CDS 1 2025

LIVE

MATHS

ALGEBRA

CLASS 5

NAVJYOTI SIR

Crack
EXAMS

10 Dec 2024 Live Classes Schedule

8:00AM	10 DEC 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	10 DEC 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

NDA 1 2025 LIVE CLASSES

1:00PM	PHYSICS - SOUND & WAVES MCQ	NAVJYOTI SIR
5:30PM	MATHS - APPLICATIONS OF DERIVATIVES - CLASS 1	NAVJYOTI SIR

CDS 1 2025 LIVE CLASSES

1:00PM	PHYSICS - SOUND & WAVES MCQ	NAVJYOTI SIR
7:00PM	MATHS - ALGEBRA - CLASS 5	NAVJYOTI SIR

Q) If $a^2 = b + c,\ b^2 = c + a,\ c^2 = a + b$, then the value of

$$\frac{1}{1+a} + \frac{1}{b+1} + \frac{1}{1+c}$$

(a) abc (b) $a^2 b^2 c^2$ (c) 1 (d) 0

$a^2 + a = a + b + c$

$a(a+1) = a + b + c$

$a + 1 = \frac{a+b+c}{a}$

$b + 1 = \frac{c+a+b}{b}$

$b + 1 = \frac{a+b+c}{b}$

$c + 1 = \frac{a+b+c}{c}$

$\frac{a}{a+b+c} + \frac{b}{a+b+c} + \frac{c}{a+b+c}$

$\frac{a+b+c}{a+b+c} = 1$

Q) If $a^2 = b + c, b^2 = c + a, c^2 = a + b$, then the value of

$$\frac{1}{1+a} + \frac{1}{b+1} + \frac{1}{1+c}$$

(a) abc (b) $a^2 b^2 c^2$ (c) 1 (d) 0

Ans: (c)

Q) If $a^2 - by - cz = 0$, $ax - b^2 + cz = 0$ and $ax + by - c^2 = 0$, then the value of $\frac{x}{a+x} + \frac{y}{b+y} + \frac{z}{c+z}$ will be

(a) $a+b+c$ (b) 3
(c) 1 (d) 0

$a^2 - by - cz = 0$ — (1)

$ax - b^2 + cz = 0$ — (2)

$ax + by - c^2 = 0$ — (3)

(1) + (3),

$a(a+x) - c^2 - cz = 0$

$a+x = \frac{c^2+cz}{a}$

(3) − (2),

$by + b^2 - c^2 - cz = 0$

$b(y+b) = c^2+cz \Rightarrow b+y = \frac{c^2+cz}{b}$

$$a + x = \frac{c^2 + cz}{a} \qquad b + y = \frac{c^2 + cz}{b}$$

$$\frac{x}{a+x} + \frac{y}{b+y} + \frac{z}{c+z}$$

$$\frac{ax}{c(c+z)} + \frac{by}{c(c+z)} + \frac{z}{c+z} = \frac{ax+by}{c(c+z)} + \frac{z}{c+z}$$

from eqn (3), $ax + by = c^2$

$$= \frac{c^2}{c(c+z)} + \frac{z}{c+z} = \frac{c+z}{c+z} = 1$$

Q) If $a^2 - by - cz = 0$, $ax - b^2 + cz = 0$ and $ax + by - c^2 = 0$, then the value of $\frac{x}{a+x} + \frac{y}{b+y} + \frac{z}{c+z}$ will be

(a) $a + b + c$
(b) 3
(c) 1
(d) 0

Ans: (c)

SSBCrack EXAMS

Q) If $x+y+z=11, x^2+y^2+z^2=133$ and $x^3+y^3+z^3=881$, then the value of $\sqrt[3]{xyz}$ is:

(a) -6 (b) 6 (c) -8 (d) 8

① $(x+y+z)^2 = x^2+y^2+z^2+2(xy+yz+zx)$

② $x^3+y^3+z^3-3xyz = (x+y+z)(x^2+y^2+z^2-xy-yz-zx)$

① $(11)^2 = 133+2(A)$

$A = \frac{121-133}{2} = \frac{-12}{2} = -6 = xy+yz+zx$

② $881-3xyz = (11)(133-(-6))$

$xyz = \frac{881-1529}{3}$

$xyz = -\frac{648}{3} = -216$

$\sqrt[3]{xyz} = -6$

Q) If $x+y+z=11, x^2+y^2+z^2=133$ and $x^3+y^3+z^3=881$, then the value of $\sqrt[3]{xyz}$ is:

(a) -6 (b) 6 (c) -8 (d) 8

Ans: (a)

Q) If α and β are the roots of the equation $x^2 - 6x + 6 = 0$, what is $\alpha^3 + \beta^3 + \alpha^2 + \beta^2 + \alpha + \beta$ equal to?

(a) 150 (b) 138
(c) 138 (d) 124

$\alpha+\beta = 6 \qquad \alpha\beta = 6$

$\alpha^3+\beta^3 = (\alpha+\beta)^3 - 3\alpha\beta(\alpha+\beta) = 6^3 - 3\times6(6) = 216 - 108 = 108$

$\alpha^2+\beta^2 = (\alpha+\beta)^2 - 2\alpha\beta = (6)^2 - 2(6) = 36 - 12 = 24$

$\alpha+\beta = 6$

$108 + 24 + 6 = 108 + 30 = 138$

Q) If α and β are the roots of the equation $x^2 - 6x + 6 = 0$, what is $\alpha^3 + \beta^3 + \alpha^2 + \beta^2 + \alpha + \beta$ equal to?

(a) 150
(b) 138
(c) 138
(d) 124

Ans: (b)

Q) If $x_1x_2x_3 = 4(4 + x_1 + x_2 + x_3)$, then what is the value of $[1/(2 + x_1)] + [1/(2 + x_2)] + [1/(2 + x_3)]$?

(a) 1 (b) 1/2 (c) 2 (d) 1/3

$$x_1 x_2 x_3 = 4(4 + x_1 + x_2 + x_3)$$

$$x_1 = x_2 = x_3 = 4$$

$$\frac{1}{2+4} + \frac{1}{2+4} + \frac{1}{2+4} = 3\left(\frac{1}{6}\right) = \frac{1}{2}$$

Q) If $x_1x_2x_3 = 4(4 + x_1 + x_2 + x_3)$, then what is the value of $[1/(2 + x_1)] + [1/(2 + x_2)] + [1/(2 + x_3)]$?

(a) 1 (b) 1/2 (c) 2 (d) 1/3

Ans: (b)

Q) If $P = 7 + 4\sqrt{3}$ and $PQ = 1$, then what is the value of $1/P^2 + 1/Q^2$?

(a) 196 (b) 194 (c) 206 (d) 182

$P = 7 + 4\sqrt{3}$

$49 \quad 48$ (squares)

difference = 1

$Q = \frac{1}{P} = 7 - 4\sqrt{3}$

$\frac{1}{P^2} = Q^2 = (7 - 4\sqrt{3})^2$) (+)

$\frac{1}{Q^2} = P^2 = (7 + 4\sqrt{3})^2$

$= 2\left(7^2 + (4\sqrt{3})^2\right) = 2(49 + 48) = 194$

Q) If $P = 7 + 4\sqrt{3}$ and $PQ = 1$, then what is the value of $1/P^2 + 1/Q^2$?

(a) 196 (b) 194 (c) 206 (d) 182

Ans: (b)

Q) If $x+y+z=0$, then what is the value of $(3y^2+x^2+z^2)/(2y^2-xz)$?

(a) 2 (b) 1 (c) 3/2 (d) 5/3

$x+z=-y$

$(x+z)^2=y^2$

$x^2+z^2+2xz=y^2$

$x^2+z^2=y^2-2xz$

$$\frac{3y^2+y^2-2xz}{2y^2-xz}=\frac{4y^2-2xz}{2y^2-xz}=\frac{2(2y^2-xz)}{2y^2-xz}=2$$

(OR) $x=1;\ y=-1;\ z=0$

$$\frac{3(-1)^2+(1)^2+(0)^2}{2(-1)^2-0}=\frac{4}{2}=2$$

Q) If $x + y + z = 0$, then what is the value of $(3y^2 + x^2 + z^2)/(2y^2 - xz)$?

(a) 2 (b) 1 (c) 3/2 (d) 5/3

Ans: (a)

Q) If $a^2 + b^2 + c^2 + 96 = 8(a + b - 2c)$, then $\sqrt{ab - bc + ca}$ is equal to:

(a) 6 (b) $2\sqrt{2}$ (c) 4 (d) $2\sqrt{3}$

$$a^2 + b^2 + c^2 + 96 = 8a + 8b - 16c$$

$$(a^2 - 8a + 16) + (b^2 - 8b + 16) + (c^2 + 16c + 64) = 0$$

$$(a-4)^2 + (b-4)^2 + (c+8)^2 = 0$$

$a - 4 = 0$ | $b - 4 = 0$ | $c + 8 = 0$

$a = 4$ | $b = 4$ | $c = -8$

$$\sqrt{ab - bc + ca}$$

$$= \sqrt{4 \times 4 - 4 \times -8 + (-8) \times 4}$$

$$= \sqrt{16 + 32 - 32} = 4$$

Q) If $a^2 + b^2 + c^2 + 96 = 8(a + b - 2c)$, then $\sqrt{ab - bc + ca}$ is equal to:

(a) 6 (b) $2\sqrt{2}$ (c) 4 (d) $2\sqrt{3}$

Ans: (c)

Q) If $\sqrt{86-60\sqrt{2}} = a - b\sqrt{2}$, then what will be the value of $\sqrt{a^2+b^2}$, correct to one decimal place?

(a) 8.4 (b) 8.2 (c) 7.8 (d) 7.2

$86 - 60\sqrt{2} = (a^2 + 2b^2) - 2\sqrt{2}ab$

$a^2 + 2b^2 = 86$ $\quad 2ab = 60$

$ab = 30$

2×15

6×5

$a = 6$

$b = 5$

$\sqrt{a^2+b^2}$

$= \sqrt{36+25}$

$= \sqrt{61}$

$=$

Q) If $\sqrt{86-60\sqrt{2}} = a - b\sqrt{2}$, then what will be the value of $\sqrt{a^2+b^2}$, correct to one decimal place?

(a) 8.4 (b) 8.2 (c) 7.8 (d) 7.2

Ans: (c)

Q) If $x = 11$, the value of $x^5 - 12x^4 + 12x^3 - 12x^2 + 12x - 1$ is

(a) 11 (b) 10 (c) 12 (d) -10

Q) If $x = 11$, the value of $x^5 - 12x^4 + 12x^3 - 12x^2 + 12x - 1$ is

(a) 11 (b) 10 (c) 12 (d) -10

Ans: (b)

Q) If $a+\frac{1}{b}=b+\frac{1}{c}=c+\frac{1}{a}$ (where $a \neq b \neq c$), then abc is equal to

(a) $+1$
(b) -1
(c) $+1$ & -1
(d) None of the options

Q) If $a+\frac{1}{b}=b+\frac{1}{c}=c+\frac{1}{a}$ (where $a \neq b \neq c$), then abc is equal to

(a) $+1$
(b) -1
(c) $+1$ & -1
(d) None of the options

Ans: (c)

Q) If $x-\sqrt{3}-\sqrt{2}=0$ and $y-\sqrt{3}+\sqrt{2}=0$ then value of $(x^3-20\sqrt{2})-(y^3+2\sqrt{2})$

(a) 3 (b) 2 (c) 0 (d) 1

Q) If $x-\sqrt{3}-\sqrt{2}=0$ and $y-\sqrt{3}+\sqrt{2}=0$ then value of $(x^3-20\sqrt{2})-(y^3+2\sqrt{2})$

(a) 3 (b) 2 (c) 0 (d) 1

Ans: (c)

Q) If $a+b+c+d=4$ then the value of

$$\frac{1}{(1-a)(1-b)(1-c)}+\frac{1}{(1-b)(1-c)(1-d)}$$

$$+\frac{1}{(1-c)(1-d)(1-a)}+\frac{1}{(1-d)(1-a)(1-b)} \text{ is.}$$

(a) 0 (b) 1 (c) 4 (d) $1+abcd$

Q) If $a+b+c+d=4$ then the value of

$$\frac{1}{(1-a)(1-b)(1-c)}+\frac{1}{(1-b)(1-c)(1-d)}$$

$$+\frac{1}{(1-c)(1-d)(1-a)}+\frac{1}{(1-d)(1-a)(1-b)}$$ is.

(a) 0 (b) 1 (c) 4 (d) $1+abcd$

Ans: (a)

Q) If $(x^3 - y^3) : (x^2 + xy + y^2) = 5 : 1$ and

$(x^2 - y^2) : (x - y) = 7 : 1$, then the ratio $2x : 3y$ equals

(a) $2 : 3$ (b) $4 : 1$ (c) $4 : 3$ (d) $3 : 2$

Q) If $(x^3 - y^3) : (x^2 + xy + y^2) = 5 : 1$ and

$(x^2 - y^2) : (x - y) = 7 : 1$, then the ratio $2x : 3y$ equals

(a) $2 : 3$ (b) $4 : 1$ (c) $4 : 3$ (d) $3 : 2$

Ans: (b)

Q) If x, y, z are the three factors of $a^3 - 7a - 6$, then value of $x + y + z$ will be

(a) $3a$ (b) 3 (c) 6 (d) a

Q) If x, y, z are the three factors of $a^3 - 7a - 6$, then value of $x + y + z$ will be

(a) $3a$ (b) 3 (c) 6 (d) a

Ans: (a)

Q) If $x = a^{1/2} + a^{-1/2}$, $y = a^{1/2} - a^{-1/2}$, then value of

$$(x^4 - x^2y^2 - 1) + (y^4 - x^2y^2 + 1)$$

(a) 16 (b) 14 (c) 12 (d) 13

Q) If $x = a^{1/2} + a^{-1/2}$, $y = a^{1/2} - a^{-1/2}$, then value of

$$(x^4 - x^2y^2 - 1) + (y^4 - x^2y^2 + 1)$$

(a) 16 (b) 14 (c) 12 (d) 13

Ans: (a)

Q) If $a + b = 1$, find the value of $a^3 + b^3 - ab - (a^2 - b^2)^2$

(a) 0 (b) 1 (c) –1 (d) 2

Q) If $a + b = 1$, find the value of $a^3 + b^3 - ab - (a^2 - b^2)^2$

(a) 0 (b) 1 (c) –1 (d) 2

Ans: (a)

Q) If $(3x-2y):(2x+3y)=5:6$, then one of value of $\left(\frac{\sqrt[3]{x}+\sqrt[3]{y}}{\sqrt[3]{x}-\sqrt[3]{y}}\right)^2$ is

(a) 25 (b) $\frac{1}{5}$ (c) $\frac{1}{25}$ (d) 5

Q) If $(3x-2y):(2x+3y)=5:6$, then one of value of $\left(\frac{\sqrt[3]{x}+\sqrt[3]{y}}{\sqrt[3]{x}-\sqrt[3]{y}}\right)^2$ is

(a) 25 (b) $\frac{1}{5}$ (c) $\frac{1}{25}$ (d) 5

Ans: (a)

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