Solutions for Class 9 Maths Chapter 6 Factorization of Polynomials

Exercise 6.3

In each of the following, using the remainder theorem, find the remainder when f(x) is divided by g(x) and verify the by actual division : (1 – 8)

Question 1: $f(x) = x^3 + 4x^2 - 3x + 10$, $g(x) = x + 4$
Solution:
$f(x) = x^3 + 4x^2 - 3x + 10$, $g(x) = x + 4$

Put g(x) =0
=> x + 4 = 0 or x = -4

Remainder = f(-4)
Now,
$f(-4) = (-4)^3 + 4(-4)^2 - 3(-4) + 10 = -64 + 64 + 12 + 10 = 22$

Actual Division:

$$
\begin{array}{r|l}
 & x^2 \quad -3 \\
\hline
x+4 & x^3 \quad +4x^2 \quad -3x \quad +10 \\
 & -\\
 & x^3 \quad +4x^2 \\
\hline
 & \quad 0 \quad -3x \quad +10 \\
 & \quad\quad -\\
 & \quad\quad -3x \quad -12 \\
\hline
 & \quad\quad\quad\quad 22
\end{array}
$$

Question 2: $f(x) = 4x^4 - 3x^3 - 2x^2 + x - 7$, $g(x) = x - 1$
Solution:

$f(x) = 4x^4 - 3x^3 - 2x^2 + x - 7$
Put g(x) =0
=> x – 1 = 0 or x = 1

Remainder = f(1)
Now,
$f(1) = 4(1)^4 - 3(1)^3 - 2(1)^2 + (1) - 7 = 4 - 3 - 2 + 1 - 7 = -7$

Actual Division:

$$
\begin{array}{r|rrrrr}
 & 4x^3 & +x^2 & -x & & \\
\hline
x-1 & 4x^4 & -3x^3 & -2x^2 & +x & -7 \\
 - & & & & & \\
 & 4x^4 & -4x^3 & & & \\
\hline
 & & x^3 & -2x^2 & +x & -7 \\
 & & - & & & \\
 & & x^3 & -x^2 & & \\
\hline
 & & & -x^2 & +x & -7 \\
 & & & - & & \\
 & & & -x^2 & +x & \\
\hline
 & & & & 0 & -7
\end{array}
$$

Question 3: f(x) = $2x^4 - 6X^3 + 2x^2 - x + 2$, g(x) = x + 2
Solution:
f(x) = $2x^4 - 6X^3 + 2x^2 - x + 2$, g(x) = x + 2

Put g(x) = 0
=> x + 2 = 0 or x = -2

Remainder = f(-2)
Now,

f(-2) = $2(-2)^4 - 6(-2)^3 + 2(-2)^2 - (-2) + 2 = 32 + 48 + 8 + 2 + 2 = 92$

Actual Division:

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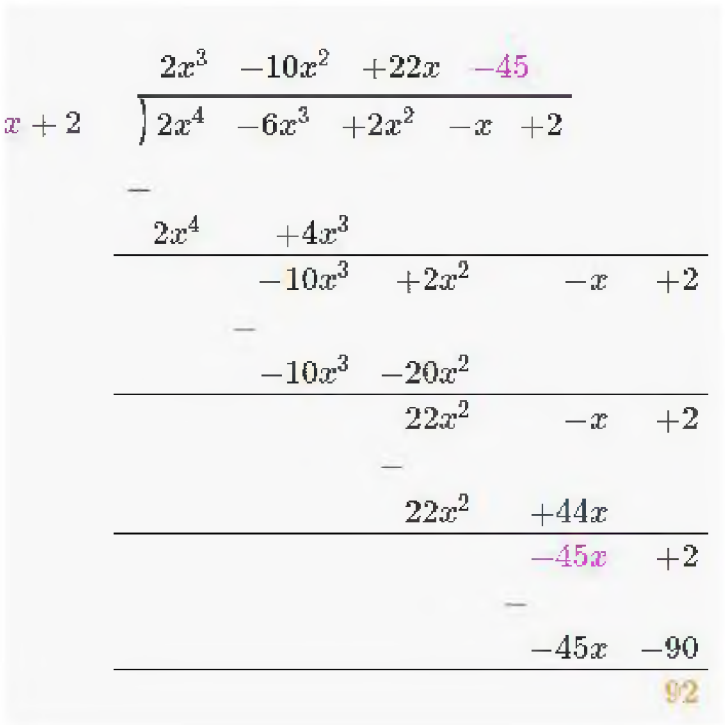


$$
\begin{array}{rl}
 & \begin{array}{rrrrr} 2x^3 & -10x^2 & +22x & -45 & \end{array} \\
x+2 & \overline{)\,2x^4 \quad -6x^3 \quad +2x^2 \quad -x \quad +2} \\
 & \underline{-\quad\quad\quad\quad\quad\quad\quad\quad} \\
 & \begin{array}{rrrrr} 2x^4 & +4x^3 & & & \\ \hline & -10x^3 & +2x^2 & -x & +2 \end{array} \\
 & \underline{\quad -\quad\quad\quad\quad\quad\quad} \\
 & \begin{array}{rrrrr} & -10x^3 & -20x^2 & & \\ \hline & & 22x^2 & -x & +2 \end{array} \\
 & \underline{\quad\quad\quad -\quad\quad\quad} \\
 & \begin{array}{rrrrr} & & 22x^2 & +44x & \\ \hline & & & -45x & +2 \end{array} \\
 & \underline{\quad\quad\quad\quad\quad -\quad} \\
 & \begin{array}{rrrrr} & & & -45x & -90 \\ \hline & & & & 92 \end{array}
\end{array}
$$

Question 4: f(x) = $4x^3 – 12x^2 + 14x – 3$, g(x) = 2x – 1

Solution:

f(x) = $4x^3 – 12x^2 + 14x – 3$, g(x) = 2x – 1

Put g(x) =0

=> 2x -1 =0 or x = 1/2

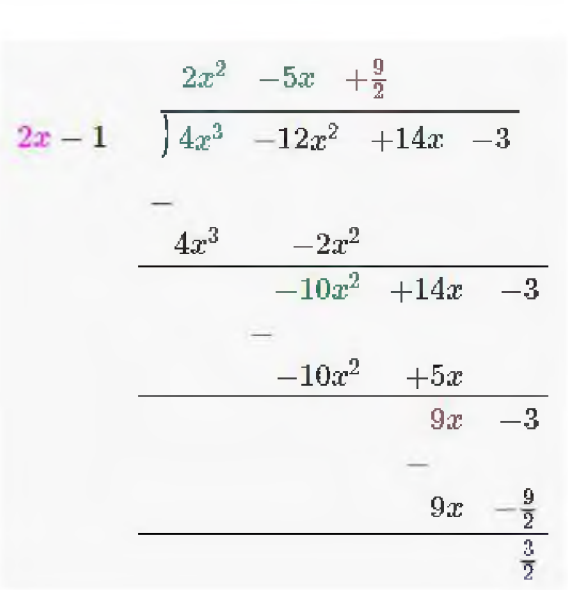
Remainder = f(1/2)

Now,

f(1/2) = $4(1/2)^3 – 12(1/2)^2 + 14(1/2) – 3$ = ½ - 3 + 7 – 3 = 3/2

Actual Division:

Solutions for Class 9 Maths Chapter 6 Factorization of Polynomials



Question 5: f(x) = $x^3 - 6x^2 + 2x - 4$, g(x) = $1 - 2x$

Solution:

f(x) = $x^3 - 6x^2 + 2x - 4$, g(x) = $1 - 2x$

Put g(x) = 0

=> $1 - 2x = 0$ or $x = 1/2$

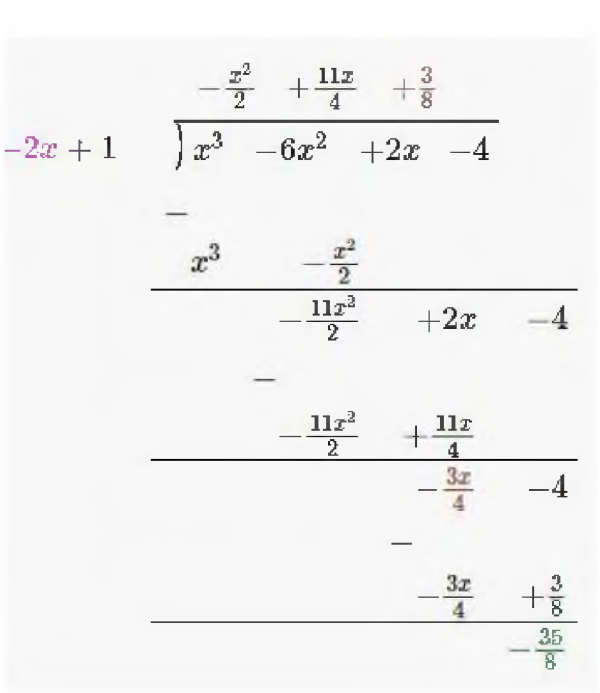
Remainder = f(1/2)

Now,

f(1/2) = $(1/2)^3 - 6(1/2)^2 + 2(1/2) - 4 = 1 + 1/8 - 4 - 3/2 = -35/8$

Actual Division:

Solutions for Class 9 Maths Chapter 6 Factorization of Polynomials



Question 6: $f(x) = x^4 – 3x^2 + 4$, $g(x) = x – 2$

Solution:

$f(x) = x^4 – 3x^2 + 4$, $g(x) = x – 2$

Put $g(x) = 0$

$\Rightarrow x - 2 = 0$ or $x = 2$

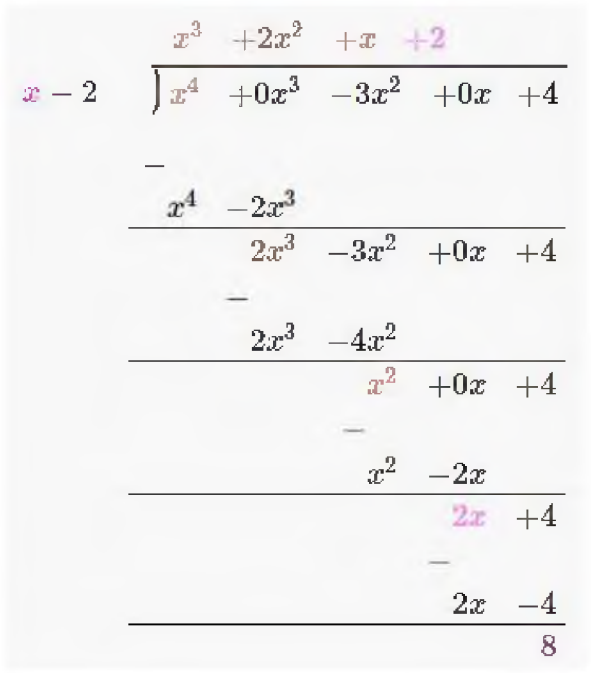
Remainder = $f(2)$

Now,

$f(2) = (2)^4 – 3(2)^2 + 4 = 16 – 12 + 4 = 8$

Actual Division:

Solutions for Class 9 Maths Chapter 6 Factorization of Polynomials



Question 7: f(x) = $9x^3 – 3x^2 + x – 5$, g(x) = x – 2/3

Solution:

f(x) = $9x^3 – 3x^2 + x – 5$, g(x) = x – 2/3

Put g(x) = 0

=> x - 2/3 = 0 or x = 2/3

Remainder = f(2/3)

Now,

f(2/3) = $9(2/3)^3 – 3(2/3)^2 + (2/3) – 5$ = 8/3 – 4/3 + 2/3 – 5/1 = -3

Actual Division:

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