

# CLASSIFIED

International Examinations Papers

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## **MODULAR MATHEMATICS/CORE-1 TOPIC-Algebra & Functions**

1. (a) Write down the value of  $8^{\frac{1}{3}}$ .

(1)

(b) Find the value of  $8^{-\frac{2}{3}}$ .

(2)



(Total 3 marks)

Q1



1. (a) Write down the value of  $16^{\frac{1}{2}}$ .

(1)

(b) Find the value of  $16^{-\frac{3}{2}}$ .

(2)

Ja-05

Ja-5



(Total 3 marks)

Q1

2. (a) Write down the value of  $16^{\frac{1}{4}}$ .

(1)

(b) Simplify  $(16x^{12})^{\frac{3}{4}}$ ;

Ja-08

(2)



Q2

(Total 3 marks)



2. (a) Find the value of  $8^{\frac{4}{3}}$ .

(2)

(b) Simplify  $\frac{15x^{\frac{4}{3}}}{3x}$ .

*JN-7*

(2)



Q2

(Total 4 marks)



1. Find the value of

(a)  $25^{\frac{1}{2}}$

7-11

(1)

(b)  $25^{-\frac{3}{2}}$

(2)



7-11

Q1

(Total 3 marks)



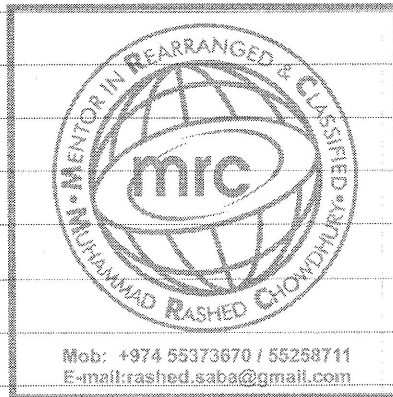
2. (a) Evaluate  $(32)^{\frac{3}{5}}$ , giving your answer as an integer.

7a-12

(2)

(b) Simplify fully  $\left(\frac{25x^4}{4}\right)^{-\frac{1}{2}}$

(2)



Q2

(Total 4 marks)



2. (a) Write down the value of  $32^{\frac{1}{5}}$

(1)

(b) Simplify fully  $(32x^5)^{-\frac{2}{5}}$

*7x-14*

(3)

Q2

(Total 4 marks)





3. (a) Find the value of  $8^{\frac{5}{3}}$

7-13

(2)

(b) Simplify fully  $\frac{(2x^{\frac{1}{2}})^3}{4x^2}$

(3)



1. (a) Find the value of  $16^{\frac{1}{4}}$

(2)

(b) Simplify  $x(2x^{\frac{1}{4}})^4$

(2)

Ja-11



Ja-11

Q1

(Total 4 marks)



1. (a) Write down the value of  $125^{\frac{1}{3}}$ . (1)

(b) Find the value of  $125^{-\frac{2}{3}}$ . (2)

Ja-09



Ja-09

Q1

(Total 3 marks)



2. Given that  $32\sqrt{2} = 2^a$ , find the value of  $a$ .

7-9

(3)



Q2

(Total 3 marks)





2. Express  $9^{3x+1}$  in the form  $3^y$ , giving  $y$  in the form  $ax + b$ , where  $a$  and  $b$  are constants.

*Jw-16* (2)

Lined area for student response.

Q2

(Total 2 marks)



7. Given that  $y = 2^x$ ,

(a) express  $4^x$  in terms of  $y$ .

(1)

(b) Hence, or otherwise, solve

$7x - 15$

$$8(4^x) - 9(2^x) + 1 = 0$$

(4)



1. Write

$$\sqrt{75} - \sqrt{27}$$

Jan-90

in the form  $k\sqrt{x}$ , where  $k$  and  $x$  are integers.

(2)

2-10



Q1

(Total 2 marks)







2. (a) Expand and simplify  $(7 + \sqrt{5})(3 - \sqrt{5})$ . (3)

(b) Express  $\frac{7 + \sqrt{5}}{3 + \sqrt{5}}$  in the form  $a + b\sqrt{5}$ , where  $a$  and  $b$  are integers. (3)

*7a - 10*



Q2

(Total 6 marks)



5. (a) Write  $\sqrt{45}$  in the form  $a\sqrt{5}$ , where  $a$  is an integer.

(1)

(b) Express  $\frac{2(3+\sqrt{5})}{(3-\sqrt{5})}$  in the form  $b + c\sqrt{5}$ , where  $b$  and  $c$  are integers.

Ja-06

(5)



2. (a) Express  $\sqrt{108}$  in the form  $a\sqrt{3}$ , where  $a$  is an integer.

(1)

(b) Express  $(2 - \sqrt{3})^2$  in the form  $b + c\sqrt{3}$ , where  $b$  and  $c$  are integers to be found.

(3)

Ja-07



(Total 4 marks)

Q2

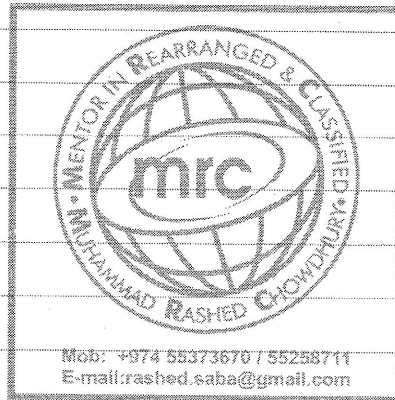


3. Simplify

$$\frac{5-\sqrt{3}}{2+\sqrt{3}}$$

giving your answer in the form  $a + b\sqrt{3}$ , where  $a$  and  $b$  are integers.

2-08 (4)



Q3

(Total 4 marks)



3. Simplify

$$\frac{5-2\sqrt{3}}{\sqrt{3}-1}$$

giving your answer in the form  $p+q\sqrt{3}$ , where  $p$  and  $q$  are rational numbers.

(4)

*Jan-11*



2. (a) Simplify

$$\sqrt{32} + \sqrt{18}$$

giving your answer in the form  $a\sqrt{2}$ , where  $a$  is an integer.

(2)

(b) Simplify

$$\frac{\sqrt{32} + \sqrt{18}}{3 + \sqrt{2}}$$

giving your answer in the form  $b\sqrt{2} + c$ , where  $b$  and  $c$  are integers.

(4)

Ja-12



3. (i) Express

$$(5 - \sqrt{8})(1 + \sqrt{2})$$

in the form  $a + b\sqrt{2}$ , where  $a$  and  $b$  are integers.

(3)

(ii) Express

$$\sqrt{80} + \frac{30}{\sqrt{5}}$$

in the form  $c\sqrt{5}$ , where  $c$  is an integer.

(3)

*7-13*

Handwritten solution area with horizontal lines for working.





3. Show that  $\frac{2}{\sqrt{12}-\sqrt{8}}$  can be written in the form  $\sqrt{a} + \sqrt{b}$ , where  $a$  and  $b$  are integers. (5)

JN-12





1. Simplify

(a)  $(2\sqrt{5})^2$  (1)

(b)  $\frac{\sqrt{2}}{2\sqrt{5} + 3\sqrt{2}}$  giving your answer in the form  $a + \sqrt{b}$ , where  $a$  and  $b$  are integers. (4)

JN-15

JN-15





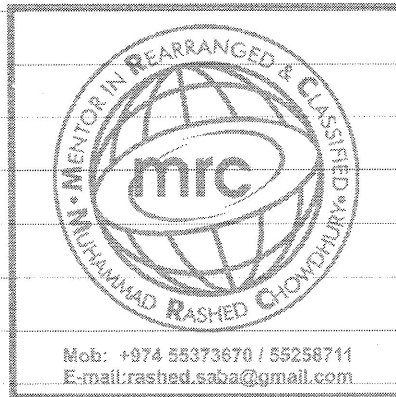
6. (a) Expand and simplify  $(4 + \sqrt{3})(4 - \sqrt{3})$ .

(2)

(b) Express  $\frac{26}{4 + \sqrt{3}}$  in the form  $a + b\sqrt{3}$ , where  $a$  and  $b$  are integers.

$\sqrt{3}-6$

(2)



1. Simplify

(a)  $(3\sqrt{7})^2$

(1)

(b)  $(8+\sqrt{5})(2-\sqrt{5})$

(3)

*JN-9*



*JN-9*

Q1

(Total 4 marks)



3. Expand and simplify  $(\sqrt{7} + 2)(\sqrt{7} - 2)$ .

(2)

7a-09



Q3

(Total 2 marks)



1. Simplify  $(3 + \sqrt{5})(3 - \sqrt{5})$ .

JN-7

(2)



JN-7

Q1

(Total 2 marks)





1. Factorise completely  $x - 4x^3$

(3)

Lined area for writing the answer.

27-13

Q1

(Total 3 marks)



2. Factorise completely

$$x^3 - 9x.$$

7-8 (3)



(Total 3 marks)

Q2

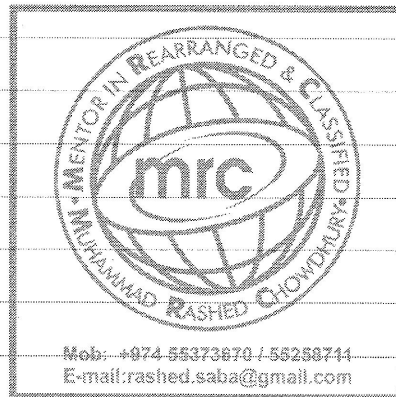


7a-06

1. Factorise completely

$$x^3 - 4x^2 + 3x.$$

(3)



7a-6

Q1

(Total 3 marks)

