## Instructions

For the following questions answer them individually

### **Question 1**

What is the value of  ${\stackrel{3}{4}}+{\stackrel{8}{9}}$  ?

**A** 
$$\frac{57}{27}$$

**B** <sup>11</sup><sub>13</sub>

- **C**  $\frac{59}{36}$
- **D**  $\frac{11}{9}$

Answer: C

# Explanation:

Expression :  $\overset{3}{4} + \overset{8}{9}$ =  $\overset{3(9)+8(4)}{36}$ =  $\overset{27+32}{36} = \overset{59}{36}$ = > Ans - (C)

# **Question 2**

The sum of 2xy(3x + 4y - 5z) and 5yz(2x - 3y) is

- **A**  $6x^2y 8xy^2 + 15y^2z$
- **B**  $6x^2y + 8xy^2 15y^2z$
- **C**  $6x^2y + 8xy^2 15y^2z 20xyz$
- **D**  $6x^2y 8xy^2 + 15y^2z + 20xyz$

Answer: B

# **Explanation:**

Sum of 2xy(3x + 4y - 5z) and 5yz(2x - 3y)

= 
$$(6x^2y + 8xy^2 - 10xyz) + (10xyz - 15y^2z)$$
  
=  $6x^2y + 8xy^2 - 15y^2z$   
=> Ans - (B)

# Question 3

If 4x-7<x-2 and  $5x+\frac{2}{3}\geq 3x+1$ ; then x can take which of the following values?

**A** 2

- **B** -1
- **C** -2

**D** 1

Answer: D

#### **Explanation:**

Expression 1 : 4x - 7 < x - 2=> 4x - x < 7 - 2=> 3x < 5=>  $x < \frac{5}{3}$  ------(i) Expression 2 :  $5x + \frac{2}{3} \ge 3x + 1$ =>  $5x - 3x \ge 1 - \frac{2}{3}$ =>  $2x \ge \frac{1}{3}$ =>  $x \ge \frac{1}{6}$  ------(ii) Combining inequalities (i) and (ii), we get :  $\frac{1}{6} \le x < \frac{5}{3}$ 

The only value that x can take among the options = 1 => Ans - (D)

#### **Question 4**

The solution set of 4x - 3y = 47 and 3x + y = 32 is

- **A** {(15, 3)}
- **B** {(4, 12)}
- $C = \{(11, -1)\}$
- **D** {(12, 3)}
  - Answer: C

#### **Explanation:**

Equation 1 : 4x - 3y = 47Equation 2 : 3x + y = 32Multiplying equation (ii) by 3 and adding it to equation (i) => (4x + 9x) + (-3y + 3y) = (47 + 96) => 13x = 143  $=> x = \frac{143}{13} = 11$ Substituting it in equation (ii), => y = 32 - 3(11) = 32 - 33 = -1  $\therefore (x, y) = (11, -1)$  => Ans - (C)Question 5 What is the value of  $\frac{(4a^2+8b+14c+2)}{2}$ ?

- **A**  $2a^2 + 4b + 7c + 1$
- **B**  $a^2 + 4b + 7c + 1$
- **C**  $2a^2 + 4b + 7c + 2$
- **D**  $a^2 + 4b + 7c + 2$

#### Answer: A

#### **Explanation:**

```
Expression : \begin{pmatrix} 4a^2+8b+14c+2 \end{pmatrix}
   2(2a^2+4b+7c+1)
_
         2
= 2a^2 + 4b + 7c + 1
=> Ans - (A)
```

#### **Question 6**

Coefficient of  $x^2$  in (x + 9)(6 - 4x) is

**A** 54

**B** -4

С -30

#### D 4

Answer: B

#### **Explanation:**

A coefficient is a numerical or constant quantity placed before and multiplying the variable in an algebraic expression. Eg : In  $ax^2$ , coefficient is a

Expression : (x+9)(6-4x) $= 6x - 4x^2 + 54 - 36x$  $= -4x^2 - 30x + 54$  $\therefore$  Coefficient of  $x^2 = -4$ 

=> Ans - (B)

#### **Question 7**

If 7x + 6y = 5xy and 10x - 4y = 4xy, then value of x and y is

**A** 3, 2

**B** 2, 3

**C** 4, 2

**D** 5, 6

Answer: C

#### **Explanation:**

Equation 1 : 7x + 6y = 5xyEquation 2 : 10x - 4y = 4xyDividing both equations by (xy) $=> \frac{7}{y} + \frac{6}{x} = 5$ and  $y^{10} - x^4 = 4$ 1 1

Let  $\overset{1}{y} = u$  and  $\overset{1}{x} = v$ => 7u + 6v = 5 -----(iii) and 10u - 4v = 4 -----(iv) Multiplying equation (iv) by 3 and equation (iii) by 2 and adding them, we get : => (14u + 30u) = (10 + 12) $=> u = {}^{22}_{44} = {}^{1}_{2}$ Substituting it in equation (iv), => 4v = 5 - 4 = 1 $=> v = \frac{1}{4}$ (x, y) = (4, 2)=> Ans - (C) **Question 8** Coefficient of  $x^2$  in  $6x^3 + 4x^2 + 2x + 3$  is Α 4 В 6 С 3

**D** 2

Answer: A

## **Explanation:**

A coefficient is a numerical or constant quantity placed before and multiplying the variable in an algebraic expression. Eg : In  $ax^2$ , coefficient is a

 ${\rm Expression}: 6x^3+4x^2+2x+3$ 

=> Coefficient of  $x^2=4$ 

=> Ans - (A)

# **Question 9**

On dividing  $8a^2b^2c^2$  by  $4a^2$ , we get

**A**  $2b^2$ 

**B**  $2c^2$ 

**C**  $2b^2c^2$ 

# **D** 2

Answer: C

# **Explanation:**

```
On dividing 8a^{2}b^{2}c^{2} by 4a^{2}
= \frac{8a^{2}b^{2}c^{2}}{4a^{2}}
= \frac{8}{4} \times \frac{a^{2}}{a^{2}} \times (b^{2}c^{2})
= 2b^{2}c^{2}
=> Ans - (C)
```

**Question 10** If 2x + 6y = 3xy and 10x - 3y = 4xy, find x, y. Α 3, 2 2.3 В С 4.6 **D** 6, 4 Answer: A

#### **Explanation:**

Equation 1: 2x + 6y = 3xyEquation 2 : 10x - 3y = 4xyDividing both equations by (xy) $=> \frac{2}{y} + \frac{6}{x} = 3$ and  $y^{10} - x^3 = 4$ Let  $\stackrel{1}{y} = u$  and  $\stackrel{1}{x} = v$ => 2u + 6v = 3 -----(iii) and 10u - 3v = 4 -----(iv) Multiplying equation (iv) by 2 and adding it to equation (iii), we get : => 22u = 11 $=> u = \frac{11}{22} = \frac{1}{2}$ Substituting it in equation (iii), => 6v = 3 - 1 = 2 $=> v = {\stackrel{2}{_{6}}} = {\stackrel{1}{_{3}}}$ (x, y) = (3, 2)=> Ans - (A) **Question 11** If  $2x-3(4-2x) < 4x-5 < 4x+rac{2x}{3}$  , then x can take which of the following values? Α 2 В 8 С 0 D -8 Answer: C **Explanation:** 

Expression 1 : 2x - 3(4 - 2x) < 4x - 5=> 2x - 12 + 6x < 4x - 5

=> 8x - 4x < -5 + 12

=> 4x < 7=>  $x < \frac{7}{4}$  ------(i) Expression 2 : 4x - 5 < 4x + 2x/3=>  $\frac{2x}{3} > -5$ =>  $x > \frac{-15}{2}$  ------(ii) Combining inequalities (i) and (ii), we get :  $\frac{-15}{2} < x < \frac{7}{4}$ The only value that x can take among the options = 0

=> Ans - (C)

# **Question 12**

If a - b = 11 and ab = 24, then value of  $a^2 + b^2$  is

A 169
B 37
C 73
D 48

# Answer: A

### **Explanation:**

Given : (a - b) = 11 and ab = 24Using  $(a - b)^2 = a^2 + b^2 - 2ab$ =>  $(11)^2 = (a^2 + b^2) - (2 \times 24)$ =>  $(a^2 + b^2) = 121 + 48 = 169$ => Ans - (A)

# **Question 13**

The simplified form of  $(x+3)^2 + (x-1)^2$  is

- **A**  $(x^2 + 2x + 5)$
- **B**  $2(x^2 + 2x + 5)$
- **C**  $(x^2 2x + 5)$
- **D**  $2(x^2 2x + 5)$ 
  - Answer: B

# Explanation:

Expression :  $(x + 3)^2 + (x - 1)^2$ =  $(x^2 + 9 + 6x) + (x^2 + 1 - 2x)$ =  $2x^2 + 4x + 10$ =  $2(x^2 + 2x + 5)$ => Ans - (B)

#### **Question 14**

What should be added to 5(2x-y) to obtain 4(2x - 3y) + 5(x + 4y)?

- **A** 3x 13y
- **B** 3x + 13y
- **C** 13x 3y
- **D** 13x + 3y

```
Answer: B
```

#### **Explanation:**

Let *m* should be added to 5(2x-y) to obtain 4(2x - 3y) + 5(x + 4y)

=> (m) + [5(2x - y)] = 4(2x - 3y) + 5(x + 4y)=> m + 10x - 5y = 8x - 12y + 5x + 20y=> m + 10x - 5y = 13x + 8y=> m = (13x - 10x) + (8y + 5y)=> m = 3x + 13y=> Ans - (B)Question 15

If  $3(2 - 3x) < 2 - 3x \ge 4x$  -6; then x can take which of the following values?

- **A** 2
- **B** -1
- **C** -2
- **D** 1

```
.
```

Answer: D

**Explanation:** 

```
Expression 1: 3(2 - 3x) < 2 - 3x
```

```
=> 6 - 9x < 2 - 3x
=> 9x - 3x > 6 - 2
=> 6x > 4
=> x > \frac{2}{3} - \dots - (i)
Expression 2 : 2 - 3x ≥ 4x -6

=> 4x + 3x \le 2 + 6
=> 7x \le 8
=> x \le \frac{8}{7} - \dots - (ii)
Combining inequalities (i) and (ii), we get : \frac{2}{3} < x \le \frac{8}{7}
The only value that x can take among the options = 1
```

=> Ans - (D)

**Question 16** 

```
If (4x - 3) - (2x + 1) = 4, then the value of x is
```

- A 0
  B 1
  C 4
- **D** 3

```
Answer: C
```

- **Explanation:**
- Expression : (4x 3) (2x + 1) = 4=> 4x - 3 - 2x - 1 = 4=> 2x - 4 = 4=> 2x = 4 + 4 = 8=>  $x = \frac{8}{2} = 4$ => Ans - (C)

# **Question 17**

## Which of the following equations has real and distinct roots?

- **A**  $3x^2 6x + 2 = 0$
- **B**  $3x^2 6x + 3 = 0$
- **C**  $x^2 8x + 16 = 0$
- **D**  $4x^2 8x + 4 = 0$ 
  - Answer: A

# **Explanation:**

A quadratic equation :  $ax^2 + bx + c = 0$  has real and distinct roots iff Discriminant,  $D = b^2 - 4ac > 0$ 

 $\begin{array}{l} (\mathsf{A}): 3x^2 - 6x + 2 = 0\\ =>\mathsf{D} = (-6)^2 - 4(3)(2) = 36 - 24 = 12\\ (\mathsf{B}): 3x^2 - 6x + 3 = 0\\ =>\mathsf{D} = (-6)^2 - 4(3)(3) = 36 - 36 = 0\\ (\mathsf{C}): x^2 - 8x + 16 = 0\\ =>\mathsf{D} = (-8)^2 - 4(1)(16) = 64 - 64 = 0\\ (\mathsf{D}): 4x^2 - 8x + 4 = 0\\ =>\mathsf{D} = (-8)^2 - 4(4)(4) = 64 - 64 = 0\\ \\ \text{Thus, the equation}: 3x^2 - 6x + 2 = 0 \text{ has real and distinct roots.} \end{array}$ 

# **Question 18**

Value of  $\left(4a^2+12ab+9b^2/(2a+3b)\right)$  is

- **B** 2a + 3b
- **C** 2a
- **D** 3b

Answer: B

#### **Explanation:**

```
Expression : (4a^2 + 12ab + 9b^2/(2a + 3b))
= (2a)^2 + (3b)^2 + (2.2a.3b)
= (2a+3b)^2
= (2a+3b)^2
= 2a + 3b
=> Ans - (B)
```

**Question 19** 

Coefficient of  $x^2$  in (x + 9)(6 - 4x)(4x - 7) is

**A** 216

- **B** -4
- **C** -92
- **D** 108

Answer: C

#### **Explanation:**

A coefficient is a numerical or constant quantity placed before and multiplying the variable in an algebraic expression. Eg : In  $ax^2$ , coefficient is a

```
Expression : (x + 9)(6 - 4x)(4x - 7)

= (6x - 4x^2 + 54 - 36x)(4x - 7)

= (-4x^2 - 30x + 54)(4x - 7)

= 4x(-4x^2 - 30x + 54) - 7(-4x^2 - 30x + 54)

= -16x^3 - 120x^2 + 216x + 28x^2 + 210x - 378

= -20x^3 - 92x^2 + 426x - 378

\therefore Coefficient of x^2 = -92

=> Ans - (C)
```

## **Question 20**

Given: 5x - 3(2x-7) > 3x - 1 < 7 + 4x; then x can take which of the following values?

- **A** 6
- **B** 9
- **C** -6
- **D**\_-9

#### Answer: C

#### **Explanation:**

Expression 1 : 5x - 3(2x-7) > 3x - 1=> 5x - 6x + 21 > 3x - 1=> 3x + x < 21 + 1=> 4x < 22=>  $x < \frac{11}{2}$  ------(i) Expression 2 : 3x - 1 < 7 + 4x=> 4x - 3x > -1 - 7=> x > -8 ------(ii) Combining inequalities (i) and (ii), we get :  $-8 < x < \frac{11}{2}$ 

The only value that x can take among the options = -6 => Ans - (C)