REMAINDER AND FACTOR THEOREMS

1. Find the remainder when $x^3 - 7x + 4$ is divided by x -1, x +2 and 2x +1.
2. Find the remainder when $f(x) = x^3 - 6x^2 + 2x - 4$ is divided by 1-3x.
3. If the polynomial $f(x) = 2x^3 - ax^2 + 4x - 1$, leaves a remainder - 37 when divided by x + 2, find the value of a.
4. The polynomial $ax^3 + 3x^2 - 13$ and $2x^3 - 5x + a$ are divided by x +2 . If the remainder is same in each case, find the value of a
5. Use factor theorem to determine whether
   a. x-1 is a factor of $f(x) = 2x^3 + 5x^2 - 3x - 4$
   b. 2x -3 is a factor of $f(x) = 2x^3 - 9x^2 + x + 12$.
6. Find the value of a if x + a is a factor of polynomial $x^3 + ax^2 - 2x + a + 4$.
7. If $x^3 + ax^2 - x + b$ has (x -2) as a factor and leaves a remainder 3 when divided by (x-3), find a and b.
8. Factorize $x^3 + 13x^3 + 31x - 45$, given that x + 9 is a factor of it.
9. Factorize $x^3 - 7x + 6$, using factor theorem.
10. If the expression $x^3 + 3x^2 + 4x + p$ has (x + 6) as a factor, find P.
11. If (x + a) be the HCF of $x^2 + mx + n$ and $x^2 + rx + s$, then show that $a = \frac{n-s}{m-r}$
12. What number must be added to $3x^3 + x^2 - 22x + 9$, so that result becomes exactly divisible by x + 3 .

1. Find the remainder when $x^2 - 8x + 4$ is divided by 2x + 1.
2. Find the value of `a' if the division of $ax^3 + 9x^2 + 4x - 10$ by $x + 3$ leaves a remainder of 5.
3. When the polynomial $2x^3 - kx^2 + (5k - 3)x - 8$ is divided by x – 2, the remainder is 14. Find the value of `k'.
4. The polynomial $3x^3 - ax^2 + 5x - 13$ and $(a + 1)x^2 - 7x + 5$ leave the same remainder when divided by x – 3. Find the value of `a'.
5. When f(x) = $x^3 + ax^2 - bx - 8$ is divided by x – 2, the remainder is zero and when divided by x + 1, the remainder is -30. Find the values of `a' and `b'.
6. What number should be added to $2x^3 - 3x^2 + x$ so that when the resulting polynomial is divided by x -2, the remainder is 3 ?
7. Determine whether x – 1 is a factor of $x^6 - x^5 + x^4 + x^3 - x^2 - x + 1$ or not ?
8. If x – 2 is a factor of $x^2 - 7x + 2a$, find the value of a.
9. Find the value of `k' if (x - 2) is a factor of $x^3 + 2x^2 - kx + 10$. Hence, determine whether (x + 5) is also a factor.
10. Given that x + 2 and x – 3 are factors of $x^3 + ax + b$; calculate the values of a and b.
11. Polynomial $x^3 - ax^2 + bx - 6$ leaves remainder -8 when divided by x – 1 and x – 2 is a factor of it. Find the values of `a' and `b'.
12. Using the Factor Theorem, show that (x - 2) is a factor of $3x^2 - 5x - 2$. Hence, factorise the given expression.
13. Show that 2x + 7 is a factor of $2x^3 + 5x^2 - 11x - 14$. Hence, factorise the given expression completely, using the factor theorem.
14. Using the Remainder Theorem, factorise the expression$2x^3 + x^2 - 2x - 1$ completely.
15. Find the values of 'a' and 'b' so that the polynomial $x^3 + ax^2 + bx - 45$ has (x – 1) and (x + 5) as its factors. For the values of 'a' and 'b', as obtained above, factorise the given polynomial completely.
16. If (x-2) is a factor of $2x^3 - x^2 - px - 2$
    i. Find the value of p.
    ii. With the value of p, factorise the above expression completely.