

Revision

1. For what values of m and n is the sum of vectors $\vec{u} + \vec{v}$ equal to $[-1, 2]$, given that $\vec{u} = [2m - 1, n + 1]$ and $\vec{v} = [n + 2, m - 3]$.
2. Find the magnitude (length) of the vector $\vec{u} - \vec{v}$, where $\vec{u} = [0, 4]$ and $\vec{v} = [-1, -4]$.
3. Show that the triangle ABC , with $A(2, 1), B(4, 0), C(5, 7)$ is a right triangle. Find its area.
4. Show that the triangle ABC , with $A(-2, -3), B(7, 4), C(-1, 5)$ is isosceles. Find its area.
5. Consider a square $ABCD$ with $A(-1, 5), C(7, 11)$.
 - (a) Find the point of intersection of the diagonals of this square.
 - (b) Find the area of the square.
6. Given a triangle ABC with $A(4, 0), B(2, 4), C(-2, -2)$, find the length of all the sides and all the medians of this triangle.
7. Given points $A(-1, 6)$ and $B(3, 1)$, find point S such that $|AS| : |SB| = 1 : 2$ and point P such that $|AP| : |PB| = 3 : 11$.
8. Let $f(x) = 2x^2 + \sqrt{x} - 3$. The graph of f has been translated by a vector $[-1, 3]$ and then reflected in the y -axis to form the graph of $g(x)$. Write down the equation of $g(x)$.
9. Consider a function $f(x)$, such that $D_f = [-1, 4]$ and $R_f = [-2, 7]$. Let $g(x) = -f(-x - 1) - 1$.
 - (a) Write down the domain and range of $g(x)$.

Given that $f(0) = 1, f(1) = 2, f(3) = -1$

 - (b) find $g(-2)$,
 - (c) solve $g(x) = 0$.
10. Solve the equation:

$$\sqrt{\frac{x}{2}} = \left| x - \frac{9}{2} \right| - \frac{3}{2}$$

11. Find the number of solution to the equation:

$$|x - 3| = m \times |x|$$

depending on the parameter m , $m \in \mathbb{R}$.

12. Find the number of solution to the equation:

$$\left| |x - 1| - 2 \right| - 1 = m$$

depending on the parameter m , $m \in \mathbb{R}$. Sketch the function, $g(m)$, denoting the number of solutions to the above equation.

13. Solve the inequality:

$$\sqrt{x + 1} - 2 > x^2 + 2x - 1$$

14. Consider a circle of radius r with two perpendicular chords AB and CD . Show that $|AD|^2 + |BC|^2 = (2r)^2$.

15. One of the angles of the triangle ABC is equal to 120° . Show that if $b - a = c - b$, then $a : b : c = 3 : 5 : 7$.