# BYJU'S Home Learning Program

Topic covered:

- **Mathematical Tools (Session - 1) - NEET**

Daily Practice Problems

1. If a man travels 10 km towards north, after that he turns towards east and travels 5 km and again he turns toward south and travels 3 km, then what is the coordinate of man with respect to its initial position.

2. For a quadratic equation $ax^2 + bx + c = 0$, if sum of root is - 1 and product of root is 1, then which of the following hold true?
   a. $a^2 = bc$
   b. $b^2 = ac$
   c. $c^2 = ab$
   d. $abc = 1$

3. In the quadratic equation, $pqx^2 - (p^2 + q^2)x + pq = 0$, then find the value of x.

4. The inclination of the line x − y + 3 = 0 with the positive direction of x-axis is
   a. 45°
   b. 135°
   c. − 45°
   d. −135°

5. Variation of velocity with time of particle is straight line as shown below. Find the slope of this straight line
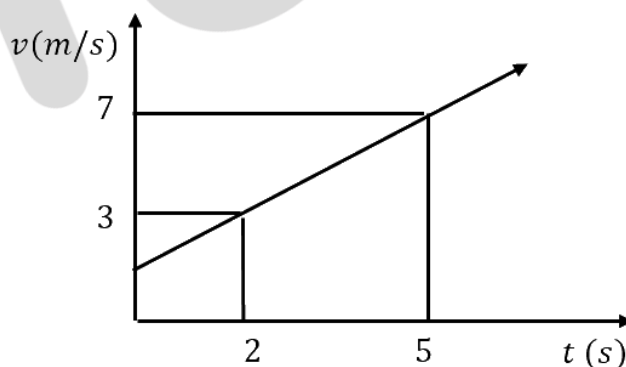
6. Given two points, P = (0, −1) and Q = (4,1) on the line, find the equation of the line.

7. An inclined plane rises 1 in 10. If length of the inclined plane is 5 m, find the height of the raised end above the horizontal.

8. If a particle moves with velocity $v(t) = 2t^2 - t\ m/s$, then find the velocity of particle at t=3 s.

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9. An expression is given by $\alpha = \frac{\theta}{t^2}$, find α in rad/s^2 if an angle of $600°$ is covered in 10 second ?

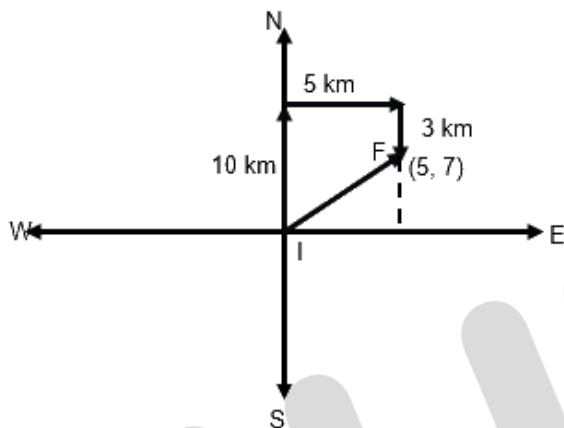10. What will be the value of z, if $(z - 2)^2 - 36 = 0$.

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Answer Key

Question Number	1	2	3	4	5
Answer Key	$(5, 7)$	(a)	$x = \dfrac{p}{q}$ and $\dfrac{q}{p}$	(a)	1.33

Question Number	6	7	8	9	10
Answer Key	$y = \dfrac{1}{2}x - 1$	$\dfrac{5}{\sqrt{101}}\, m$	$15\ m/s$	$\dfrac{\pi}{30}$	8 or -4

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Solutions

1. $(5, 7)$

2. (a)

   Quadratic equation $ax^2 + bx + c = 0$

   Sum of roots, $-\dfrac{b}{a} = 1 \Rightarrow b = -a$

   Product of roots $\dfrac{c}{a} = 1 \Rightarrow c = a$

   On comparing, we get $a^2 = bc$

3. In the given equation a $= pq, b = -(p2 + q2), c = pq$

   Finding the roots using formula x$= \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

   Substituting and simplifying we get x$= \dfrac{p}{q}$ and $\dfrac{q}{p}$

4. (a)

   The equation of the line $x - y + 3 = 0$ can be rewritten as

   $y = x + 3 \Rightarrow m = \tan\theta = 1$ and hence $\theta = 45°$.

5. (1.33)

   $t_1 = 2\,s,\ t_2 = 5\,s$

   $v_1 = 3\,m/s,\ v_2 = 7\,m/s$

   $$slope = \frac{(v_2 - v_1)}{(t_2 - t_1)} = \frac{(7 - 3)}{(5 - 2)} = \frac{4}{3} = 1.33$$

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6. Slope $=\frac{y_2-y_1}{x_2-x_1}=\frac{1}{2}=m$

    Substitute $m=\frac{1}{2}$, into the equation, y $=$ mx $+$ b, to get the equation $y=\frac{1}{2}x+b$

    Select one of the given points, for example $(4, 1)$, and substitute the x and y values into

    the equation $y=\frac{1}{2}x+b$

    We, then, get that b $=-1$, which is the y-intercept.

    Substitute b $=-1$ to get the equation.

    $$y=\frac{1}{2}x-1$$

7.

    Let h be the horizontal raise

    $\tan\theta=\frac{1}{10}$

    $\sin\theta=\frac{1}{\sqrt{10^2+1^2}}=\frac{1}{\sqrt{101}}=\frac{h}{5}$

    Therefore, h $=\frac{5}{\sqrt{101}}\ m$

8. $v(t)=2t^2-t$

    t = 3 s

    $v(3)=2\times(3)^2-(3)=15\dfrac{m}{s}$

9. Given $\alpha=\frac{\theta}{t^2}$

    Angle covered $=600°$

    Time duration $(t)=10\ sec$

    Since, $180°=\pi\ radian$

    So, $600°=600^0\frac{\pi}{180}=\frac{10\pi}{3}\ radian$

    $$\alpha=\frac{\theta}{t^2}=\frac{10\pi}{300}=\frac{\pi}{30}\ rad/s^2$$

10. $(z-2)^2-36=0$

    $(z-2)^2=36$

    $(z-2)=\pm6$

    z= 2+6 or 2−6

    z= 8 or −4