



Date : 13th Dec 2023

Quantitative Aptitude – Algebra

English

Q:1 If $a : b = 4 : 5$, then $(2a + 3b) : (3a + 2b)$ is equal to:

1. 22 : 23
2. 23 : 22
3. 10 : 9
4. 6 : 7

Q:2 If $x = y - z$ then find the value of $x^3 - y^3 + z^3$.

1. $-3xyz$
2. $-2xyz$
3. $4xyz$
4. xyz

Q:3 If $(p - q) = 8$, then what is the value of $q^3 - p^3 + 24pq$?

1. 729
2. -512
3. 512
4. -449

Q:4 If $\{\sqrt{x} + (1/\sqrt{x})\} = 3$, then find the value of $\{x^3 + (1/x^3)\} - 162$.

1. 172
2. 133
3. 154
4. 160

Q:5 If $A/3 = B/2 = C/5$, then what is the value of ratio $(C + A)^2 : (A + B)^2 : (B + C)^2$?

1. 9 : 4 : 25
2. 25 : 4 : 9
3. 64 : 25 : 49
4. 49 : 25 : 64

Q:6 If $x^2 + y^2 + z^2 = xy + yz + xz$, then find the value of $(x + y + z)/3x$.

1. 1
2. 3
3. 2
4. $1/3$

Q:7 If $\{\sqrt{m} + (1/\sqrt{m})\} = 3$, then find the value of $\{m^3 + (1/m^3)\} - 16^2$.

1. 72
2. 33
3. 54
4. 66

Q:8 If $x^3 - y^3 = 208$ and $x - y = 4$, then $(x + y)^2 - xy$ is equal to:

1. 59
2. 48
3. 38
4. 76

Q:9 Find the value of $a + b + c$, if a , b , and c are the three factors of $x^3 - 7x - 6$.

1. $3x+1$
2. $3x$
3. $2+2x$
4. $3x+3$

Q:10 If the sum of two natural numbers is 24. And the sum of their squares is 290 then find the product of the numbers?

1. 178
2. 145
3. 79
4. 143



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Answer Key

1. (2)	2. (1)	3. (2)	4. (4)	5. (3)
6. (1)	7. (4)	8. (4)	9. (2)	10. (4)

Answers and Solutions

Q:1 The correct answer is **Option 2** i.e. **23 : 22**.

$$= a : b = 4 : 5$$

Suppose $a = 4x$ and $b = 5x$

$$= (2a + 3b) : (3a + 2b)$$

$$= (2 \times 4x + 3 \times 5x) : (3 \times 4x + 2 \times 5x)$$

$$= (8x + 15x) : (12x + 10x)$$

$$= 23 : 22$$

Q:2 The correct answer is **Option 1** i.e. **-3xyz**.

$$x = y - z$$

$$\text{Or, } x - y + z = 0$$

$$\text{Or, } x + (-y) + z = 0$$

We know that $a + b + c = 0$ then $a^3 + b^3 + c^3 = 3abc$

$$\text{So, } x^3 + (-y)^3 + z^3 = 3x(-y)z = -3xyz$$

$$\text{Hence, } x^3 - y^3 + z^3 = -3xyz$$

Q:3 The correct answer is **Option 2** i.e. **-512**.

$$p^3 - q^3 = (p - q)^3 + 3pq \times (p - q)$$

$$\Rightarrow p^3 - q^3 = 8^3 + 3pq \times 8$$

$$\Rightarrow p^3 - q^3 - 24pq = 512$$

$$\Rightarrow q^3 - p^3 + 24pq = -512$$

Q:4 The correct answer is **Option 2** i.e. **160**.

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

Squaring both sides, we get

$$x + (1/x) + 2 = 9$$

$$x + (1/x) = 7$$

Cubing both sides, we get

$$x^3 + (1/x^3) + 3 \times 7 = 343$$

$$x^3 + (1/x^3) = 322$$

$$\text{So, } \{x^3 + (1/x^3)\} - 162 = 322 - 162 = 160$$

Q:5 The correct answer is **Option 3** i.e. **64 : 25 : 49**.

$$A/3 = (B)/2 = (C)/5 = K$$

$$\therefore A = 3K, B = 2K, C = 5K$$

$$\therefore (C + A)^2 : (A + B)^2 : (B + C)^2$$

$$= (5 + 3)^2 k^2 : (3 + 2)^2 k^2 : (2 + 5)^2 k^2$$

$$= 64 : 25 : 49$$

Q:6 The correct answer is **Option 1** i.e. **1**.

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

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

$$(x - y)^2 + (y - z)^2 + (x - z)^2 = 0$$

$$\text{So, } x - y = 0, y - z = 0 \text{ and } x - z = 0$$

$$\text{Now, } (x + y + z)/3x = (x + x + x)/3x = 1$$

Q:7 The correct answer is **Option 4** i.e. **66**.

$$\{\sqrt{m} + (1/\sqrt{m})\} = 3$$

Squaring both sides, we get

$$\Rightarrow m + (1/m) + 2 = 9$$

$$\Rightarrow m + (1/m) = 7$$

Cubing both sides, we get

$$\Rightarrow m^3 + (1/m^3) + 3 \times 7 = 343$$

$$\Rightarrow m^3 + (1/m^3) = 322$$

$$\text{So, } \{m^3 + (1/m^3)\} - 16^2 = 322 - 256 = 66$$

Q:8 The correct answer is **Option 1** i.e. **76**.

$$\Rightarrow x^3 - y^3 = (x - y) [(x + y)^2 - xy]$$

$$\text{Given, } x^3 - y^3 = 456 \text{ and } x - y = 6$$

$$\Rightarrow 456 = 6 [(x + y)^2 - xy]$$

$$\Rightarrow [(x + y)^2 - xy] = 456/6 = 76$$

Q:9 The correct answer is **Option 2** i.e. **3x**.

$$x^3 - 7x - 6$$

$$\Rightarrow x^3 - x - 6x - 6$$

$$\Rightarrow x(x^2 - 1) - 6(x + 1)$$

$$\Rightarrow x(x + 1)(x - 1) - 6(x + 1)$$

$$\Rightarrow (x + 1)[x(x - 1) - 6]$$

$$\Rightarrow (x + 1)[x^2 - x - 6]$$

$$\Rightarrow (x + 1)[x^2 - 3x + 2x - 6]$$

$$\Rightarrow (x + 1)[x(x - 3) + 2(x - 3)]$$

$$\Rightarrow (x + 1)(x - 3)(x + 2)$$

$$\text{Let } a = (x + 1), b = (x - 3) \text{ and } c = (x + 2)$$

$$\therefore a + b + c = x + 1 + x - 3 + x + 2 = 3x$$

Q:10 The correct answer is **Option 4** i.e. **143**.

Let the numbers be x and y .

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

$$576 = 290 + 2xy$$

$$2xy = 286$$

$$xy = 143$$