



1. Find a vector of magnitude 26 in the direction  $5\mathbf{i} + 12\mathbf{j}$ . (2)

---

---

---

2. Find a unit vector in the direction  $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$  (2)

---

---

---

3. Given that  $m = 2\mathbf{i} + \gamma\mathbf{j}$  and  $n = \mu\mathbf{i} - 5\mathbf{j}$ , find the values of  $\gamma$  and  $\mu$  such that  $m + n = 3\mathbf{i} - \mathbf{j}$  (3)

---

---

---

---

4. Given that  $r = 6\mathbf{i} + c\mathbf{j}$ , where  $c$  is a positive constant, find the value of  $c$  such that,  $|r| = 10$  (3)

---

---

---

---

### Solutions

1.

$ 5\mathbf{i} + 12\mathbf{j}  = \sqrt{25 + 144} = 13$	<b>M1</b>
$\frac{26}{13} (5\mathbf{i} + 12\mathbf{j}) = 10\mathbf{i} + 24\mathbf{j}$	<b>M1</b>

2.

$\left  \binom{4}{3} \right  = \sqrt{16 + 9} = 5$	<b>M1</b>
$\frac{1}{5} \binom{4}{3}$	<b>M1</b>

3.

$(2\mathbf{i} + \gamma\mathbf{j}) + (\mu\mathbf{i} - 5\mathbf{j}) = 3\mathbf{i} - \mathbf{j}$	<b>M1</b>
$\gamma - 5 = -1$ $\gamma = 4$	<b>M1</b>
$2 + \mu = 3$ $\mu = 1$	<b>M1</b>

4.

$36 + c^2 = 10^2 = 100$	<b>M1</b>
$c^2 = 64$	<b>M1</b>
$c > 0$ , therefore $c = 8$	<b>M1</b>

