Answers-

1. **x+4** *Linear polynomial is polynomial with degree 1.*
   $2x^2$-6x+1 *Quadratic polynomial is polynomial with degree 2.*
   x^3+2x^2+x *Cubic polynomial is polynomial with degree 3.*

2. **$2x^{225}$ + 3** *Binomial is a polynomial with exactly two term.*
   y^{110} *Monomial is a polynomial with exactly one term.*

3.
   a) **False.** *It has 2 variables x andq*
   b) True. *It is has only 1 variable***.**
   c) **False.** *It has 3 variables t, x & r*

4. **Zero**. *(Every constant term except 0 is Non-zero constant polynomial eg- 7 =$7x^0${degree=0})*

5. -9/2

Zero of a polynomial can be obtained by equating the polynomial to zero.
4x+18= 0
4x=-18
x= -18/4
x= -9/2

6. **False** Every linear polynomial has one and only one zero.

7.
   a) p(x)= 3x+1
      p(-⅓)= 3(-⅓)+1
      p(-⅓)= -1+1 = 0. **Yes**. -⅓ is 0 of given polynomial
   b) p(x)= 16x+6
      p(-⅜)= 16(-⅜)+6
      p(-⅜)= 2(-3)+6
      p(-⅜)= -6+6 = 0. **Yes**.-⅜ is a 0 of the given polynomial.
   c) p(q)= q^2-3
      p(√2)=$(\sqrt{2})^2$-3
      p(√2)=2-3 = -1. **No**.√2 is not a 0 of given polynomial.
   d) p(r)= π-4r
      p(11/14)= π- 4(11/14)
      p(11/14)= 22/7- (22/7)
      p(11/14)= 0 **Yes**. 11/14 is 0 of the given polynomial

8. The degree of Zero polynomial is undefined.

9. $p(x)= x^2-3x-10$

   Factors of constant term(10)= ±1, ±2, ±5,±10

   At x=+1 p(x) = -12

   At x=-1 p(x) = -6

   At x=+2 p(x) = -12

   At x=-2 p(x) = 0

   So x+2 is 1 factor of polynomial.

   Writing $x^2-3x-10$ in terms of x+2

   $=x^2+2x- 5x -10$

   $=x(x+2)-5(x+2)$

   $=(x+2)(x-5)$

10.
   a) $p(-2)=7(-2)^3+8(-2)-7$

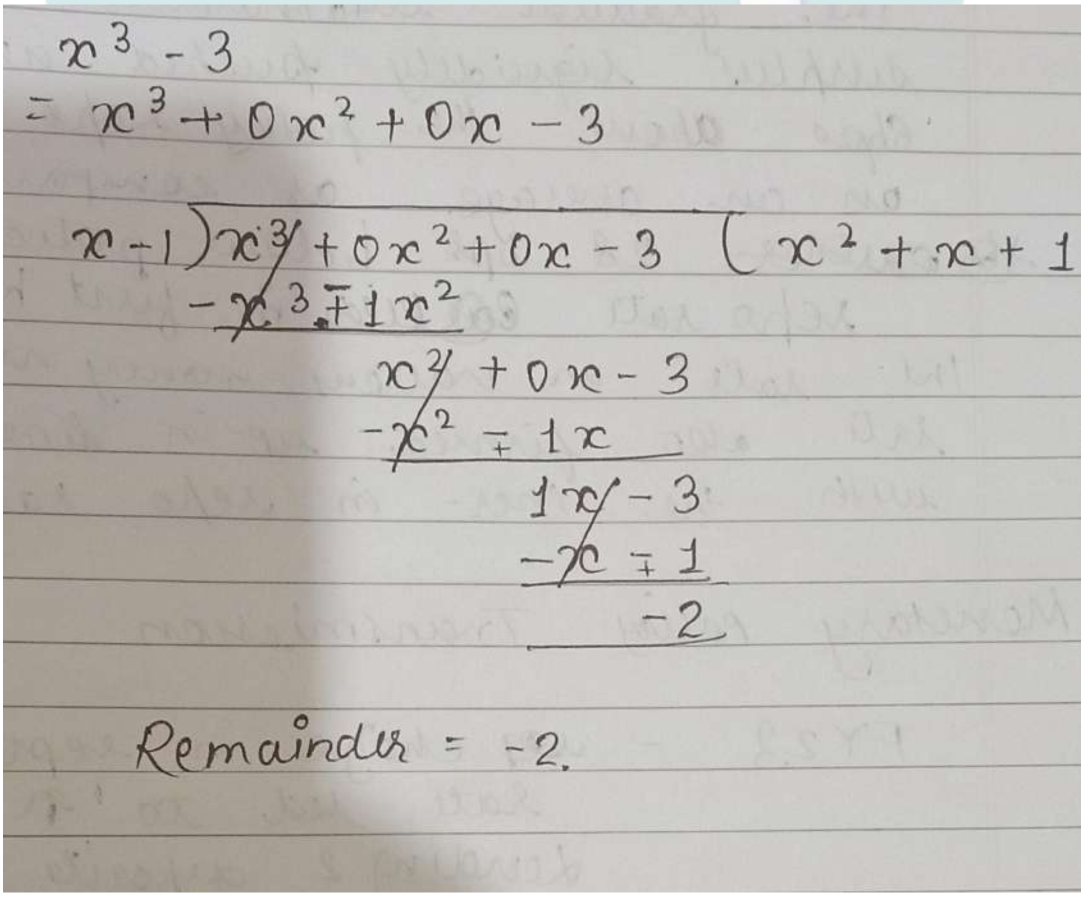
      $p(-2)= 7(-8)-16-7$

      $p(-2)=-56-16-7=-79$

   b) $p(1,-1)=(1+3)\{-(-1)^2+1\}$

      $p(1,-1)= 4 (0) =0$

11.



$x^3 - 3$

$= x^3 + 0x^2 + 0x - 3$

$x - 1 \,)\, x^3 + 0x^2 + 0x - 3 \,(\, x^2 + x + 1$

$- x^3 \mp 1x^2$

$x^2 + 0x - 3$

$- x^2 \mp 1x$

$1x - 3$

$- x \mp 1$

-2

Remainder = -2.

12. As x-1 is factor of $7x+7x^2-kx+4$. So
    $p(1)=0$
    or, $p(1)= 7(1)+7(1)^2-k(1)+4=0$
    or, $7+7-k+4=0$
    or, $18-k=0$
    or, **k=18**

13. a)
    $(98)^3=(100-2)^3$. *Using Identity:-*
    $(x-y)^3 = x^3- y^3 -3xy(x-y)$
    $=(100)^3-(2)^3-3(100)(2)(100-2)$
    $=10,00,000-8-600(98)$
    $=999992-58800$
    $=941192$

    b)
    $(1003)^3=(1000+3)^3$ *Using Identity:-*
    $(x+y)^3 =x^3+y^3 +3xy(x+y)$
    $= (1000)^3+(3)^3+3(1000)(3)(1000+3)$
    $= 1,00,00,00,000+27+9,000(1003)$
    $=1,00,00,00,027+90,27,000$
    $= 1,00,90,27,027$

14. Zero of a polynomial can be obtained by equating the polynomial to zero.
    $bx=0$
    $x=0$ Hence, 0 is the zero of polynomial bx.

15. $t-\frac{1}{2} =0$
    $t=\frac{1}{2}$
    $q(\frac{1}{2}) = -2(\frac{1}{2})^3-2(\frac{1}{2})^2+\frac{1}{2} +1$
    or, $q(\frac{1}{2})= -2(\frac{1}{8})-2(\frac{1}{4})+\frac{1}{2}+1$or,
    $q(\frac{1}{2})= -\frac{1}{4}-\frac{1}{2}+\frac{1}{2}+1$
    $=-\frac{1}{4} +1$
    $= -\frac{3}{4}$ No, q(t) is not multiple of $t-\frac{1}{2}$

16. $(4p)^3 +(6p)^3$
    = [*Using $a^3 + b^3= (a+b)(a^2 -ab + b^2)$*]
    $=(4p+ 6p) [(4p)^2 - (4p)(6p) + (6p)^2]$
    $= (10p) [16 p^2 - 24p^2 + 36 p^2]$
    $= (10p) [28p^2]$
    $=280p^3$

17. a) $(x+7) (x-3)$
    [*Using $(x+a) (x + b) = x^2 + (a+b) x + ab$*]
    $(x+7)(x-3)= x^2 + (7+(-3))x + (7)(-3)$
    $= x^2+ 4x-21$

    b) $(x+6)(x+6) = (x+6)^2$

[*Using* $(x+y)^2= x^2+ y^2+ 2xy$]
$= x^2+(6)^2 + 2x(6)$
$=x^2 + 36 + 12x$
$=x^2+12x+36$

c) $(16-y^2) = [(4)^2- (y)^2]$
[Using $x^2-y^2 = (x+y)(x-y)$*]*
$(4)^2- y^2 = (4+ y)(4-y)$

d) $(x^2+⅓)(x^2-⅓)$
[Using $x^2-y^2 = (x+y)(x-y)$*]*
or, $(x^2+⅓)(x^2-⅓)= (x^2)^2- [⅓]^2$or,
$(x^2+⅓)(x^2-⅓)= x^4 - 1/9$

18. (102)(102)
$=(100+2)^2$
[Using $(x+y)^2= x^2+ y^2+ 2xy$*]*
$= (100)^2+(2)^2 + 2(100)(2)$
$=10000 + 4 + 400$
$=10404$

19. $y+1=0$
$y=-1$
$p(y) = 4y^3+2y^2-1$
or, $p(-1)=4(-1)^3+2(-1)^2-1$
or, $p(-1)= -4+2-1$
or, $p(-1)= -3$

20. $ay^2-k =0$
$ay^2 =k$
$y^2=k/a$
Thus, $y=\sqrt{(k/a)}$ is 0 of a polynomial

21. *[Using* $(x+y+z)^2= x^2+ y^2+ z^2+2xy+2yz+2zx$*]*
$x= 2x$
$y= 3y$
$z= -6r$
$(2x+3y-6r)^2 = 4x^2+ 9y^2 +36r^2 +12xy-36ry-24rx$

22. **a)** [*Using* $(x + y)^3= x^3+ y^3 + 3xy (x + y)$]
$(2p+7c)^3= (2p)^3 +(7c)^3p+3(2p)(7c)(2p+7c)$
b) [*Using* $(x- y)^3= x^3- y^3- 3xy (x-y)$]
$(c - x/2)^3 = [c]^3 -(x/2)^3-3c(x/2)(c-x/2)$

23. $x^2 + 2x -15$
$=x^2 +(5-3)x- 15$
$=x^2+5x-3x-15$
$=x(x+5)-3(x+5)$

$=(x+5)(x-3)$

24. $3x+1=0$
 $x=-1/3$
 As $3x+1$ is factor of $p(x)= 3x^2-tx+2$
 So $p(-\frac{1}{3}) = 0$
 or, $3(-\frac{1}{3})^2-t(-\frac{1}{3})+2 =0$
 or, $3(1/9)+t/3=-2$
 or, $(1+t)/3 =-2$
 or, $1+t =-6$
 or, $t=-7$

25. a)
 All factors of constant term(120) = ±1,±2, ±3, ±4, ±5, ±6, ±8, ±10, ±12,±15, ±20, ±24, ±30, ±40, ±60, ±120
 Using hit & trial method
 At $x=+10$
 $p(10)= (10)^2- 22(10)+120 =0$
 So $x-10$ is the factor of $x^2-22x+120$
 $x^2-22x+120$
 $= x^2-10x-12x+120$
 $= x(x-10)-12(x-10)$
 $=(x-10)(x-12)$

 b)
 All factors of constant term(3) = ±1, ±3
 Putting $p=1$ $2p^2+5p-3= 4$
 Putting $p=-1$ $2p^2+5p-3= -6$
 Putting $p=3$ $2p^2+5p-3= -3$
 Putting $p=-3$ $2p^2+5p-3= 0$
 So, $p+3$ is the factor of $2p^2+5p-3$
 $2p^2+5p-3$
 $=2p^2+6p-1p-3$
 $=2p(p+3)-1(p+3)$
 $=(p+3)(2p-1)$

26. $(8)^3 +(-5)^3 +(-3)^3$
 $x= 8$
 $y=-5$
 $z=-3$
 $x+y+z = 8-5-3= 0$
 We know that if,
 $x + y + z = 0$,then $x^3 + y^3+ z^3 = 3xyz$
 So,
 $(8)^3 +(-5)^3 +(-3)^3= 3(8)(-5)(-3)$
 $=360$