

Summer Assignment Test 2 Version O

1. A particle P is projected with velocity $(3u\mathbf{i} + 4u\mathbf{j}) \text{ ms}^{-1}$ from a fixed point O on horizontal ground. P strikes the ground at a point 750 m from O.

- Find u
- Calculate the greatest height above the ground reached by P
- Find the angle that the direction of motion of P makes with \mathbf{i} when $t=5$

2. Integrate the following functions

(a) $\int \sin 4x \, dx$ (b) $\int (3x + 2)^5 \, dx$ (c) $\int \cos(x + 2) \, dx$

3. The vectors \mathbf{a} , \mathbf{b} and \mathbf{c} given as $\mathbf{a} = \begin{pmatrix} 8 \\ 23 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} -15 \\ x \end{pmatrix}$, $\mathbf{c} = \begin{pmatrix} -13 \\ 2 \end{pmatrix}$, where x is an integer. Given that $\mathbf{a} + \mathbf{b}$ is parallel to $\mathbf{b} - \mathbf{c}$, find the value of x .

Summer Assignment Test 2 Version P

1. A particle P is projected with velocity $(6u\mathbf{i} + 8u\mathbf{j}) \text{ ms}^{-1}$ from a fixed point O on horizontal ground. P strikes the ground at a point 750 m from O.

- Find u
- Calculate the greatest height above the ground reached by P
- Find the angle that the direction of motion of P makes with \mathbf{i} when $t=4$

2. Integrate the following functions

(a) $\int \sin 5x \, dx$ (b) $\int (3x - 2)^5 \, dx$ (c) $\int \sin(x + 2) \, dx$

3. The vectors \mathbf{a} , \mathbf{b} and \mathbf{c} given as $\mathbf{a} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 3 \\ x \end{pmatrix}$, $\mathbf{c} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$, where x is an integer. Given that $\mathbf{a} + \mathbf{b}$ is parallel to $\mathbf{b} - \mathbf{c}$, find the value of x .

Summer Assignment Test 2 Version Q

1. A particle P is projected with velocity $(u\mathbf{i} + 8u\mathbf{j}) \text{ ms}^{-1}$ from a fixed point O on horizontal ground. P strikes the ground at a point 500 m from O.

a) Find u

b) Calculate the greatest height above the ground reached by P

c) Find the angle that the direction of motion of P makes with \mathbf{i} when $t=12$

2. Integrate the following functions

(a) $\int \sin 9x \, dx$ (b) $\int (3x + 2)^9 dx$ (c) $\int 3\cos(x + 2) \, dx$

3. The vectors \mathbf{a} , \mathbf{b} and \mathbf{c} given as $\mathbf{a} = \begin{pmatrix} 9 \\ 12 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} -1 \\ x \end{pmatrix}$, $\mathbf{c} = \begin{pmatrix} -13 \\ 2 \end{pmatrix}$, where x is an integer. Given that $\mathbf{a} + \mathbf{b}$ is parallel to $\mathbf{b} - \mathbf{c}$, find the value of x .

Summer Assignment Test 2 Version R

1. A particle P is projected with velocity $(9u\mathbf{i} + 10u\mathbf{j}) \text{ ms}^{-1}$ from a fixed point O on horizontal ground. P strikes the ground at a point 900 m from O.

a) Find u

b) Calculate the greatest height above the ground reached by P

c) Find the angle that the direction of motion of P makes with \mathbf{i} when $t=2$

2. Integrate the following functions

(a) $\int \sin ax \, dx$ (b) $\int (3x + 2)^n dx$ (c) $\int p\cos(x + q) \, dx$

3. The vectors \mathbf{a} , \mathbf{b} and \mathbf{c} given as $\mathbf{a} = \begin{pmatrix} 31 \\ 25 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 2 \\ x \end{pmatrix}$, $\mathbf{c} = \begin{pmatrix} -40 \\ 8 \end{pmatrix}$, where x is an integer. Given that $\mathbf{a} + \mathbf{b}$ is parallel to $\mathbf{b} - \mathbf{c}$, find the value of x .

Answers

Version O

1. a) 17.5
 - b) 250 m
 - c) 22
2. a) $-\frac{1}{4}\cos 4x + c$
 - b) $\frac{1}{18}(3x + 2)^6$
 - c) $\sin(x + 2) + c$
3. 12

Version P

1. a) 8.75
 - b) 250 m
 - c) 30
2. a) $-\frac{1}{5}\cos 5x + c$
 - b) $\frac{1}{18}(3x - 2)^6$
 - c) $-\cos(x + 2) + c$
3. 4

Version Q

1. a) 17.5
 - b) 1000 m
 - c) 52
2. a) $-\frac{1}{9}\cos 9x + c$
 - b) $\frac{1}{30}(3x + 2)^{10}$
 - c) $3\sin(x + 2) + c$
3. -40

Version R

1. a) 7
 - b) 250 m
 - c) 39
2. a) $-\frac{1}{a}\cos ax + c$
 - b) $\frac{1}{3(n+1)}(3x + 2)^{n+1}$
 - c) $p\sin(x + q) + c$
3. 146