# QB365 Question Bank Software Study Materials

## Algebra Important 2 Marks Questions With Answers (Book Back and Creative)

9th Standard

**Maths**

Total Marks : 60

**2 Marks**

30 x 2 = 60

1) Which of the following expressions are polynomials. If not give reason: $\frac{1}{x^2}+3x-4$

**Answer :** $\frac{1}{x^2}+3x-4$ is not apolynominal.

Since the exponent of $x^2$ is not a whole number but it is $\left(\frac{1}{2}=x^{-2}\right)$ negative number

2) Which of the following expressions are polynomials. If not give reason: $\sqrt{5}x^2+\sqrt{3}x+\sqrt{2}$

**Answer :** $\sqrt{5}x^2+\sqrt{3}x+\sqrt{2}$ is a polynomial

Non negative integral power.

3) Write the coefficient of $x^2$ and x in each of the following polynomials $\pi x^2-x+2$

**Answer :** Coefficient of $x^2$ is $\pi$ and Coefficient of x is -1

4) Find the value of the polynomial f (y) = 6y - $3y^2$ + 3 at y = 1

**Answer :** When y = 1

f(y) = 6y-$3y^2$ + 3

f(1) = 6(1) - $3(1)^2$+ 3

= 6 - 3+ 3 = 6

5) Find the value of the polynomial f (y) = 6y - $3y^2$ + 3 at y = 0

**Answer :** When y = 0

f(y) = 6y-$3y^2$ + 3

f(0) = 6(0) - $3(0)^2$+ 3

= 0 - 0+ 3 = 3

6) Find the zeros of the polynomial in each of the following: h(x) = ax + b, a $\neq$ 0, a, b $\in$ R

**Answer :** h(x) = ax + b, a $\neq$ 0, a, b $\in$ R

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

$h\left(-\frac{b}{a}\right)=a\left(-\frac{b}{a}\right)+b$

= -b + b = 0

Hence $-\frac{b}{a}$ is the zero of h(x)

7) Find the roots of the polynomial equations: 9x – 4 = 0

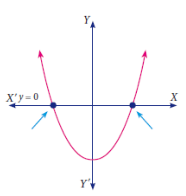
**Answer :** 9x - 4 = 0

9x = 4

x = $\frac{4}{9}$

$\frac{4}{9}$ is the root of the polynomial

8) Find the number of zeros of the following polynomials represented by their graphs.



**Answer :** Number of zeros = 2 (The curve is intersecting the x-axis at 2 points)

9) Determine whether (x -1) is a factor of the following polynomials: $x^3+5x^2-10x+4$

**Answer :** Let P(x) = $x^3+5x^2-10x+4$

**Answer :** Let $P(x) = x^3+5x^2-10x+4$

By factor theorem (x-1) is a factor of P(x), if P(1) = 0

$P(1) = 1^3+5(1^2)-10(1)+4$

= 1+5-10+4

P(1) = 0

∴ (x-1) is a factor of $x^3+5x^2-10x+4$

10) Expand $(5a - 3b)^3$

**Answer :** We know that, $(x-y)^3 = x^3-3x^2y+3xy^2-y^3$

$(5a - 3b)^3 = (5a)^3-(5a)^2(3b)+3(5a)(3b)^2- (3b)^3$

$= 125a^3- 3(25a^2)(3b)+3(5a)(9b^2)-(3b)^3$

$= 125a^3- 225a^2b+135ab^2-27b^3$

The following identity is also used:

$$x^3+y^3+z^3-3xyz \equiv (x+y+z)\left(x^2+y^2+z^2-xy-yz-zx\right)$$

We can check this by performing the multiplication on the right hand side.

11) Expand: $\left(x+\frac{1}{y}\right)^3$

**Answer :** $(x+y)^3 \equiv x^3 + 3x^2y + 3xy^2 + y^3$

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

12) Find $27a^3+ 64b^3$, if 3a + 4b = 10 and ab = 2.

**Answer :** 3a+4b = 10, ab = 2

$(3a + 4b)^3 = (3a)^3+3(3a)^2(4b)^2+(4b)^3$

∵ $x^3+ y^3 = (x+y)^3-3xy-(x+y)$

$= 10^3- 36ab(10) = 1000 - 36\times2\times10$

= 1000 - 720 = 280

13) If $x^2+\frac{1}{x^2}$= 23, then find the value of $x+\frac{1}{x}$ and $x^3+\frac{1}{x^3}$ .

**Answer :** $(a+b)^2 = a^2+b^2+2ab$

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

= 23 + 2 = 25

$\therefore x+\frac{1}{x} = \pm 5$

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

$5^3 = x^3+\frac{1}{x^3}+3\left(x+\frac{1}{x}\right)$

$125 = x^3+\frac{1}{x^3}+3(5)$

$125-15 = x^3+\frac{1}{x^3}$

$x^3+\frac{1}{x^3} = \pm 110$

14) Factorise the following: $9x^2+12xy+4y^2$

**Answer :** $9x^2+12xy+4y^2 = (3x)^2+2(3x)(2y)+(2y)^2$ [∵ $a^2+2ab+b^2 = (a+b)^2$]

$= (3x + 2y)^2$

15) Factorise the following: $27x^3+125y^3$

**Answer :** $27x^3+125y^3 = (3x)^3+(5y)^3$ [∵ $(a^3+b^3)=(a+b)(a^2-ab+b^2)$]

$= (3x+5y)((3x^2)-(3x)(5y)+(5y)^2)$

$= (3x+5y)(9x^2-15xy+25y^2)$

16) Factorise the following: $216m^3- 343n^3$

**Answer :** $216m^3- 343n^3 = (6m)^3 - (7n)^3$ [∵ $(a^3-b^3) = (a - b)(a^2+ ab + b^2)$]

$= (6m-7n)((6m)^2+ (6m)(7n) + (7n)^2)$

$= (6m-7n)(36m^2+ 42mn + 49n^2)$

17) Factorise the following: $8x^3+27y^3+ 64z^3- 72xyz$

**Answer :** $8x^3 + 27y^3 + 64z^3 - 72xyz$

$= (2x)^3+(3y)^3+(4z)^3 - 3(2x)(3y)(4z)$

$=(2x + 3y + 4z)(4x^2 + 9y^2 + 16z^2 - 16xy - 12yz - 8xz)$

18) Factorise the following: $a^6-64$

**Answer :** $(a^2)^3-4^3$

$= (a^2-4)(a^4+4a^2+4^2)$

$= (a+2)(a-2)(a^2+4-2a)(a^2-4+2a)$

19) Factorise the following: $x^3+8y^3+6xy-1$

**Answer :** $x^3+(2y)^3+(-1)^3-3(x)(2y)(-1)$

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

20) ABCD is a cyclic quadrilateral such that $\angle A = (4y + 20)°$ , $\angle B = (3y – 5)°$ , $\angle C = (4x)°$ and $\angle D = (7x + 5)°$ . Find the four angles.

**Answer :** $\angle A + \angle C = 180^0$

$4y + 20 + 4x = 180$

$4x + 4y = 180 - 20$

$x + y = \frac{\cancel{160}^{40}}{\cancel{4}}$

$x + Y = 40$ ...(1)

$\angle B + \angle D = 180^0$

$3y - 5 + 7x + 5 = 180$

$7x + 3y = 180$ ...(2)

$(1)\times 7 \Rightarrow 7x + 7y = 280$

$(2) \Rightarrow \frac{7x + 3y = 180}{4y = 100}$ ...(2)

$y = 25°$

Substitute $y = 25°$ in (1)

$x + 25 = 40$

$x = 40 - 25$

$x = 15°$

$\angle A = (4y+ 20)° = (4\times 25 + 20) = 100 + 20 = 120°$

$\angle B = (3y - 5) = (3\times 25° - 5) = 75° - 5° = 70°$

$\angle C = (4x)° = (4\times 15°) = 60°$

$\angle D = (7x + 5)° = (7\times 15 + 5) = 105° + 5° = 110°$

The Four angles are $\angle A = 120°$, $\angle B = 70°$, $\angle C = 60°$, $\angle D = 110°$

21) Simplify $3y(2y - 7) - 3 (y - 4) - 63$ and evaluate when $y = -2$.

**Answer :** $x^2 - 3x + 2$.

The value is 0

22) Factorise the following: $a^3+3a^2b+3ab^2+2b^3$

**Answer :** $a^3+3a^2b+3ab^2+2b^3$

$= (a+2b) (a^2+b^2+ab)$

23) Factorise the following : $x^4 - 9x^2$

**Answer :** $x^4 - 9x^2 = x^2 (x^2 - 9) = x^2 (x^2 - 32) = x^2 (x - 3)(x + 3)$

24) Draw the graph for the following linear equations

(i) $y = 4$

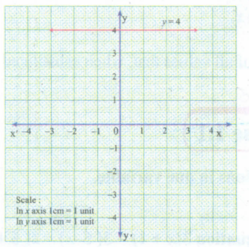
(ii) $x = -2$

(iii) $2x - 4 = 0$

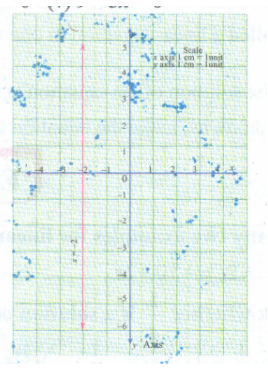
(iv) $6 + 2y = 0$

(v) $9 – 3x = 0$

**Answer :** (i)



(ii)

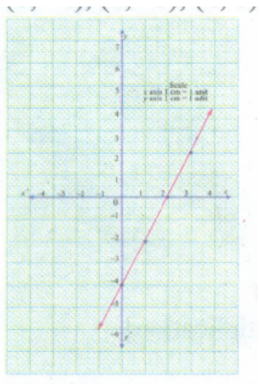


(iii)

| | | | | |
|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 |
| 2x | 0 | 2 | 4 | 6 |
| -4 | -4 | -4 | -4 | -4 |
| y=2x-4 | -4 | -2 | 0 | 2 |

∴ The points to be plotted:

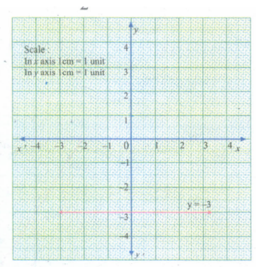
(0, -4), (1, -2), (2, 0), (3,2)



(iii)

2y = - 6

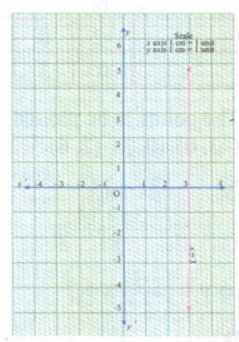
$$y = \frac{-6}{2} \Rightarrow y = 3$$



(v) - 9 + 9 - 3x = 0 -9

$$\cancel{-}3x = \cancel{-}9$$

$$x = \frac{9}{3} \Rightarrow x = 3$$



25) Solve by the method of elimination.

2x + y = 10; 5x - y = 11

**Answer :** 2x +y = 10 ----------(1)

5x - y = 11 -----------(2)

(1)+(2)⇒

2x+y =10

$$\frac{5x-y=11}{7x=21}$$

$$x=\frac{21}{7}=3$$

(l) ⇒ 2(3) +y =10

6+y = 10

y = 10 - 6 = 4

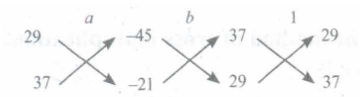
∴ Solution is x = 3, y = 4

26) Solve by cross multiplication method.

37a + 29b = 45; 29a + 37b = 21

**Answer :** 37a + 29b - 45 = 0

29a + 37b - 21 = 0




$$\frac{a}{29(-21)-37(-45)}=\frac{b}{(-45)(29)-(-21)37}{}'=\frac{1}{37(37)-29(29)}$$

$$\frac{a}{-609+1665}=\frac{b}{-1305+777}=\frac{1}{1369-841}$$

$$\frac{a}{1056}=\frac{b}{-528}=\frac{1}{528}$$

$$\frac{a}{1056}=\frac{b}{-528}\Rightarrow a\frac{1056}{528}=2$$

$$\frac{b}{-528}=\frac{1}{528}\Rightarrow b=\frac{-528}{528}=-1$$

27) Expand

i) $(3a + 4b)^3$

ii) $(2x - 3y)^3$

**Answer :** i) $(3a+4b)^3=(3a)^3+3(3a)^2(4b)+3(3a)(4\text{ b})^2+(4\text{ b})^3$

$=27a^3+108a^2b+144ab^2+64b^3$

ii) $(2x-3y)^3=(2x)^3-3(2x)^2(3y)+3(2x)(3y)^2-(3y)^3$

$=8x^3-36x^2y+54xy^2-27y^3$

28) Factorize:

(i) $3x^2$ +19x + 6

(ii) $5y^2$ +29+ 20

(iii) $18x^2$-x - 4

(iv) $2x^2$-3x - 14

**Answer :** i) $3x^2$ +19x + 6 = $3x^2$ + 18x +x+6

$=3x(x+6)+1(x+6)$

$=(3x+1)(x+6)$

ii) $5y^2$ +29+ 20= $5y^2-25y-4y+20$

$=5y(y-5)-4(y-5)$

$=(5y-4)(y-5)$

iii) $18x^2-x-4=18x^2-9x+8x-4$

9x (2x - 1) + 4(2x - 1)

= (9x + 4) (2x - 1)

iv) $2x^2$-3x - 14 = 2x2 - 7x + 4x - 14

= 2x (2x - 7) + 2(2x-7)

= (2x-7)(x+2)

29) If the polynomials $x^3+3x^2-m$ and $2x^2$ -mx +9 leaves the same remainder when they are divided by (x-2). Find the value of m. Also find the remainder.

**Answer :** Let p(x) =$x^3 + 3x^2 - m$ and q(x) = $2x^2$ -mx +9

When p(x) and q6) are divided by (x - 2), we get same remainder

i.e, p(2) = q(2)

$2^3 + 3(2)^2 - m = 2(2)^3 - m(2) + 9$

8 + 12 - m = 16 - 2m +9

20 - m = 25 - 2m

2m - m = 25 - 20

m = 5

**Reminder:**

= P(2)

= $2^3 + 3(2)^2$- 5

= 20 - 5

=15

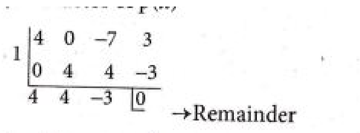
30) $4x^3 - 11x^2 - 7x + 3$?

**Answer :** Let p(x) = $4x^3 - 11x^2 - 7x + 3$

p(1) - $4(1)^3$ - 7(1) + 3

= 7 - 7 = 0

(x - 1) is a factor of p(x)



| | | | | |
|---|---|---|---|---|
| 1 | 4 | 0 | −7 | 3 |
| | 0 | 4 | 4 | −3 |
| | 4 | 4 | −3 | 0 |



The other factor is $4x^2$ + 4x - 3

$4x^2 + 4x - 3 = (2x + 3)(2x - 1)$

$\therefore 4x^3 - 11x^2 - 7x + 3 = (2x + 3)(2x - 1)(x - 1)$