## REVISION SHEET

SUBJECT : MATHS

1. If $A \times B = \{(a, 1), (b, 3), (a, 3), (b, 1), (a, 2), (b, 2)\}$, find A and B, then set B is
   (a) {a}
   (b) {a, b}
   (c) {1, 2}
   (d) {1, 2, 3}

2. Range of the function $f(x) = \dfrac{x}{x+2}$ is
   (a) R
   (b) R – {2}
   (c) R – {1}
   (d) R – {–2}

3. If $n(A) = 3$, $n(B) = 2$, then number of non empty relations from set A to set B are
   (a) 8
   (b) 4
   (c) 64
   (d) 63

4. Range of the function $f(x) = \dfrac{x+4}{|x+4|}$ is
   (a) {4}
   (b) {–4}
   (c) {–1, 1}
   (d) any real number

5. If $[x]^2 - 5[x] + 6 = 0$, where [ ] denote the greatest integer function, then
   (a) $x \in [3, 4)$
   (b) $x \in [2, 3)$
   (c) $x \in [2, 3)$
   (d) $x \in [2, 4)$

6. Domain of $\sqrt{a^2 - x^2}$ $(a > 0)$ is
   (a) (–a, a)
   (b) [–a, a]
   (c) [0, a]
   (d) (–a, 0]

7. Given set $A = \{1, 2, 3, ....., 10\}$. Relation R is defined in set A as $R = \{(a, b) \in A \times A : a = 2b\}$. Then range of relation R is
   (a) {2, 4, 6, 8, 10}
   (b) {1, 3, 5, 7, 9}
   (c) {(2, 1), (4, 2), (6, 3), (8, 4), (10, 5)}
   (d) {1, 2, 3, 4, 5}

8. Let $n(A) = m$ and $n(B) = n$. Then the total number of non-empty relations that can be defined from A to B is
   (a) $m^n$
   (b) $n^m - 1$
   (c) $mn - 1$
   (d) $2^{mn} - 1$

For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.
   (a) Both A and R are true and R is the correct explanation of A.
   (b) Both A and R are true but R is not the correct explanation of A.
   (c) A is true but R is false.
   (d) A is false but R is true.

9. **Assertion (A):** Let A = {1, 2} and B = {3, 4}. Then, number of relations from A to B is 16.
   **Reason (R):** If n(A) = p and n(B) = q, then number of relations is $2^{pq}$.

10. **Assertion (A):** The domain of the relation R = {(x + 2, x + 4) : x ∈ N, x < 8} is
    {3, 4, 5, 6, 7, 8, 9).
    **Reason (R):** The range of the relation R = {(x + 2, x + 4) : x ∈ N, x < 8} is {1, 2, 3, 4, 5, 6, 7}.

11. Let $f : R \rightarrow R$ be given by $f(x) = x^2 + 3$ Find (*i*) {x : f(x) = 28} (*ii*) The pre-images of 39 and 2 under '*f*'.

12. Determine the domain and range of the relation R defined by R = {(x + 1, x + 5) : x ∈ (0, 1, 2, 3, 4, 5)}

13. Find the domain of each of the following functions given by : $f(x) = \dfrac{x^3 - x + 3}{x^2 - 1}$

14. Find the range of the following functions given by : $fx() = \dfrac{|x-4|}{x-4}$

15. Find the domain and the range of the function : $f(x) = \sqrt{x^2 - 4}$

16. Find the domain and range of the real function $f(x) = \sqrt{9 - x^2}$

17. If A = {x : x ∈ W, x < 2}, B = {x : x ∈ N, 1 < x < 5}, C = {3, 5} find
    (*i*) A × (B ∩ C)    (*ii*) A × (B ∪ C)

18. (a) Relations $R_1$ and $R_2$ are defined on the set Z of integers as follows :
    (x, y) ∈ $R_1$ ⟺ $x^2 + y^2 = 25$ ; (y, x) ∈ $R_2$ ⟺ $x^2 + y^2 = 25$
    Express $R_1$ and $R_2$ as the sets of ordered pairs and hence find their respective domains.
    (b) A relation R is defined from a set A = {2, 3, 4, 5} to a set B = {3, 6, 7, 10} as follows : (x, y)
    ∈ R ⟺ x divides y. Express R as a set of ordered pairs and determine the domain and range of R.

19. Maths teacher started the lesson Relations and Functions in Class XI. He explained the following topics:
    **Ordered Pairs:** The ordered pair of two elements a and b is denoted by (a, b) : a is first element (or first component) and b is second element (or second component).
    Two ordered pairs are equal if their corresponding elements are equal. i.e., (a, b) = (c, d) ⟹ a = c and b = d
    **Cartesian Product of Two Sets:** For two non-empty sets A and B, the cartesian product A x B is the set of all ordered pairs of elements from sets A and B.
    In symbolic form, it can be written as A x B= {(a, b) : a ∈ A, b ∈ B}

**Based on the above topics, answer the following questions.**
(i) If (a – 3, b + 7) = (3, 7), then find the value of a and b
(ii) If (x + 6, y – 2) = (0, 6), then find the value of x and y
(iii) If (x + 2, 4) = (5, 2x + y), then find the value of x and y
(iv) Find x and y, if (x + 3, 5) = (6, 2x + y).

**20.** Maths teacher explained the topics:
**Method to Find the Sets When Cartesian Product is Given**
For finding these two sets, we write first element of each ordered pair in first set say A and corresponding second element in second set B (say).
**Number of Elements in Cartesian Product of Two Sets**
If there are p elements in set A and q elements in set B, then there will be pq n(A) = p and n(B) = q, then n(A x B) = pq
**Based on the above two topic, answer the following questions.**
(i) If A x B = {(a, 1), (b, 3), (a, 3), (b, 1), (a, 2), (b, 2)}. Then, find A and B
(ii) If the set A has 3 elements and set B has 4 elements, then find the number of elements in A x B
(iii) A and B are two sets given in such a way that A x B contains 6 elements. If three elements of A x B are (1, 3), (2, 5) and (3, 3), then find A, B
(iv) The cartesian product P x P has 16 elements among which are found (a, 1) and (b, 2). Then, find the set P

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**1.** Angle formed by the large hand of a clock in 20 minutes is

(a) $\dfrac{\pi}{6}$  (b) $\dfrac{\pi}{3}$  (c) $\dfrac{3\pi}{4}$  (d) $\dfrac{2\pi}{3}$

**2.** If $\sin \theta + \operatorname{cosec} \theta = 2$, then $\sin^2 \theta + \operatorname{cosec}^2 \theta$ is equal to

(a) 1  (b) 4  (c) 2  (d) 3

**3.** If $\tan \theta = \dfrac{1}{2}$ and $\tan \phi = \dfrac{1}{3}$, then the value of $\theta + \phi$ is

(a) $\dfrac{\pi}{6}$  (b) $\pi$  (c) 0  (d) $\dfrac{\pi}{4}$

**4.** The value of $\sin (45° + \theta) - \cos (45° - \theta)$ is

(a) $2 \cos \theta$  (b) $2 \sin \theta$  (c) 1  (d) 0

**5.** The value of $\tan 75° - \cot 75°$ is

(a) $2\sqrt{3}$  (b) $2 + \sqrt{3}$  (c) $2 - \sqrt{3}$  (d) 1

**6.** The minimum value of $3 \cos x + 4 \sin x + 8$ is

(a) 5  (b) 9  (c) 7  (d) 3

**7.** $\cos 2\theta \cos 2\phi + \sin2(\theta - \phi) - \sin^2(\theta + \phi)$ is equal to

(a) $\sin 2(\theta + \phi)$  (b) $\cos 2(\theta + \phi)$  (c) $\sin 2(\theta - \phi)$  (d) $\cos 2 (\theta + \phi)$

**8.** If $\sin \theta + \cos \theta = 1$, then the value of $\sin 2\theta$ is

(a) 1  (b) $\dfrac{1}{2}$  (c) 0  (d) –1

**For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.**

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

9. **Assertion (A):** The ratio of the radii of two circles at the centres of which two equal arcs subtend angles of 30° and 70° is 21:10.
   **Reason (R):** Number of radians in an angle subtended at the centre of a circle by an arc is equal to the ratio of the length of the arc to the radius of the circle.

10. **Assertion (A):** cosec x is negative in third and fourth quadrants.
    **Reason (R):** cot x decreases from 0 to -∞ in first quadrant and increases from 0 to ∞ in third quadrant.

11. If $\alpha + \beta = \dfrac{\pi}{4}$, then find the value of $(1 + \tan \alpha)(1 + \tan \beta)$

12. If $\sin x = \dfrac{3}{5}, \dfrac{\pi}{2} < x < \pi$, then find the value of cos $x$, tan $x$, sec $x$ and cot $x$.

13. A wheel makes 270 revolutions in one minute. Through how many radians does it turn in one second?

14. Prove: $\cos 24° + \cos 55° + \cos 125° + \cos 204° + \cos 300° = \dfrac{1}{2}$.

15. If $\sin x = \dfrac{3}{5}$, $\cos y = \dfrac{-12}{13}$ and $x, y$ both lie in the second quadrant, find the values of $\sin (x + y)$

16. Prove that $\dfrac{\sin 8x \cos x - \sin 6x \cos 3x}{\cos 2x \cos x - \sin 4x \sin 3x} = \tan 2x$

17. Prove that, $\cos 20° \cos 40° \cos 60° \cos 80° = \dfrac{1}{16}$.

18. In a triangle ABC, prove that, $\cos^2 \dfrac{A}{2} + \cos^2 \dfrac{B}{2} + \cos^2 \dfrac{C}{2} = 2\left(1 + \sin \dfrac{A}{2} \sin \dfrac{B}{2} \sin \dfrac{C}{2}\right)$

**OR**

If $\alpha, \beta$ are the roots of $a \cos \theta + b \sin \theta = c$, show that, $\cos (\alpha + \beta) = \dfrac{a^2 - b^2}{a^2 + b^2}$.

19. From the top of a tower of 10 m high building the angle of elevation of top of a tower is 75° and the angle of depression of foot of the tower is 15°. If the tower and building are on the same horizontal surfaces.

Tower

75°

15°

10 m
Building
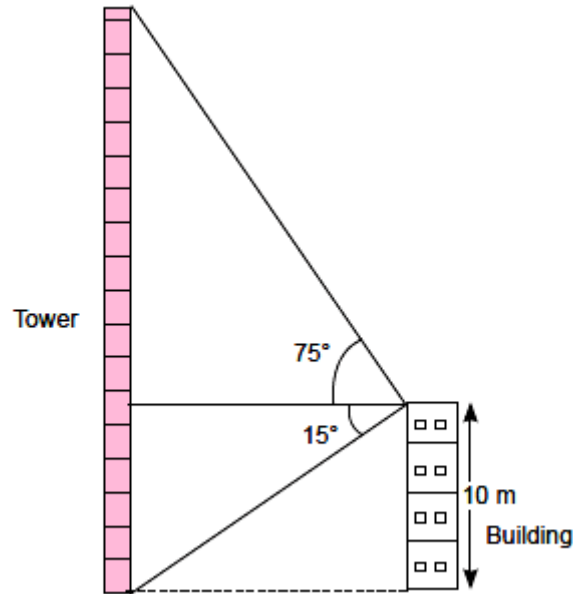
(i) Find the value of tan 15°. (2)
(ii) Find the value of cos 75°.  (2)

20. The below figure shows the compass. The East direction is along the positive X-axis (0° angle) and North direction is along the +ve Y-axis (90° angles). Initially the pointer is pointed towards North-East direction. Pointer is deflected in a magnetic field by some angle.
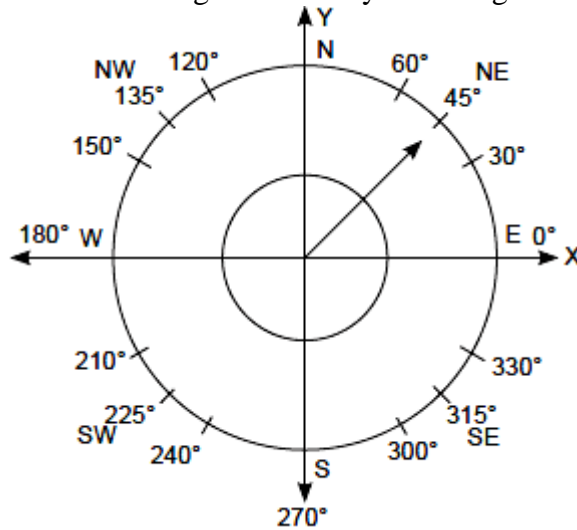


**On the basis of above answer the following.**
(i)  If pointer move in anticlockwise direction by an angle of 90°, then find the value of sine of angle made by pointer from East direction. (1)
(ii) If pointer moves an angle of 165° from its initial position in anticlockwise direction, then find the value of cosine of angle made by pointer from East direction. (1)

(iii)If the sine and cosine of angle made by pointer with East direction is $-\dfrac{1}{\sqrt{2}}$ then find where the pointer pointed? (1)

(iv) How much angle will pointer move in anticlock wise direction if tangent of angle made by pointer with x-axis is – 1? (1)

1. The equation of line whose intercepts on the axes of x and y are –2 and 3 respectively is
   (a) $3x - 2y = 6$     (b) $3x - 2y + 6 = 0$          (c) $3x + 2y = 6$          (d) $3x + 2y = -6$

2. The new coordinates of point (3, –5), if origin is shifted to the point (–3, –2) are
   (a) (6, 3)          (b) (6, –3)          (c) (–6, 3)          (d) (–6, –3)

3. The angle between the X -axis and the line joining the points $(3, -1)$ and $(4, -2)$ is
   (a) 45°          (b) 135°          (c) 90°          (d) 180°

4. The value of y will be, so that the line through (3, y ) and (2, 7) is parallel to the line through $(-1, 4)$ and (0, 6).
   (a) 7          (b) 8          (c) 9          (d) 10

5. The equation of the line passing through the point (1, 2) and perpendicular to the line $x + y + 1 = 0$ is
   (a) $y - x + 1 = 0$     (b) $y - x - 1 = 0$          (c) $y - x + 2 = 0$          (d) $y - x - 2 = 0$

6. The equation of line, which passes through point (4, 3) and parallel to the line $2x - 3y = 7$ is
   (a) $2x - 3y + 1 = 0$ (b) $2x - 3y - 1 = 0$          (c) $2x + 3y + 1 = 0$      (d) $2x + 3y - 1 = 0$

7. The distance of the point $(3, -5)$ from the line $3x - 4y - 26 = 0$ is
   (a) $\dfrac{3}{7}$          (b) $\dfrac{2}{5}$          (c) $\dfrac{7}{5}$          (d) $\dfrac{3}{5}$

8. The distance between the parallel lines $3x - 4y + 7 = 0$ and $3x - 4y + 5 = 0$, is
   (a) $\dfrac{3}{7}$          (b) $\dfrac{2}{5}$          (c) $\dfrac{7}{5}$          (d) $\dfrac{3}{5}$

**For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.**
   (a) Both A and R are true and R is the correct explanation of A.
   (b) Both A and R are true but R is not the correct explanation of A.
   (c) A is true but R is false.
   (d) A is false but R is true.

9. **Assertion (A):** Slope of line $3x - 4y + 10 = 0$ is 3/4.
   **Reason (R):** x-intercept and y-intercept of $3x - 4y + 10 = 0$ respectively are $-10/3$ and 5/2.

**10. Assertion (A):** The slope of the line x + 7y = 0 is 1/7 and y-intercept is 0.
   **Reason (R):** The slope of the line 6x + 3y − 5 = 0 is − 2 and y-intercept is 5/3.

**11.** Line through the points (–2, 6) and (4, 8) is perpendicular to the line through the points (8, 12) and (x, 24), find the value of $x$.

**12.** Find the equation of the straight line passing through the point (6, 2) and having slope – 3.

**13.** If the lines $2x + y − 3 = 0$, $5x + ky − 3 = 0$ and $3x − y − 2 = 0$ are concurrent, find the value of $k$.

**14.** Find the equation of lines passing through (1, 2) and making angle 30° with $y$-axis.

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**15.** Find the equations of the altitudes of the triangle whose vertices are A(7, –1), B(–2, 8) and C (1, 2).

**16.** If P $(a, b)$ is the mid-point of a line segment between axes. Show that equation of the line is $\dfrac{x}{a} + \dfrac{y}{b} = 2$.

**17.** The vertices of the triangle are A(2, 3), B(4, –1) and C(1, 2). Find the length and equation of the perpendicular drawn from the point A on side BC.

**18.** Find the equations of the lines which pass through the point (4, 5) and make equal angles with the lines $5x − 12y + 6 = 0$ and $3x = 4y + 7$.

**19.** One triangular shaped pond is there in a park. Three friends Rani, Mansi, Sneha are sitting at the corners of the triangular park. They are studying in Class XI in an International.
Rani marked her position as (2, –2), Mansi marked as (1, 1) and Sneha marked her position as (–1, 0) as shown in figure given below.
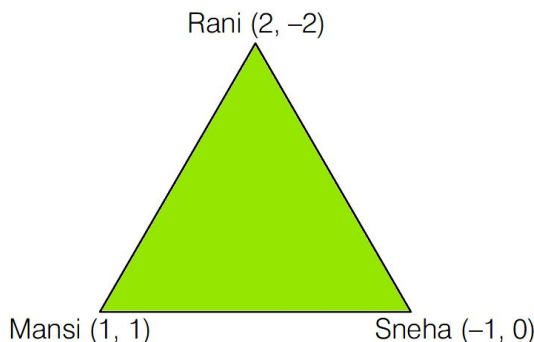


Based on the above information answer the following questions.
(i) Find the equation of lines formed by Rani and Mansi. (1)
(ii) Find the Slope of equation of line formed by Rani and Sneha. (1)
(iii) Find the equation of median of lines through Rani. (1)

(iv) Find the equation of altitude through Mansi. (1)

20. One day the mathematics teacher drew a triangle $\triangle ABC$ while revising straight lines. He marked vertices A(1, 4), B (2, − 3) and C(− 1, − 2) as shown in the given below figure. AD is the median and AM is the altitude through A.
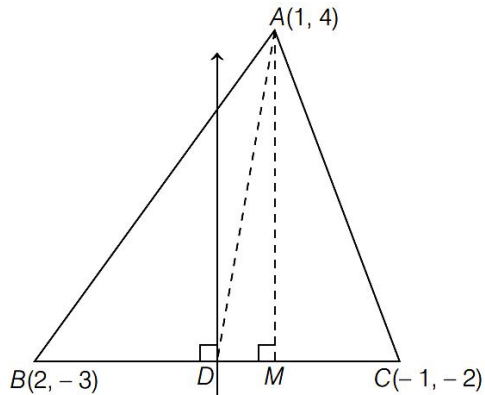


Based on the above information answer the following questions.
(i) Find the slope of BC. (1)
(ii) Find the equation of median through A. (1)
(iii) Find the equation of the altitude through A. (1)
(iv) Find the equation of right bisector of side BC. (1)

1. Slope of a line which cuts off intercepts of equal lengths on the axes is

   (a) $-1$            (b) 0            (c) 2            (d) $\sqrt{3}$

2. If the coordinates of the middle point of the portion of a line intercepted between the coordinate axes is (3, 2), then the equation of the line will be
   (a) $2x + 3y = 12$    (b) $3x + 2y = 12$      (c) $4x - 3y = 6$          (d) $5x - 2y = 10$

3. The equation of the line through $(-2, 3)$ with slope $-4$ is
   (a) $x + 4y - 10 = 0$   (b) $4x + y + 5 = 0$     (c) $x + y - 1 = 0$          (d) $3x + 4y - 6 = 0$

4. The perpendicular distance from origin to the line $5x + 12y - 13 = 0$ is
   (a) 10 unit        (b) 5 unit          (c) 2 unit           (d) 1 unit

5. The equation of the circle in the first quadrant touching each coordinate axis at a distance of one unit from the origin is
   (a) $x^2 + y^2 - 2x - 2y + 1 = 0$         (b) $x^2 + y^2 - 2x - 2y - 1 = 0$
   (c) $x^2 + y^2 - 2x - 2y = 0$             (d) $x^2 + y^2 - 2x + 2y - 1 = 0$

6. The equation of the ellipse whose centre is at the origin and the x-axis, the major axis, which passes through the points $(-6, 1)$ and $(4, -4)$ is
   (a) $3x^2 - 4y^2 = 32$        (b) $3x^2 + 4y^2 = 112$     (c) $4x^2 - 3y^2 = 112$     (d) $4x^2 + 3y^2 = 112$

7. The length of the latus rectum of the ellipse $9x^2 + 16y^2 = 144$ is
   (a) 4            (b) 11/4           (c) 7/2           (d) 9/2

8. The equation of hyperbola referred to its axes as axes of co-ordinate whose distance between the foci is 20 and eccentricity equals $\sqrt{2}$ is
   (a) $x^2 - y^2 = 25$         (b) $x^2 - y^2 = 50$      (c) $x^2 - y^2 = 125$     (d) $x^2 + y^2 = 25$

**For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.**
   (a) Both A and R are true and R is the correct explanation of A.
   (b) Both A and R are true but R is not the correct explanation of A.
   (c) A is true but R is false.
   (d) A is false but R is true.

9. **Assertion (A):** If $x\cos\theta + y\sin\theta = 2$ is perpendicular to the line $x - y = 3$, then one of the value of $\theta$ is $\pi/4$.
   **Reason (R):** If two lines $y = m_1x + c_1$ and $y = m_2x + c_2$ are perpendicular then $m_1 = m_2$.

10. **Assertion (A):** The length of major and minor axes of the ellipse $5x^2 + 9y^2 - 54y + 36 = 0$ are 6 and 10, respectively.
    **Reason (R):** The equation $5x^2 + 9y^2 - 54y + 36 = 0$ can be expressed as $5x^2 + 9(y - 3)^2 = 45$.

11. Find the angle between the x-axis and the line joining the points $( 3, -1)$ and $(4, -2)$.

12. Find the equation of an ellipse whose vertices are at $(\pm 5, 0)$ and foci at $(\pm 4, 0)$.

13. If the line through the points $(-2, 6)$ and $(4, 8)$ is perpendicular to the line through the points $(8, 12)$ and $(x, 24)$, find the value of x.

14. Show that the lines $27x - 18y + 25 = 0$ and $2x + 3y + 7 = 0$ are perpendicular to each other.

15. Find the coordinates of the focus and the vertex, the equations of the directrix and the axis, and length of the latus rectum of the parabola $y^2 = 8x$.

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16. Find the equation of the perpendicular bisector of the line joining the points $A(2, 3)$ and $B(6, -5)$.

17. Find the equation of the line which passes through the point $(3, 4)$ and the sum of whose intercepts on the axes is 14.

18. Find the equation of the hyperbola whose vertices are $(\pm 7, 0)$ and the eccentricity is $4/3$.

19. Find the equation of the circle passing through the vertices of a triangle whose sides are represented by the equations $x + y = 2$, $3x - 4y = 6$ and $x - y = 0$.

20. In a rectangle park, four friends Rishabh, Shubham, Vikram and Rajkumar are sitting at the corners and chatting through their phones. Their positions in the form of coordinates are given as Rishabh (1, 4), Rajkumar (5, 4) Shubham (1, 2) and Vikram (5, 2)



Rishabh (1, 4)   A    D   Rajkumar (5, 4)
Shubham (1, 2)   B    C   Vikram (5, 2)
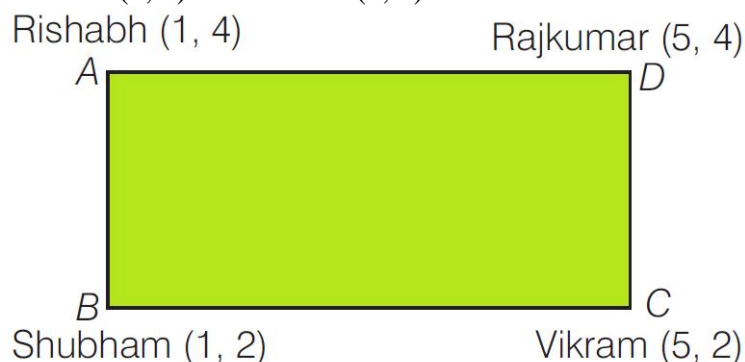
On the bases of the information answer the following.
(i) Find the equation formed by Shubham and Rajkumar. (2)

**OR**

(ii) Find the equation formed by Rishabh and Vikram. (2)
(iii) Find the Slope of equation of line formed by Rishabh and Rajkumar. (1)
(iv) Pair for the same slope is
  (a) Rishabh-Rajkumar and Shubham-Vikram
  (b) Rishabh-Rajkumar and Rajkumar-Vikram
  (c)Rishabh-Rajkumar and Rishabh-Shubham
  (d) None of the above

21. Aditya was playing a football match. When he kicked the football, the path formed by the football from ground level is parabolic, which is shown in the following graph. Consider the coordinates of point A as (3, –2).
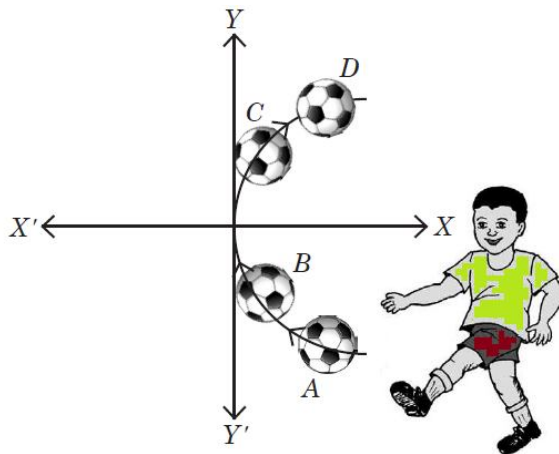


On the bases of the information answer the following.
(i) Find the equation of path formed by the football. (1)
(ii) Find the equation of directrix of path formed by football. (1)
(iii) Find the extremities of latus rectum of given curve. (1)
(iv) Find the length of latus rectum of given curve. (1)

**1.** L is the foot of the perpendicular drawn from a point P (6, 7, 8) on the XY-plane, then the coordinates of point L are

(a) (6, 0, 0)        (b) (6, 7, 0)        (c) (6, 0, 8)        (d) None of these

**2.** The point $(-2, -3, -4)$ lies in the

(a) first octant (b) seventh octant (c) second octant (d) eight octant

**3.** The point on Y-axis which is at a distance $\sqrt{10}$ from the point (1, 2, 3), is

(a) (0, 2, 0)        (b) (0, 0, 2)        (c) (0, 0, 3)        (d) None of these

**4.** If the distance between the points (a, 0, 1) and (0, 1, 2) is $\sqrt{27}$, then the value of a is

(a) 5        (b) $\pm 5$        (c) $-5$        (d) None of these

**5.** If the point A (3, 2, 2) and B (5, 5, 4) are equidistant from P, which is on X-axis, then the coordinates of P are

(a) (39/4, 2 , 0)    (b) (49/4, 2 , 0)        (c) (39/4, 0 , 0)        (d) (49/4, 0 , 0)

**6.** The points (5, –1, 1), (7, – 4, 7), (1, – 6, 10) and (−1, – 3, 4) are

(a) the vertices of a rectangle        (b) the vertices of a square
(c) the vertices of a rhombus        (d) None of these

**7.** The coordinate of the point P which divides the line joining the points A(−2, 0, 6) and B(10, – 6, – 12) internally in the ratio 5 : 1.

(a) (8, 5, 9)        (b) (–8, 5, 9)        (c) (8, –5, –9)        (d) None of these

**8.** The ratio in which the line joining (2, 4, 5) and (3, 5, –4) is divided by the YZ-plane, is

(a) 2 : 3        (b) 3 : 2        (c) –2 : 3        (d) 4 : –3

**For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.**

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

9. **Assertion (A):** The points A(3, –1, 2), B(1, 2, – 4), C(–1, 1, 2) and D(1, –2, 8) are the vertices of a parallelogram.
   **Reason (R):** Coordinates of mid-point of a line joining the points A($x_1$, $y_1$, $z_1$) and B($x_2$, $y_2$, $z_2$) is
   $$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}, \frac{z_1 + z_2}{2} \right)$$

10. **Assertion (A):** The distance between the points (1 + $\sqrt{11}$, 0, 0) and (1, –2, 3) is $2\sqrt{6}$ units.
    **Reason (R):** Distance between any two points A($x_1$, $y_1$, $z_1$) and B($x_2$, $y_2$, $z_2$) is,
    $$|AB| = \sqrt{(x_2 + x_1)^2 + (y_2 + y_1)^2 + (z_2 + z_1)^2}$$

.

11. Find the point on y-axis which is equidistant from the point A(3, 2, 2) and B(5, 5, 4).

12. Show that the points A(0, 7, 10), B(–1, 6, 6) and C(–4, 9, 6) form an isosceles right-angled triangle.

13. A point R with x-coordinate 4 lies on the line segment joining the points P(2, –6, 4) and Q(8, 6, 10). Find the coordinates of the point R.

14. Find the coordinates of the point which divides the join of P(2, –1, 4) and Q(4, 3, 2) in the ratio 2 : 3 externally.

15. Find the ratio in which the join of A(2, 1, 5) and B( 3, 4, 3) is divided by the plane $2x + 2y - 2z = 1$. Also, find the coordinates of the point of division.

16. Find the points of trisection of the segment joining the points A(1, 0, –6) and B(–5, 9, 6).

17. Find the equation of the set of points which are equidistant from the points (1, 2, 3) and (3, 2, –1).

.

18. The midpoints of the sides of a triangle are (1, 5, −1), (0, 4, −2) and (2, 3, 4). Find its vertices.

19. Raj and his father were walking in a large park. They saw a kite flying in the sky. The position of kite, Raj and Raj's father are at (20, 30, 10), (4, 3, 7) and (5, 3, 7) respectively.
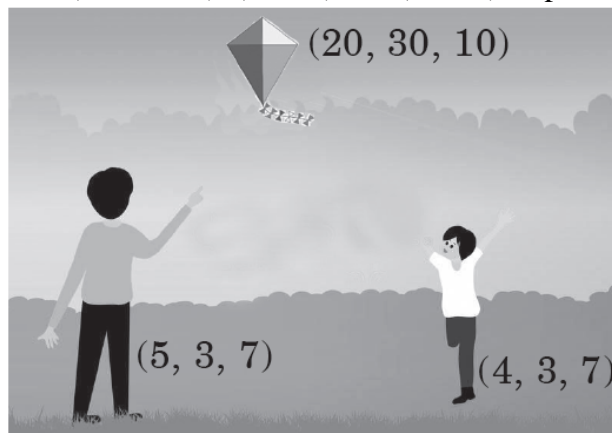
**On the basis of above information, answer the following:**
(i) Find the distance between Raj and kite. Also find the distance between Raj's father and kite. (2)
(ii) Find the form of the co-ordinates of points in the XY-plane (1)
(iii) If co-ordinates of kite, Raj and Raj's father form a triangle, then find the centroid of it. (1)

**20.** Deepak and his friends went for camping for 2 or 3 days. There they set up a tent which is triangular in shape. The vertices of the tent are A(4, 5, 9), B(3, 2, 5), C(5, 2, 5), D(–3, 2, –5) and E(–4, 5, –9) respectively. The vertex A is tied up by the rope at the ends F and G and the vertex E is tied up at the ends I and H.
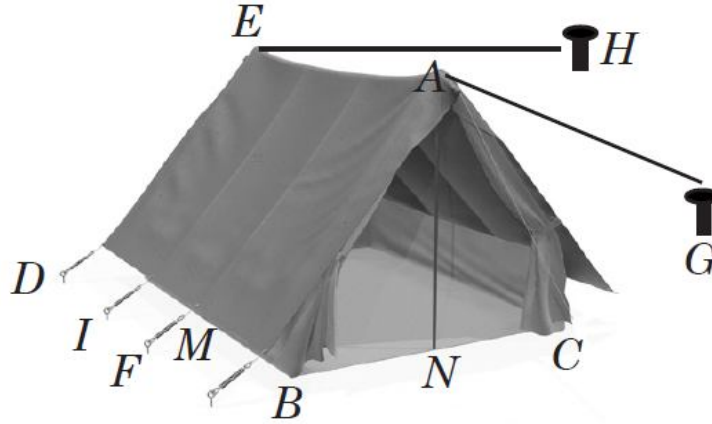


**On the basis of above information, answer the following:**
(i) If M denotes the position of their bags inside the tent and it is just in middle of the vertices B and D, then find the coordinates of M. (1)
(ii) Find the length AE. (1)
(iii) If the length of the rope by which E is tied up with H is $5\sqrt{2}$ units, then the equation denotes the set of point of H (2)

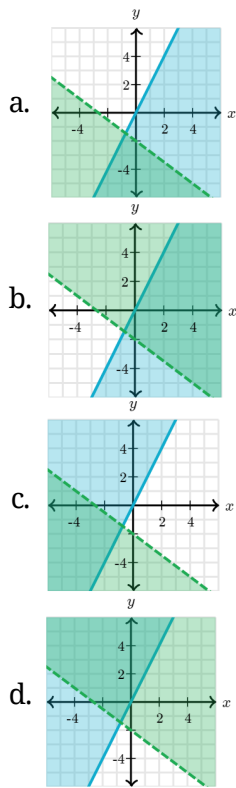1. **Read the Case study given below and attempt any 4 subparts:**



A company produces certain items. The manager in the company used to make a data record on daily basis about the cost and revenue of these items separately. The cost and revenue functions of a product are given by C(x) = 20 x + 4000 and R(x) = 60x + 2000, respectively, where x is the number of items produced and sold.

The company manager wants to know:

i. How many items must be sold to realize some profit

   a. x < 50

   b. x > 50

   c. x $\geq$ 50

   d. x $\leq$ 50

ii. Also if the cost and revenue functions of a product are given by C(x) = 2x + 400 and R(x) = 6x + 20 respectively, where x is the number of items produced by the manufacturer. The minimum number of items that the manufacturer must sell to realize some profit is

   a. 95

   b. 96

   c. 105

   d. 100

iii. solve for x : 12x+7< -11  OR 5x-8>40

   a. x < $\frac{-3}{2}$ or x > $\frac{48}{5}$

   b. $\frac{-3}{2}$ < x < $\frac{48}{5}$

   c. x > $\frac{3}{2}$ or x < $\frac{48}{5}$

   d. There are no solutions

iv. y $\leq$ 2x and y < $\frac{-3}{2}$ x - 2  Which graph represents the system of inequalities

a. 

b. 

c. 

d. 

v. Graph the following inequality on the number line: x > 27

a. 

b. 

c. 

d. 
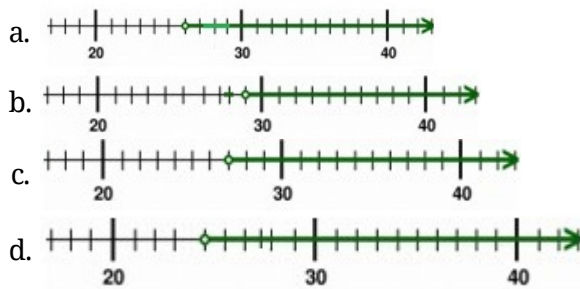
2. **Read the Case study given below and attempt any 4 subparts:** [4]

Plumbers are responsible for installing and maintaining water systems within buildings, including drinking water, drainage, heating, sanitation, and sewage systems. Plumbers are not only involved with the installation and development of new houses and plumbing systems, but also with assessing and fixing problems in existing and older systems.

A plumber can be paid under two schemes as given below:

I: Rs 600 and Rs 50 per hour.

II: Rs 170 per hour.



i. If the job takes n hours, then the values of n for which the scheme I will give the plumber better wages are
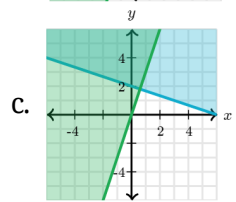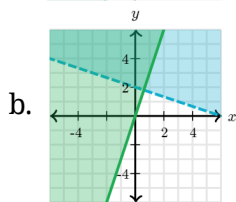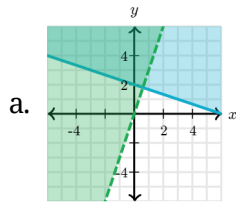
a. less than 4 hours

b. less than 5 hours

c. more than 5 hours

d. 4 hours

ii. Solve for x: 3x-91> -87 and 17x-16>18

a. $x > 2$

b. $x > \frac{4}{3}$

c. $\frac{4}{3} < x < 2$

d. all value of x is the solutions

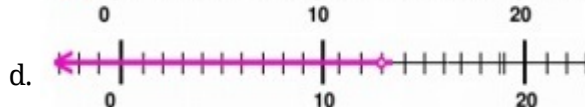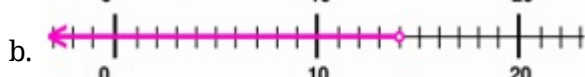iii. $y \geq \frac{-1}{3}x+2$ and $y \geq 3x$, Which graph represents the system of inequalities

a.



b.



c.



d.
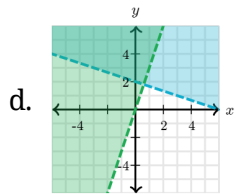


iv. Solve: $f(x) = \{(x − 1)×(2 − x)\}/(x − 3) \geq 0$

a. $(-\infty, 1] \cup (2, \infty)$

b. $(-\infty, 1] \cup (2, 3)$

c. $(-\infty, 1] \cup (3, \infty)$

d. None of these

v. Graph the following inequality on the number line: x < 14

a.



b.



c.



d.



3.  **Read the Case study given below and attempt any 4 sub parts:**

Schools do not take IQ tests of the majority of students anymore. IQ tests are mostly used for

children who struggle in school in order to determine if they are eligible to receive special services. Do you think this is a mistake? If money were not an issue, what do you think of the idea of giving an IQ test to every child in upper elementary school? Is this a good idea or a bad idea? What would you see as the pros and cons of doing so? Write an opinion piece answering these questions, concluding with your recommendation either to give all children IQ tests or not.

IQ of a person is given by the formula IQ = $\frac{MA}{CA} \times 100$ where MA is mental age and CA is the chronological age. If $80 \leq$ IQ $\leq 140$ for a group of 12 years old children, find:
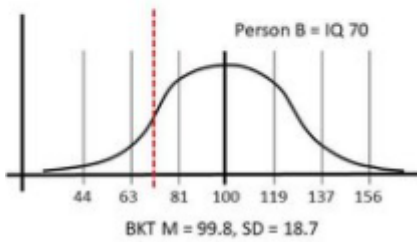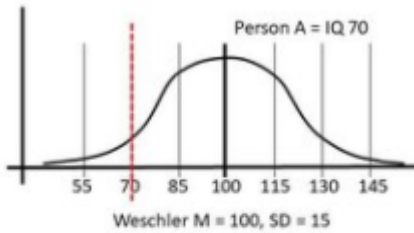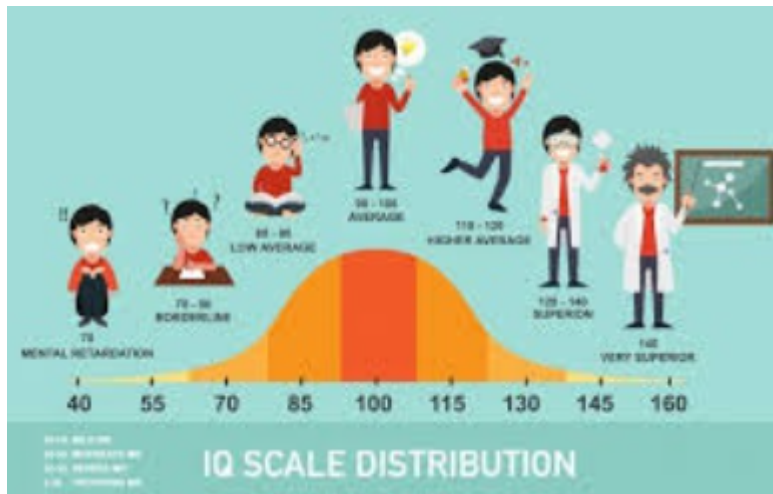


Person A = IQ 70

55  70  85  100  115  130  145

Weschler M = 100, SD = 15

Person B = IQ 70

44  63  81  100  119  137  156

BKT M = 99.8, SD = 18.7

Figure 1: IQ distribution of two different SDs



40  55  70  85  100  115  130  145  160

IQ SCALE DISTRIBUTION

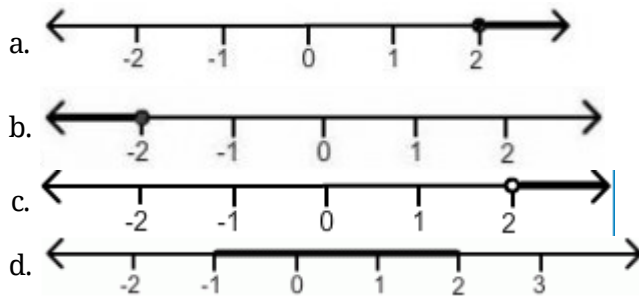i. the range of their mental age.

   a. 9.6 to 14.8

   b. 9.6 and 16.8

   c. 9.6 to 16.8

   d. 14.8 to 16.8 2.

ii. Jake is younger than Sophie. Sophie is 14 years old.

Write an inequality that compares Jake's age in years, j to Sophie's age.
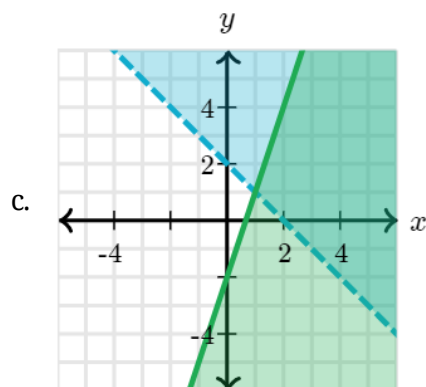
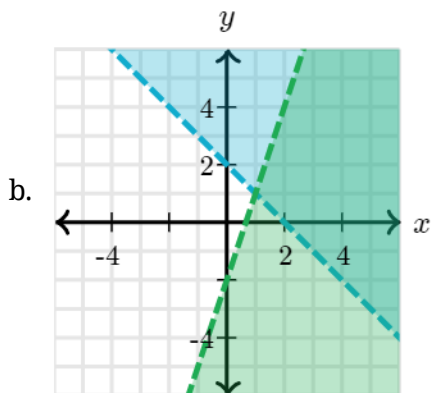   a. j < 14
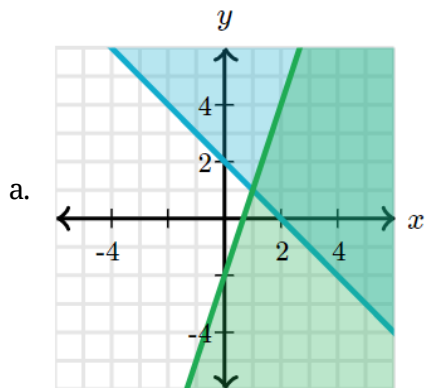
   b. j > 14

   c. j $\leq$ 14

   d. j $\geq$ 14
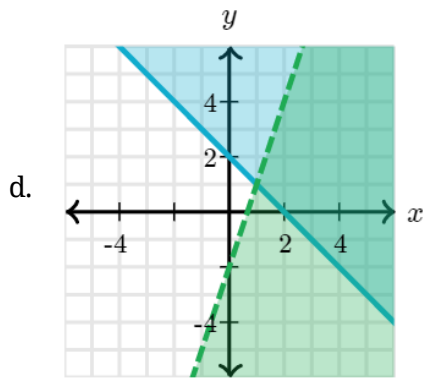
iii. The graphical representation of x > 2 on the number line is

a. 

b. 

c. 

d. 

iv. {14,15,16} is the solution set of

a.  x > 14 and x > 17, x∈Z

b. x ⩾ 14 and x ⩽ 17, x∈Z

c.  x > 14 and x < 17, x∈Z

d. x ⩾ 14 and x < 17, x∈Z

v. y>−x+2 and y≤3x−2 Which graph represents the system of inequalities

a. 

b. 

c. 

d.

4. **Read the Case study given below and attempt any 4 sub parts:**

In drilling world's deepest hole, the Kola Superdeep Borehole, the deepest manmade hole on Earth and deepest artificial point on Earth, as a result of a scientific drilling project, it was found that the temperature T in degree Celsius, x km below the surface of Earth, was given by:

$T = 30 + 25 (x - 3)$, $3 < x < 15$.

If the required temperature lies between $200^0$ C and $300^0$ C, then



Journey to the Earth's mantle

i. the depth, x will lie between

    a. 9 km and 13 km

    b. 9.8 km and 13.8 km

    c. 9.5 km and 13.5 km

    d. 10 km and 14 km

ii. Solve for x. -9x+2> 18 OR 13x+15 ≤−4

    a. $\mathbf{x} \leq \frac{-19}{13}$

    b. $x < \frac{-16}{13}$

    c. $\frac{-16}{13} < x < \frac{-19}{13}$

    d. There are no solution.

iii. **Find the inequality represented by the graph**
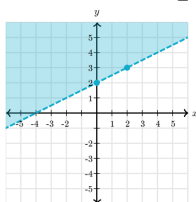


    a. $y \leq \frac{1}{2}x+2$

    b. $y > \frac{1}{2}x+2$

    c. $y \geq \frac{1}{2}x+2$

d. $y < \frac{1}{2}x+2$

iv. If $|x| < 5$ then the value of x lies in the interval

    a. $(-\infty, -5)$

    b. $(\infty, 5)$

    c. $(-5, \infty)$

    d. $(-5, 5)$

v. Graph the following inequality on the number line: $x > -32$
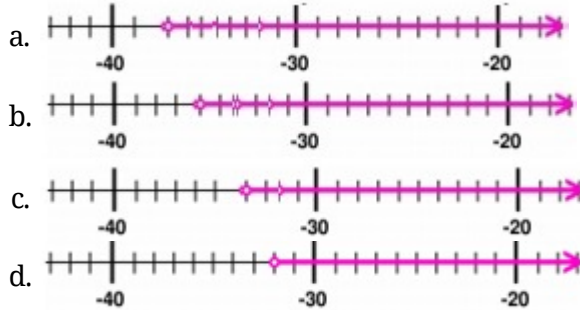
    a. 

    b. 

    c. 

    d. 

5. **Read the Case study given below and attempt any 4 subparts:**



In science practical class, students used to perform experiments, one-day group A of class 11th have the following experiment results: A solution of 10% boric acid is to be diluted by adding a 4% boric acid solution to it. The resulting mixture is to be more than 5% but less than 8% boric acid. If we have 750 litres of the 10% solution, then:

 i. The quantity of the 4% solution that has to be added will lie between

    a. 370 liters and 3750 liters

    b. 375 liters and 3750 liters

    c. 320 liters and 1280 liters

    d. 370 liters and 3700 liters

 ii. In an experiment, a solution of hydrochloric acid is to be kept between 30 and 35 degrees Celcius. What is the range of temperature in degree Fahrenheit if the conversion formula is given by, $C = \frac{5}{9}(F-32)$ where C and F represent the temperature in degree Celsius and degree Fahrenheit, respectively

    a. $30 < F < 35$

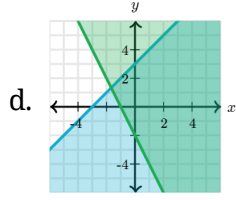    b. $86 < F < 95$

    c. $62 < F < 67$

    d. $77 < F < 86$

iii. Solve for x: $-8x+3 \geq 27$ And $-13x+5 \geq 57$

    a. $x \leq -4$

    b. $x \leq -3$

c. $-4 \le x \le -3$

d. There are no solutions

iv. y≤x+3 and y≥-2x-2, Which graph represents the system of inequalities?

a.



b.



c.



d.
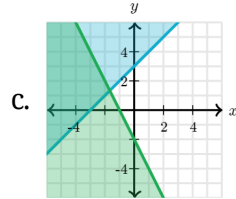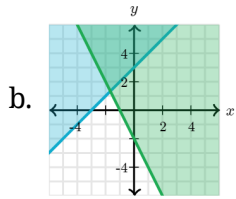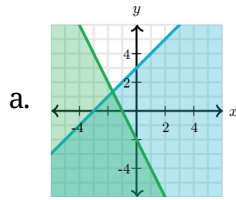


v. Graph the following inequality on the number line: x ≤ -42

a.



b.



c.



d.
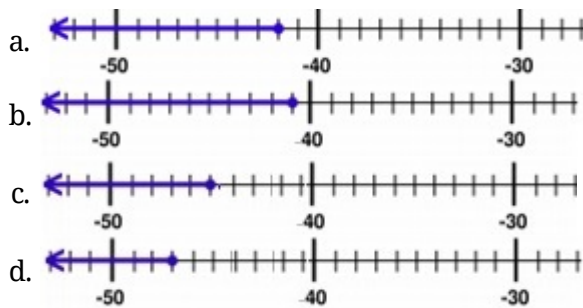


6. **Read the Case study given below and attempt any 4 subparts:**

A state cricket authority has to choose a team of 11 members, to do it so the authority asks 2 coaches of a government academy to select the team members that have experience as well as the best performers in last 15 matches. They can make up a team of 11 cricketers amongst 15 possible candidates. In how many ways can the final eleven be selected from 15 cricket players if:



i. there is no restriction

a. 1365

b. 2365

c. 1465

d. 1375

ii. one of then must be included

    a. 1002

    b. 1003

    c. 1001

    d. 1004

iii. one of them, who is in bad form, must always be excluded

    a. 480

    b. 364

    c. 1365

    d. 640

iv. Two of them being leg spinners, one and only one leg spinner must be included?

    a. $^2C_1 \times {^{13}C_{10}}$

    b. $^2C_1 \times {^{10}C_{13}}$

    c. $^1C_2 \times {^{13}C_{10}}$

    d. $^2C_{10} \times {^{13}C_{10}}$

v. If there are 6 bowlers, 3 wicket-keepers, and 11 batsmen in all. The number of ways in which a

A team of 4 bowlers, 2 wicket-keepers, and 5 batsmen can be chosen.

    a. $^6C_2 \times {^3C_4} \times {^{11}C_5}$

    b. $^6C_2 \times {^3C_4} \times {^{11}C_5}$

    c. $^6C_2 \times {^3C_5} \times {^{11}C_4}$

    d. $^6C_2 \times {^3C_1} \times {^{11}C_5}$

7.  **Read the Case study given below and attempt any 4 sub parts:**    **[4]**
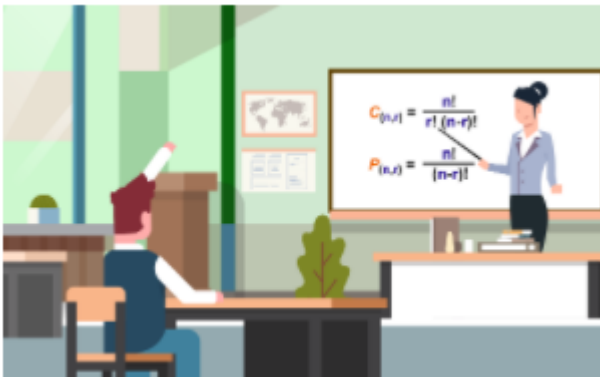


During the math class, a teacher clears the concept of permutation and combination to the 11th standard students. After the class was over she asks the students some questions, one of the question was: how many numbers between 99 and 1000 (both excluding) can be formed such that:

i. every digit is either 3 or 7.

    a. 8 ways

    b. 2 ways

    c. 27ways

    d. 16 ways

ii. there is no restriction.

    a. 1000 ways

    b. 900 ways

    c. 800 ways

    d. 700 ways

iii. no digit is repeated.

    a. 684 ways

    b. 600 ways

    c. 648 ways

    d. 729 ways

iv. the digit in hundred's place is 7.

    a. 70 ways

    b. 80 ways

    c. 90 ways

    d. 100 ways

v. at least one of the digits is 7.

    a. 252 ways

    b. 525 ways

    c. 200 ways

    d. 500 ways

8. **Read the Case study given below and attempt any 4 sub parts:**
A restaurant offers 5 choices of appetizer, 10 choices of the main meal, and 4 choices of dessert. A customer can choose to eat just one course, or two different courses, or all the three courses. Assuming all choices are available.

Using the above information answer the following questions:

i. If the customer eats a 1-course meal, the number of ways of doing this is:

    1. 200

    2. 110

    3. 19

    4. 120

ii. If the customer has a 2-course meal, the number of ways of doing this is:

    a. 38

    b. 110

    c. 200

    d. 329

iii. If the customer has a 3-course meal, the number of combinations is:

    a. 200

    b. 57

    c. 110

    d. 300

iv. How many different possible meals do the restaurant offer i.e.The number of possible meals is:

    a. 329

    b. 310

    c. 200

    d. 300

v. A person who eats an appetizer and the main meal has:

    a. 50 choices.

b. 60 choices

c. 20 choices

d. 40 choices

9. **Read the Case study given below and attempt any 4 subparts:**

One evening, four friends decided to play a card game Rummy. Rummy is a card game that is played with decks of cards. To win the rummy game a player must make a valid declaration by picking and discarding cards from the two piles given. One pile is a closed deck, where a player is unable to see the card that he is picking, while the other is an open deck that is formed by the cards discarded by the players. To win at a rummy card game, the players have to group cards invalid sequences and sets.

In rummy, the cards rank low to high starting with Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, and King. Ace, Jack, Queen, and King each have 10 points. The remaining cards have a value equal to their face value. For example, 5 cards will have 5 points, and so on.



Four cards are drawn from a pack of 52 playing cards, then:

i. How many different ways can this is done

a. $\dfrac{52!}{4!48!}$

b. $\dfrac{48!}{4!52!}$

c. $\dfrac{52!4!}{48!}$

d. $\dfrac{48!4!}{52!}$

ii. exactly one card of each suit

a. 13 ways.

b. $(13)^4$ ways

c. $(13)^2$ ways.

d. (d) $13_{C_1}$

iii. all cards of the same suit

a. 2060 ways.

b. 2800 ways.

c. 2860 ways.

d. 2000 ways.

iv. all club cards

a. 751 ways.

b. 175 ways.

c. 517 ways.

d. 715 ways.

v. The value of P(n, n – 1) is

a. n

b. 2n

c. n!

d. 2n!

vi. If  If $^nP_r$ = 3024 and $^nC_r$ = 126 then find n and r.

    a.  9, 4

    b. 10, 3

    c. 12, 4

    d. 11, 4

10. **Read the Case study given below and attempt any 4 subparts:** [4]

A locker in a bank has 3 digit lock. Each place's digits may vary fro 0 to 9. Mahesh has a locker in the bank where he can put all his property papers and important documents. Once he needs one of the document but he forgot his password and was trying all possible combinations.



Read the above information and answer the following questions:

i. He took 6 seconds for each try. How much time will be needed by Mahesh to try all the combinations:

    a. 90 minutes

    b. 120 minutes

    c. 60 minutes

    d. 100 minutes

ii. How many permutations of 3 different digits are there, chosen from the ten digits 0 to 9 inclusive:

    a. 84

    b. 120

    c. 504

    d. 720

iii. The total number of 9-digit numbers that have all different digits is:

    a. 10!

    b. 9!

    c. $9 \times 9!$

    d. $10 \times 10!$

iv. A bank has 6 digit account number with no repetition of digits within an account number. The first and last digit of the account numbers is fixed to be 4 and 7. How many such account numbers are possible:

a. 10080

b. 5040

c. 890

d. 1680

v. If $^nC_{12}$ = $^nC_8$, then n is equal to:

a. 20

b. 12

c. 6

d. 30

11. **Read the Case study given below and attempt any 4 subparts:** [4]

A farmer, Ramgarh, took a bank loan from SBI for repairing his house. But he could not pay the amount on time.

This resulted in the accumulation of interest and the amount to pay reached Rs.1,00,000.

After a few months, the farmer opened a shop that resulted in enough income and the income increased on a regular basis. So he decided to pay the bank loan in a different manner.

The farmer visited the bank. He made an agreement with the bank that he will start paying the amount of Rs.1,00,000 without interest from Jan 2020. In January he will pay Rs.5000 and will increase the payment by Rs. 100 in each month, as shown in the figure.



Now answer the following questions:

i. In how many months will the farmer clear the loan amount?

a. 16

b. 15

c. 18

d. 20

ii. How much amount he has to pay in last month in rupees?

a. 1400

b. 1500

c. 1800

d. 2000

iii. In which month he will pay Rs.6000?

a. 14th

b. 10th

c. 12th

d. 11th

iv. How much amount he will pay in 10th month in Rs.?

a. 6000

b. 6400

c. 7500

d. 7000

v. How much amount in rupees till 10th month he will have paid?

a. 54500

b. 50000

c. 55000

d. 60000

12. **Read the Case study given below and attempt any 4 subparts:** [4]

On the roof of Monesh's house, a water tank of capacity 9000 litres is installed. A water pump fills the tank, the pump uses water from the municipality water supply, In the beginning, the water flow of the pump remains 100 litres/hour for the first hour.

The water flow from the pump is 1.25th after each 1 hour.

Once Monesh's mother was not at home and told him to switch off the pump when the tank is almost full.

He calculated that after how many hours should he stop the pump so water does not get overflow in the next one hour.



Water inlet

**Now answer the following questions:**

i. After how many hours Monesh should stop the pump so that in the next hour the tank does not get overflow?

a. 15 hours

b. 14 hours

c. 16 hours

d. 13 hours

ii. After 10 hours how much water was filled in the tank?

a. 3000 Liters

b. 3300 Liters

c. 3200 Liters

d. 3325.29 Liters

iii. In 7th hour how much water was filled in the tank?

    a. 400 Liters

    b. 381.47 Liters

    c. 375.25 Liters

    d. 450 Liters

iv. What was the water flow in 5th hour?

    a. 244.14 Liters/hr

    b. 250 Liters/hr

    c. 300 Liters/hr

    d. 400 Liters/hr

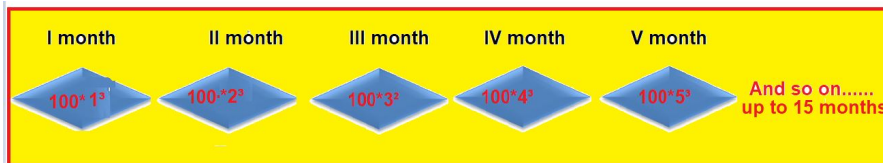v. After 15 hours how much water would have filled in the tank?

    a. 11235.32 Liters

    b. 10025.47 Liters

    c. 10968.68 Liters

    d. 11968.68 Liters

13. **Read the Case study given below and attempt any 4 sub parts:**     **[4]**

Ratan wants to open an RD for the marriage of his daughter, He visited the branch of SBI at sector 3, Gurgaon.

There he made an agreement with the bank.



According to this agreement, he would deposit Rs 100 $\times$ n² every month ( here n =1 to 15).

Other terms and conditions are as follows:

  I. He has to pay a minimum of six instalments.

  II. If he continues the deposit up to 15 months then the bank will pay 20% extra as a bonus.

 III. If he breaks the deposit after 6 months then the bank will pay 10% extra as a bonus

 IV. If he breaks the deposit after 10 months then the bank will pay 15% extra as a bonus.

  V. No other interest will be paid by the bank.

**Answer the following questions:**

  i. How much amount would be accumulated after 15 months?

    a. Rs 14,40,000

    b. Rs 11,02,500

    c. Rs 10,00,000

    d. Rs 15,00,000

 ii. How much total amount would Ratan get after 15 months?

    a. Rs 14,40,000

    b. Rs 17,28,000

    c. Rs 13,23,000

    d. Rs 15,00,000

iii. How much total amount would Ratan get if he breaks the deposit after 10 months?

    a. Rs 3,45,875

    b. Rs 3,50,000

    c. Rs 3,23,000

    d. Rs 3,47,875

iv. How much total amount would Ratan get if he breaks the deposit after 6 months?

    a. Rs 65,875

    b. Rs 50,000

    c. Rs 50,715

    d. Rs 60,000

v. How much amount did Ratan pay in the 10th month?

    a. Rs 1,00,000

    b. Rs 729,000

    c. Rs 50,715

    d. Rs 60,000

14. **Read the Case study given below and attempt any 4 sub parts:**     **[4]**

Father of Ashok is a builder, He planned a 12 story building in Gurgaon sector 5. For this, he bought a plot of 500 square yards at the rate of Rs 1000 /yard². The builder planned ground floor of 5 m height, first floor of 4.75 m and so on each floor is 0.25 m less than its previous floor.



**Now Answer the following questions:**

i. What is the height of the last floor?

    a. 2.5 m

    b. 2.75 m

    c. 2.25 m

    d. 3 m

ii. Which floor no is of 3 m height?

    a. 5

    b. 7

    c. 10

    d. 9

iii. What is the total height of the building?

a. 40 m

b. 43.5

c. 40.5 m

d. 44 m

iv. Up to which floor the height is 33 m?

a. 8

b. 7

c. 10

d. 9

v. Which floor no. is half in height of ground floor?

a. 10

b. 9

c. 12

d. 11

15. **Read the Case study given below and attempt any 4 sub parts:** **[4]**

One morning a big circus arrived in the Ramleela maidan at Delhi. The arrival of the circus was seen in the morning at 08:00 AM by Gopal. He passed this information on 08:15 to 2 other residents of the city.

Each of these 2 people then informed the other 2 residents at 08:30, and again at 08:45, they reported the arrival of the circus every 2 to other uninformed residents

This chain continued the same way till 12:00 PM. By 12:00 PM enough people were informed about the arrival of the circus.



**Answer the following equations:**

i. By 12:00 PM total how many people were informed about the arrival of the circus?

a. 131000

b. 131017

c. 141000

d. 65536

ii. By 10:00 AM total how many people were informed about the arrival of the circus?

a. 511

b. 256

c. 300

d. 500

iii. From 10:00 AM to 11:00 AM how many people were informed about the circus?

a. 8000

b. 7000

c. 7680

d. 7936

iv. What are the three terms between 16 and 256?

a. 64,32,128

b. 16,32,256

c. 32,64,128

d. 16,32,64

v. At 10:30 AM how many people were informed about the circus?

a. 512

b. 1024

c. 2048

d. 2047

16. **Read the Case study given below and attempt any 4 sub parts:** [4]

Neeraj's house is 1 km in the east of origin(0,0), While going to the school first he takes auto till hospital at B(4,4). From the hospital(4,4) to church (4,8) he travels by city bus. From Church C(4,8) he rides in a metro train and he reaches the school at D(-5,8). All the units are in km.
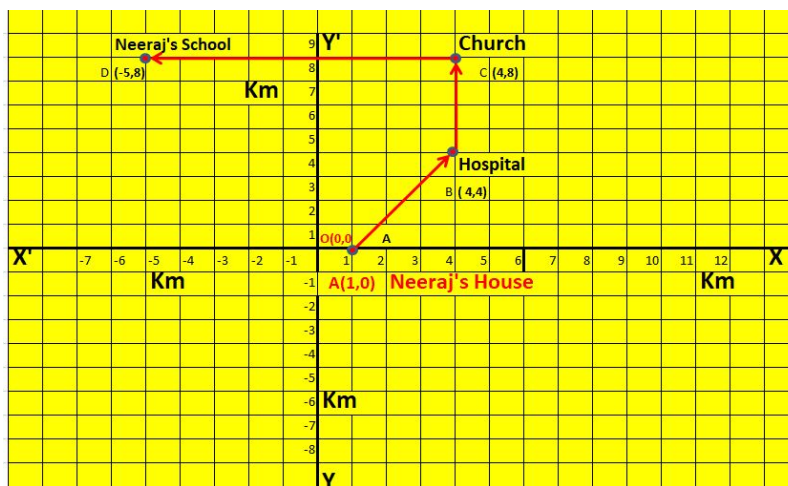


**Now answer the following questions:**

i. What is the slope of Neeraj's journey from home to Hospital?

a. $\frac{3}{4}$

b. $\frac{4}{3}$

c. $\frac{4}{5}$

d. $\frac{5}{4}$

ii. What is the distance of School from Hospital?

a. $\sqrt{97}$ km

b. 10 km

c. √145 km

   d. 12 km

iii. What is the equation of the straight line joining the points A and D?

   a. 4x - 3y = 4 km

   b. 5x + 4y = 10

   c. 4x + 3y = 4

   d. 6x + 7y = -15

iv. What is the equation of the straight line joining church and hospital?

   a. y = 4 km

   b. 5x + 4y = 10

   c. x = -4

   d. x = 4

 v. What is the equation of the straight line joining the points A (House) and C (church)?

   a. 4x - 3y = 4 km

   b. 8x - 3y = 8

   c. 4x + 3y = 4

   d. 6x + 7y = -15

17.  **Read the Case study given below and attempt any 4 sub parts:**                                **[4]**

A surveyor was measuring the width of a river. For this, he selected a tree at Y on the other side of the river. He is standing at Point O(0,0). From O he walks 50 m in the right direction, at point B he fixes a stick. From B in the right side at distance 20 m at C fixes a stick. Now from C, he walks perpendicular to line OC. Further, he fixes a stick D so the stick D, B and the tree are in the same straight line approximately. He finds that CD = 30m.

We assume that OC is the x-axis and OY is the y-axis.
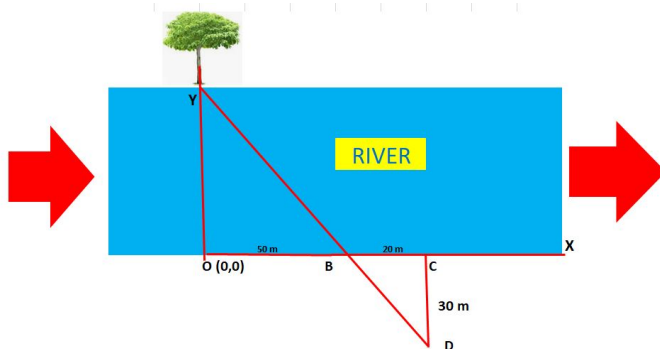


**Now answer the following questions:**

 i. What are the coordinates of point D?

   a. (50, 30)

   b. (70, -30)

   c. (50, 20)

   d. (70, 30)

ii. What are the coordinates of point C?

   a. (0, 500)

   b. (0, -70)

   c. (0, 70)

d. (70, 30)

iii. What is the width of the river?

    a. 75 m

    b. 50 m

    c. 200 m

    d. 300 m

iv. What are the coordinates of point Y?

    a. (0, 100)

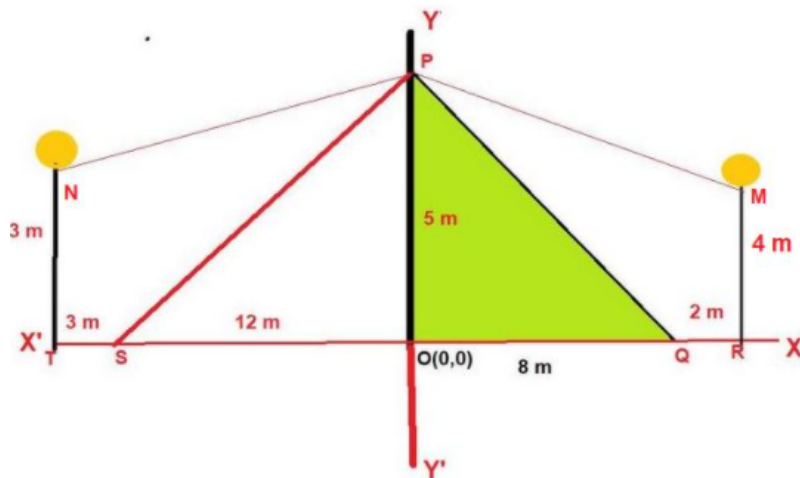    b. (0 ,-70)

    c. (75, 0)

    d. (0, 75)

v. What is the equation of straight line BD?

    a. $3x + 2y = 150$

    b. $3x + 2y = 100$

    c. $5x + 2y = 150$

    d. $5x - 3y = 150$

18. **Read the Case study given below and attempt any 4 subparts:**     **[4]**

In a colony, as shown in the following picture, an electric pole has been installed. The pole has been tied by strong wire PQ to support this pole, some electricians were working on the staircase PS.



In the left and right side of the pole, two street lights are fixed at a height of 3m and 4m respectively. These lights are given supply by wires PM and PN. The height OP=5 m and O is the origin.

**Now answer the following questions:**

i. What are the coordinates of point P?

    a. (5, 0)

    b. (0, 5)

    c. (0, -5)

    d. (0, 10)

ii. What is the length of the staircase?

    a. 12 m

b. 15 m

c. 13m

d. 20 m

iii. What is the area of the ΔOPQ?

    a. 12 m²

    b. 15 m²

    c. 13m²

    d. 20 m²

iv. What is the equation of line PN?

    a. x + 15y = -75
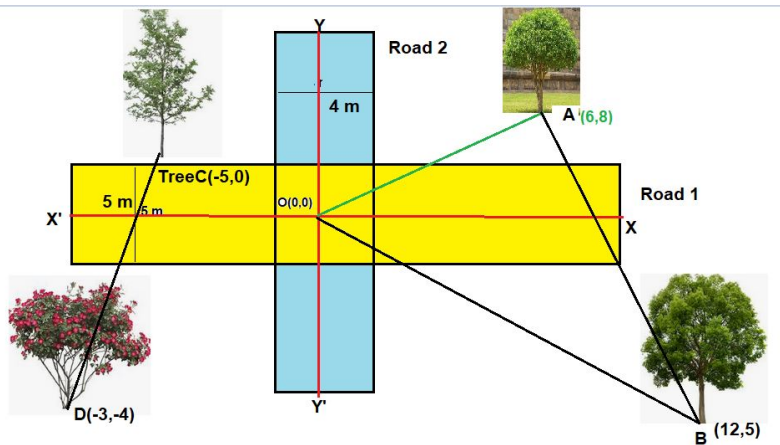
    b. 15x - 2y + 6 = 0

    c. x + 5y = 50

    d. x - 5y = 20

v. What is the length of wire PM?

    a. √101

    b. √26 m

    c. 26 m

    d. 25 m

19. **Read the Case study given below and attempt any 4 sub parts:**     **[4]**

In a park Road 1 and road 2 of width 5 m and 4 m are crossing at centre point O(0, 0). As shown in the following figure:



For trees A, B, C and D are situated in four quadrants of the Cartesian system of coordinate. The coordinates of the trees A, B, C and D are (6, 8), (12, 5), (-5, 0) and (-3, 4) respectively.

Now answer the following questions:

i. What is the distance of Tree C from the Origin?

    a. 5 m

    b. 10 m

    c. 15 m

    d. 25 m

ii. What is the equation of line AB?

    a. 2x + y = 22

    b. x - 2y = -6

c. x + 2y - 22 = 0

d. x + 2y = 6

iii. What is the slope of line CD?

   a. $\frac{2}{1}$

   b. $\frac{1}{2}$

   c. $\frac{-1}{2}$

   d. $\frac{3}{2}$

iv. What is the slope of line OA?

   a. $\frac{3}{4}$

   b. 1

   c. $\frac{4}{3}$

   d. $\frac{6}{8}$

v. What is the distance of point B from the origin?

   a. 13 m

   b. 15 m

   c. 12 m

   d. 5 m

20. **Read the Case study given below and attempt any 4 sub parts:**     **[4]**

villages of Shanu and Arun's are 50km apart and are situated on Delhi Agra highway as shown in the following picture. Another highway YY' crosses Agra Delhi highway at O(0,0). A small local road PQ crosses both the highways at pints A and B such that OA=10 km and OB =12 km. Also, the villages of Barun and Jeetu are on the smaller high way YY'. Barun's village B is 12km from O and that of Jeetu is 15 km from O.
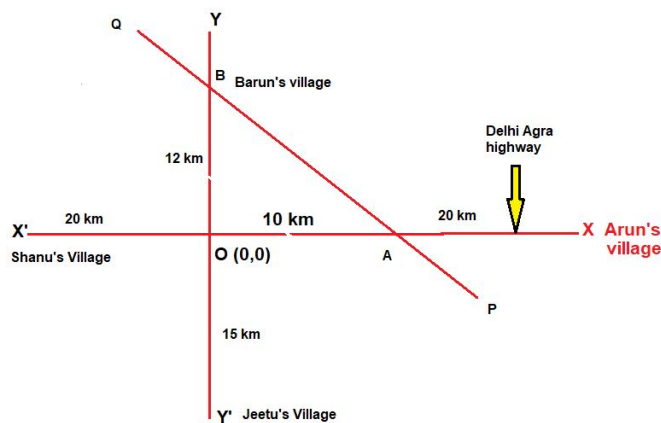


**Now answer the following questions:**

i. What are the coordinates of A?

   a. (10, 0)

   b. (10, 12)

   c. (0,10)

   d. (0,15)

ii. What is the equation of line AB?

   a. 5x + 6y = 60

   b. 6x + 5y = 60

c. x = 10

d. y = 12

iii. What is the distance of AB from O(0, 0)?

    a. 60 km

    b. 60/√61 km

    c. √61 km

    d. 60 km

iv. What is the slope of line AB?

    a. 6/5

    b. 5/6

    c. -6/5

    d. 10/12

v. What is the length of line AB?

    a. √61 km

    b. 12 km

    c. 10 km

    d. 2√ 61 km