Algebra Questions For IBPS Clerk Set-3 PDF

Instructions

For the following questions answer them individually

Question 1

If $\frac{a}{b} = \frac{2}{3}$, then the value of $(5a^3 - 2a^2b) : (3ab^2 - b^3)$ is:

A   16:27

B   32:29

C   34:19

D   27:16

Answer: A

Explanation:

Let a = 2 and b = 3

Then, $(5a^3 - 2a^2b) : (3ab^2 - b^3) = (5 \times 2^3 - 2 \times 2^2 \times 3) : (3 \times 2 \times 3^2 - 3^3)$

$= 5 \times 8 - 2 \times 4 \times 3 : 3 \times 2 \times 9 - 27$

$= 40 - 24 : 54 - 27 = 16 : 27$

Question 2

If $x + x^{-1} = 2$, then the value of $x^3 + x^{-3}$ is:

A   3

B $\frac{1}{2}$

C   1

D   2

Answer: D

Explanation:

Given, $x + \frac{1}{x} = 2$

Cubing on both sides

$(x + \frac{1}{x})^3 = 2^3$

$=> x^3 + \frac{1}{x^3} + 3 \times x \times \frac{1}{x}(x + \frac{1}{x}) = 8$

$=> x^3 + \frac{1}{x^3} + 3(2) = 8$

Therefore, $x^3 + \frac{1}{x^3} = 8 - 6 = 2$

Question 3

If $\left(\frac{x}{a}\right) + \left(\frac{y}{b}\right) = 3$ and $\left(\frac{x}{b}\right) - \left(\frac{y}{a}\right) = 9$, then what is the value of $\frac{x}{y}$?

A $\frac{(b+3a)}{(a-3b)}$

B $\frac{(a+3b)}{(b-3a)}$

C $\frac{(1+3a)}{(a+3b)}$

D $\frac{(a+3b^2)}{(b-3a^2)}$

Answer: A

Explanation:

$\left(\frac{x}{a}\right) + \left(\frac{y}{b}\right) = 3$

bx+ay=3ab

3bx+3ay=9ab

$\left(\frac{x}{b}\right) - \left(\frac{y}{a}\right) = 9$

ax-by=9ab

3bx+3ay=ax-by

3bx-ax=-by-3ay

x(3b-a)=y(-b-3a)

y/x =(a-3b)/(3a+b)

x/y=(3a+b)(a-3b)

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Question 4

If $x + y = 3$, then what is the value of $x^3 + y^3 + 9xy$?

A 15

B 81

C 27

D 9

Answer: C

Explanation:

x+y=3

Cubing on both sides

$x^3 + 3xy(x + y) + y^3$=27

$x^3 + 3xy(3) + y^3$=27

$x^3 + 9xy + y^3$=27

Question 5

If $x = 2 + \sqrt{3}, y = 2 - \sqrt{3}$ and $z = 1$, then what is the value of $\left(\frac{x}{yz}\right) + \left(\frac{y}{xz}\right) + \left(\frac{z}{xy}\right) + 2\left[\left(\frac{1}{x}\right) + \left(\frac{1}{y}\right) + \left(\frac{1}{z}\right)\right]$?

A 25

B 22

C 17

D 43

Answer: A

Explanation:

$x = 2 + \sqrt{3}, y = 2 - \sqrt{3}$

$(1/x) = (2 - \sqrt{3})$
$(1/y) = (2 + \sqrt{3})$

$(\frac{x}{yz} = (2 + \sqrt{3})/(2 - \sqrt{3})$

$= (2 + \sqrt{3})^2$

$(\frac{y}{xz} = (2 - \sqrt{3})/((2 + \sqrt{3}))$

$= (2 - \sqrt{3})^2$

$(\frac{z}{xy} = 1$

$(\frac{x}{yz} + (\frac{y}{xz}) + (\frac{z}{xy}) + 2\left[(\frac{1}{x}) + (\frac{1}{y}) + (\frac{1}{z})\right]$

$= (2 + \sqrt{3})^2 + (2 - \sqrt{3})^2 + 1 + 2(2 - \sqrt{3} + 2 + \sqrt{3} + 1)$
= 14+1+2(5)
= 14+1+10
= 245

Question 6

If $(3^{33} + 3^{33} + 3^{33})(2^{33} + 2^{33}) = 6^x$, then what is the value of x?

A   34

B   35

C   33

D   33.5

  Answer: A

Explanation:
$(3^{33} + 3^{33} + 3^{33})(2^{33} + 2^{33}) = 6^x$
$(3 * 3^{33})(2 * 2^{33}) = 6^x$
$(3^{34})(2^{34}) = 6^x$
$6^{34} = 6^x$
x=34

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Question 7

If $x_1 x_2 x_3 = 4(4 + x_1 + x_2 + x_3)$, then what is the value of $\left[\frac{1}{(2+x_1)}\right] + \left[\frac{1}{(2+x_2)}\right] + \left[\frac{1}{(2+x_3)}\right]$?

A   1

B $\frac{1}{2}$

C   2

D $\frac{1}{3}$

  Answer: B

Explanation:

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

From clear observation we can say that $x_1 = 4, x_2 = 4, x_3 = 4$ will satisfy the equation

i.e 4*4*4=4(4+12)

64=64

Therefore $\left[\frac{1}{(2+x_1)}\right] + \left[\frac{1}{(2+x_2)}\right] + \left[\frac{1}{(2+x_3)}\right]$=3(1/6)

=1/2

Question 8

If $\frac{(a+b)}{c} = \frac{6}{5}$ and $\frac{(b+c)}{a} = \frac{9}{2}$, then what is the value of $\frac{(a+c)}{b}$?

A $\frac{9}{5}$

B $\frac{11}{7}$

C $\frac{7}{11}$

D $\frac{7}{4}$

Answer: D

Explanation:

$\frac{(a+b)}{c} = \frac{6}{5}$

5a+5b=6c

$\frac{(b+c)}{a} = \frac{9}{2}$

2b+2c=9a

9a-2b=2c

27a-6b=6c

5a+5b=6c

27a-6b=5a+5b

22a=11b

b=2a

4a+2c=9a

2c=5a

c=(5/2)a

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

=((a+(5/2)a))/2a

=7a/4a

=7/4

Question 9

If $a^3 + 3a^2 + 9a = 1$, then what is the value of $a^3 + \left(\frac{3}{a}\right)$?

A 31

B 26

C 28

D 24

Answer: C

Explanation:

$a^3 + 3a^2 + 9a = 1$

$a(a^2 + 3a + 9) = 1$

$a^2 + 3a + 9 = 1/a$

$(a^3 - b^3)=(a - b)(a^2 + ab + b^2)$
for b=3
we have $(a^3 - 3^3)=(a - 3)(a^2 + 3a + 9)$
$(a^3 - 27)=(a - 3)(1/a)$
$a^3 + (3/a) = 1 + 27$
$a^3 + (3/a) = 28$

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Question 10

If $x + y + z = 0$, then what is the value of $\dfrac{(3y^2+x^2+z^2)}{(2y^2-xz)}$?

A   2

B   1

C $\dfrac{3}{2}$

D $\dfrac{5}{3}$

Answer: A

Explanation:
Solution 1:
As the answer is independent of variables and so we can assume values for x,y and z an solve
let x=1,y=-1,z=0 therefore x+y+z=1-1+0=0
$\dfrac{(3y^2+x^2+z^2)}{(2y^2-xz)}$
$= \dfrac{(3(-1)^2+1^2+0^2)}{(2(-1)^2-1*(0))}$
$= \dfrac{4}{2}$
$=2$
Solution 2: $\dfrac{(3y^2+x^2+z^2)}{(2y^2-xz)}$ =k

$(3y^2 + x^2 + z^2)=k(2y^2 - xz)$
$x^2 + z^2 + kxz=2ky^2 - 3y^2$
We know x+y+z=0
we can see that for k=2
we get $(x + z)^2 = y^2$
x+z+y=0
Therefore value of k=2

Question 11

What is the value of $\dfrac{(1.2)^3+(0.8)^3+(0.7)^3-2.016}{1.35[(1.2)^2+(0.8)^2+(0.7)^2-0.96-0.84-0.56]}$?

A $\dfrac{1}{4}$

B $\dfrac{1}{2}$

C   1

D   2

Answer: D

Explanation:

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

x=1.2 y=0.8 z=0.7

$\dfrac{(1.2)^3+(0.8)^3+(0.7)^3-2.016}{1.35[(1.2)^2+(0.8)^2+(0.7)^2-0.96-0.84-0.56]}$

$= \dfrac{((2.7)((1.2)^2+(0.8)^2+(0.7)^2-0.96-0.84-0.56)}{1.35[(1.2)^2+(0.8)^2+(0.7)^2-0.96-0.84-0.56]}$

=2.7/1.35

=2

Question 12

If $x = \sqrt[3]{7} + 3$ **then the value of** $x^3 - 9x^2 + 27x - 34$ **is:**

A 0

B 1

C 2

D -1

Answer: A

Explanation:

Given : $x = \sqrt[3]{7} + 3$

$=> x - 3 = \sqrt[3]{7}$

Cubing both sides, we get :

$=> (x - 3)^3 = (\sqrt[3]{7})^3$

$=> x^3 - 27 - 3(3x)(x - 3) = 7$

$=> x^3 - 27 - 9x^2 + 27x - 7 = 0$

$=> x^3 - 9x^2 + 27x - 34 = 0$

$=>$ Ans - (A)

Question 13

Out of the given responses, one of the factors of $(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3$ **is**

A (a + b) (a - b)

B (a + b) (a + b)

C (a - b) (a - b)

D (b - c) (b - c)

Answer: A

Explanation:

Let, $X = a^2 - b^2$, $Y = b^2 - c^2$, $Z = c^2 - a^2$

Then, X + Y + Z = 0 (i.e $a^2 - b^2 + b^2 - c^2 + c^2 - a^2 = 0$)

We know that,

$X^3 + Y^3 + Z^3 = 3XYZ$ i.e,

$(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3 = 3(a^2 - b^2)(b^2 - c^2)(c^2 - a^2)$

One of the factors is,

$a^2 - b^2 (or)(a + b)(a - b)$

Hence, option A is the correct answer.

Question 14

If 3√2 + √18 + √50 = 15.55, then what is the value of √32 + √72?

A 13.22

B 10.83

C 14.13

D 16.54

Answer: C

Explanation:

Given : $3\sqrt{2} + \sqrt{18} + \sqrt{50} = 15.55$

=> $3\sqrt{2} + 3\sqrt{2} + 5\sqrt{2} = 15.55$

=> $\sqrt{2} = \frac{15.55}{11} = 1.413$ -----------(i)

To find : $\sqrt{32} + \sqrt{72}$

= $4\sqrt{2} + 6\sqrt{2} = 10\sqrt{2}$

= $10 \times 1.413 = 14.13$

=> Ans - (C)

Question 15

The value of $\frac{a}{a-b} + \frac{b}{b-a}$ is

A (a+b)/(a-b)

B -1

C 2ab

D 1

Answer: D

Explanation:

Expression : $\frac{a}{a-b} + \frac{b}{b-a}$

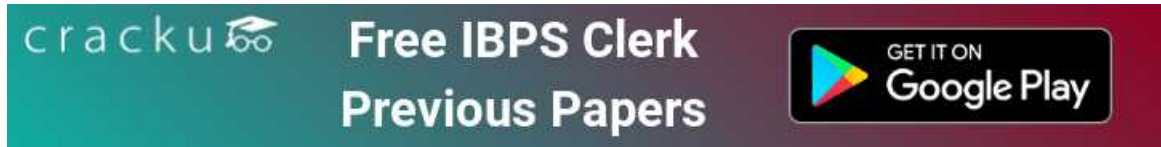Taking (-) common from second term

= $\frac{a}{a-b} - \frac{b}{a-b}$

= $\frac{a-b}{a-b} = 1$

=> Ans - (D)

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