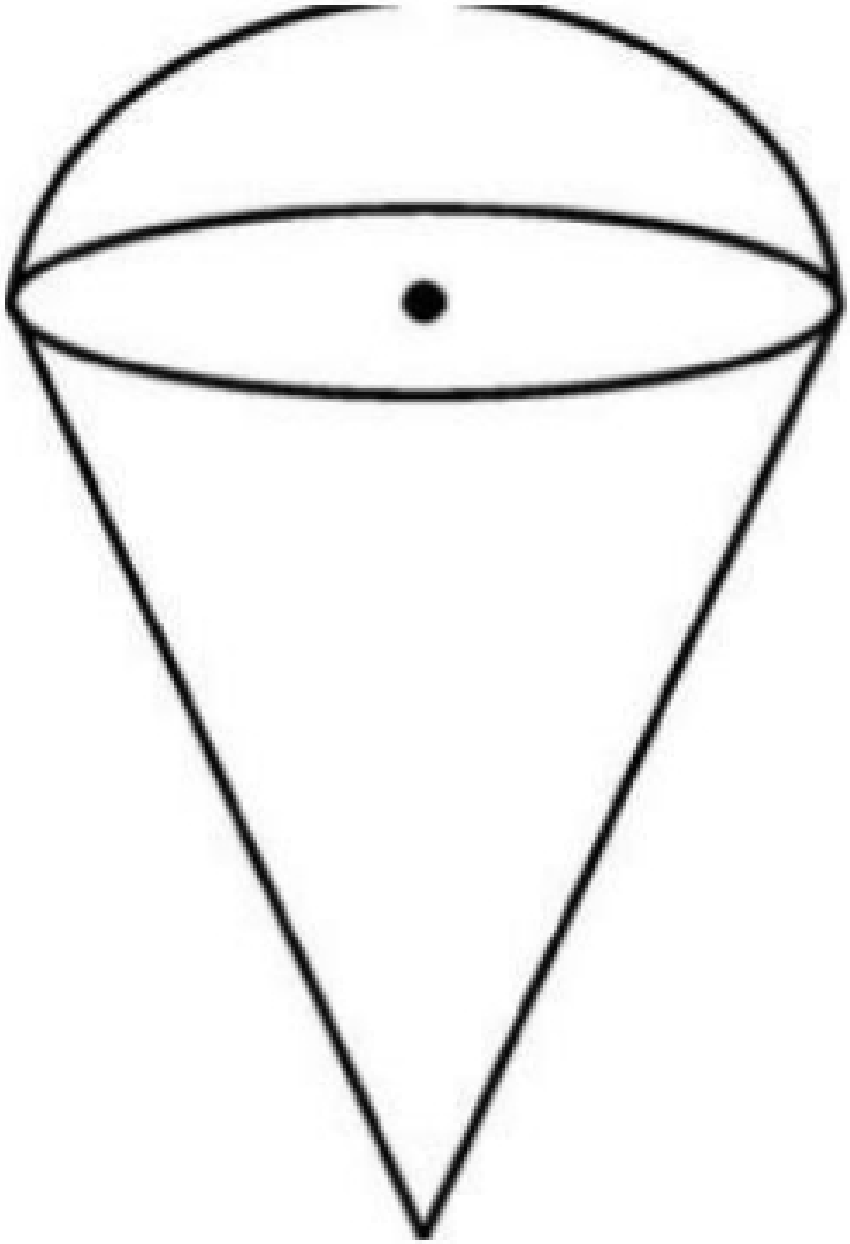

Figure 6: Cone

14. If a line is drawn parallel to one side of a triangle to intersect the other two sides at distinct points, prove that the other two sides are divided in

the same ratio.

15. The angle of elevation of the top of a tower $24m$ high from the foot of another tower in the same plane is $60°$. The angle of elevation of the top of the second tower from the foot of the first tower is $30°$. Find the distance between two towers and the height of the other tower. Also, find the length of the wire attached to the tops of both the towers.

16. A spherical balloon of radius r subtends an angle of $60°$ at the eye of an observer. If the angle of elevation of its centre is $45°$ from the same point, then prove that the height of the centre of the balloon is $\sqrt{2}$ times its radius.

17. A chord of a circle of radius $14cm$ subtends an angle of $60°$ at the centre. Find the area of the corresponding minor segment of the circle. Also, find the area of the major segment of the circle.

18. The discus throw is an event in which an athlete attempts to throw a discus. The athlete spins anti-clockwise around one and a half times through a circle,then releases the throw. When released, the discus travels along a tangent to the circular spin orbit

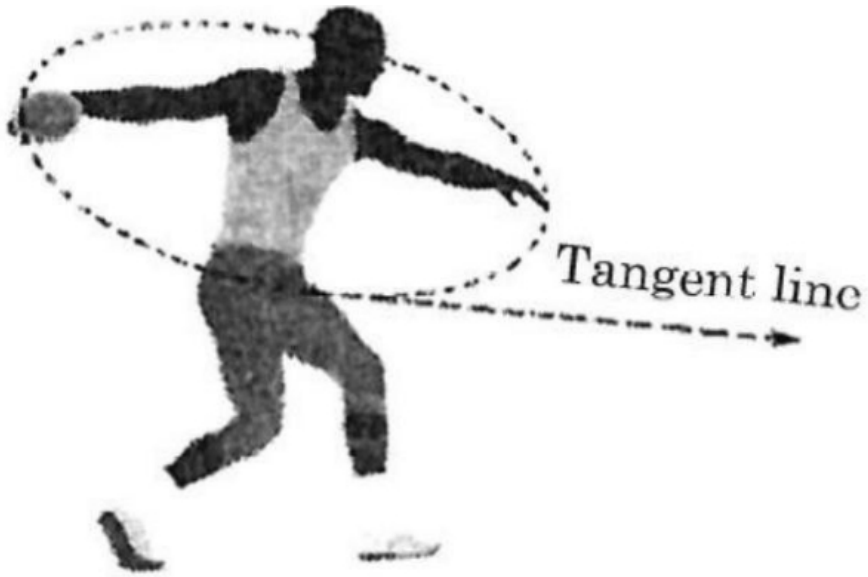

Figure 7: Discus Throw

In the given figureFig. 18 AB is one such tangent to a circle of radius $75cm$. Point O is the centre of the circle and $\angle ABO = 30°$. PQ is parallel to OA .

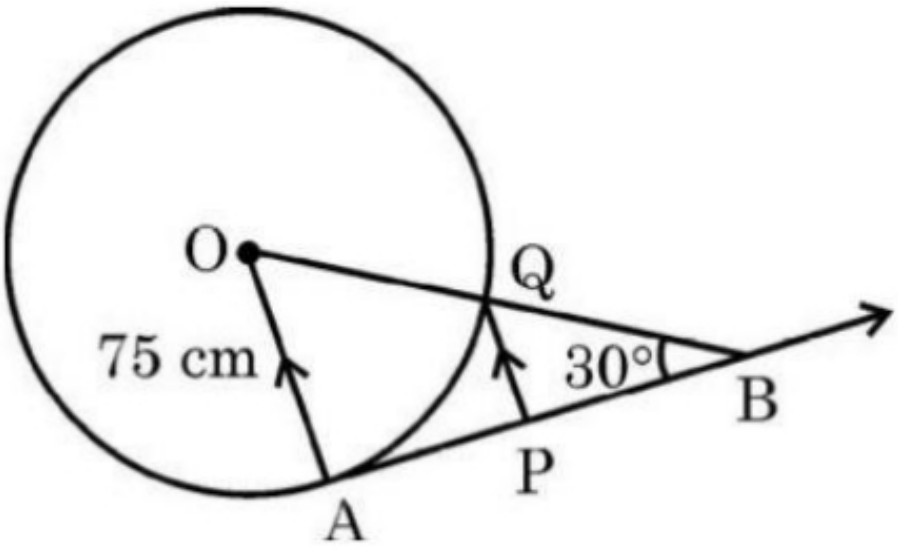

Figure 8: circle with radius

Based on the above information:

(a) Find the length of AB.
(b) Find the length of OB.
(c) Find the length of AP.
(d) Find the length of PQ.

1.2 data handling

19. The distribution below gives the marks obtained by 80 students on a test:

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
Number of Students	3	12	27	57	75	80

The model class of this distribution is:

(a) $10 - 20$
(b) $20 - 30$
(c) $30 - 40$
(d) $50 - 60$

20. If the value of each observation of a statistical data is increased by 3, then the mean of the data

(a) remains unchanged

(b) increases by 3

(c) increases by 6

(d) increases by $3n$

21. India Meteorological Department observes seasonal and annual rainfall every year in different sub-divisions of our country.

Figure 9: Meteorological departmaent logo

It helps them to compare and analyse the results. The table given below shows sub-division wise seasonal (monsoon) rainfall (mm) in 2018:

Rainfall (mm)	**Number of Sub-divisions**
200-400	2
400-600	4
600-800	7
800-1000	4
1000-1200	2
1200-1400	3
1400-1600	1
1600-1800	1

(a) Write the modal class.

(b) Find the median of the given data. Find the mean rainfall in this season.

(c) If a sub-division having at least $1000mm$ rainfall during monsoon season, is considered a good rainfall sub-division, then how many sub-divisions had good rainfall?

1.3 algebra

22. The graph of $y = p(x)$ is given, for a polynomial $p(x)$.The number of zeroes of $p(x)$ from the graph is

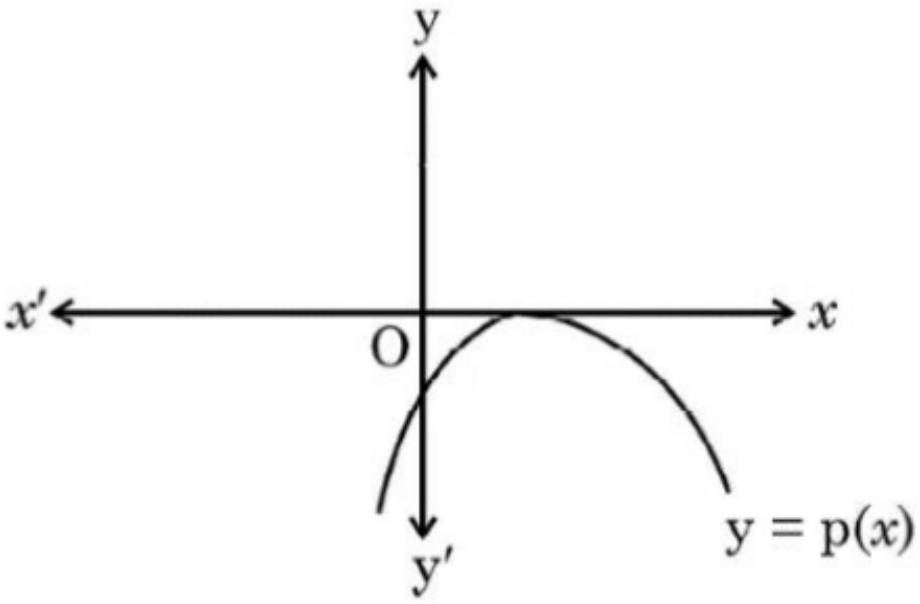

Figure 10: Graph

(a) 3

(b) 1

(c) 2

(d) 0

23. The value of k for which the pair of equations $kx = y + 2$ and $6x = 2y + 3$ has infinitely many solutions

(a) is $k = 3$

(b) does not exist

(c) is $k = -3$

(d) is $k = 4$

24. If α, β are the zeroes of a polynomial $p(x) = x^2 + x - 1$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ equals to

(a) 1

(b) 2

(c) -1

(d) $\frac{-1}{2}$

25. The least positive value of k, for which the quadratic equation $2x^2 + kx - 4 = 0$ has rational roots, is

    (a) $\pm 2\sqrt{2}$

    (b) 2

    (c) ± 2

    (d) $\sqrt{2}$

26. Which of the following is a quadratic polynomial having zeroes $\frac{-2}{3}$ and $\frac{2}{3}$?

    (a) $4x^2 - 9$

    (b) $\frac{4}{9}(9x^2 + 4)$

    (c) $x^2 + \frac{9}{4}$

    (d) $5(9x^2 - 4)$

27. Solve the pair of equations $x = 3$ and $y = -4$ graphically.

28. Using graphical method, find whether the following system of linear equations is consistent or not:
    $x = 0$ and $y = -7$

29. Find the greatest number which divides 85 and 72 leaving remainders 1 and 2 respectively.

30. Half of the difference between two numbers is 2. The sum of the greater number and twice the smaller number is 13. Find the numbers.

31. Prove that $\sqrt{5}$ is an irrational number.

32. While designing the school yearbook, a teacher asked the student that the length and width of a particular photo is increased by x units each to double the area of the photo. The original photo is $18cm$ long and $12cm$ wide.

    (a) Write an algebraic equation depicting the above information.

    (b) Write the corresponding quadratic equation in standard form.

    (c) What should be the new dimensions of the enlarged photo?

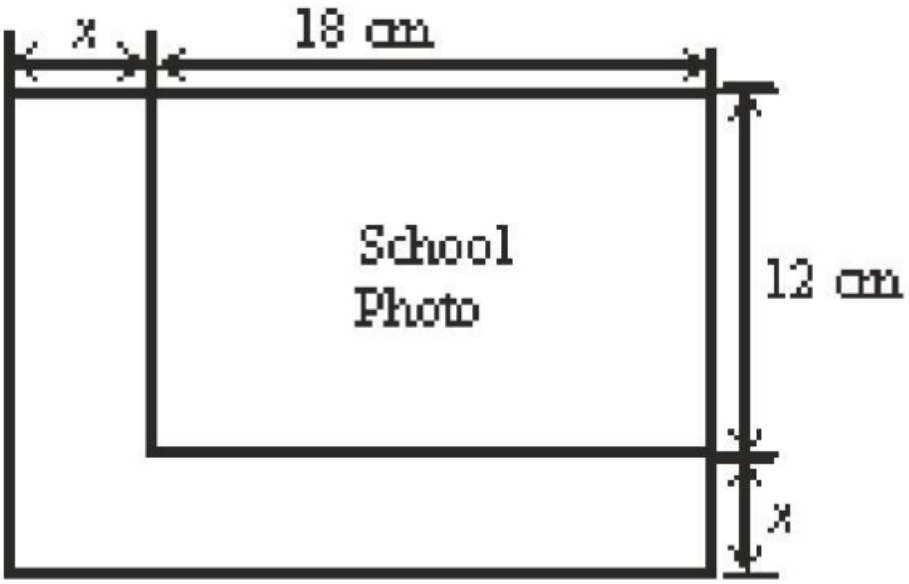

Figure 11: school

Can any rational value of x make the new area equal to $220cm^2$?

1.4 probability

33. Probability of happening of an event is denoted by p and probability of non-happening of the event is denoted by q. The relation between p and q is

    (a) $p + q = 1$

    (b) $p = 1, q = 1$

    (c) $p = q - 1$

    (d) $p + q + 1 = 0$

34. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought ?

    (a) 40

    (b) 240

    (c) 480

    (d) 750

35. In a group of 20 people, 5 can't swim. If one person is selected at random, then the probability that he/she can swim, is

    (a) $\frac{3}{4}$

    (b) $\frac{1}{3}$

    (c) 1

    (d) $\frac{1}{4}$

36. A bag contains 4 red, 3 blue, and 2 yellow balls. One ball is drawn at random from the bag. Find the probability that the drawn ball is

    (a) red

    (b) yellow.

1.5 sequences

37. If $p-1$, $p+1$ and $2p+3$ are in A.P., then the value of p is

    (a) -2

    (b) 4

    (c) 0

    (d) 2

38. The ratio of the 11^th term to the 17^th term of an A.P. is $3:4$. Find the ratio of the 5^th term to the 21^st term of the same A.P. Also, find the ratio of the sum of the first 5 terms to that of the first 21 terms.

39. 250 logs are stacked in the following manner: 22 logs in the bottom row, 21 in the next row, 20 in the row next to it, and so on (as shown by an example). In how many rows are the 250 logs placed and how many logs are there in the top row ?

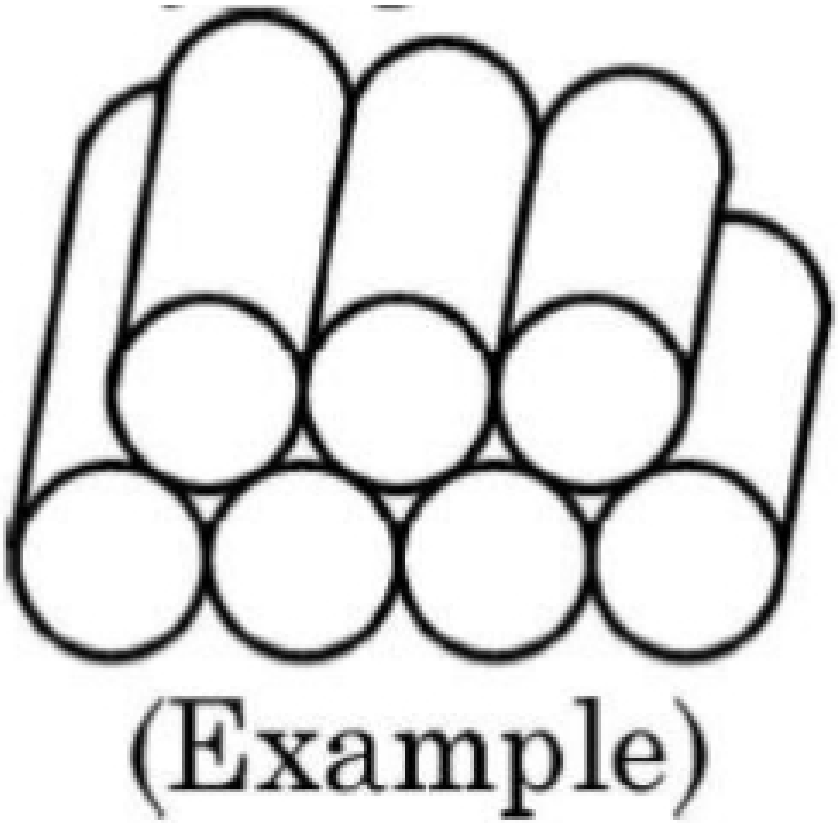

Figure 12: logs

1.6 trignometry

40. If $2\tan A = 3$, then the value of

$$\frac{4\sin A + 3\cos A}{4\sin A - 3\cos A} \tag{1}$$

(2)

(a) $\frac{7}{\sqrt{13}}$

(b) $\frac{1}{\sqrt{13}}$

(c) 3

(d) does not exist

41. $\left[\frac{3}{4}\tan^2 30^\circ - \sec^2 45^\circ + \sin^2 60^\circ\right]$ is equal to

(a) -1

(b) $\frac{5}{6}$

(c) $\frac{-3}{2}$

(d) $\frac{1}{6}$

42. If $\sin\theta + \cos\theta = \sqrt{3}$, then find the value of $\sin\theta.\cos\theta$.

43. If $\sin\alpha = \frac{1}{\sqrt{2}}$ and $\cot\beta = \sqrt{3}$, then find the value of $\csc\alpha + \csc\beta$.

44. Prove that:

$$\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \frac{1 + \sin\theta}{\cos\theta} \tag{3}$$