Practice Exercises

A. Divide the polynomials using the long method. Express your answer as $P(x) = D(x) \cdot Q(x) + R$.

1. $(x^3 - 7x - 6) \div (x - 2)$
2. $(4x^2 + 5x + 8) \div (x + 1)$
3. $(10x^4 + 5x^3 + 4x^2 - 9) \div (x + 1)$
4. $(2x^4 - 6x^3 + x^2 - 3x - 3) \div (x - 3)$
5. $(4x^4 + 5x^3 + 2x^2 - 1) \div (x + 1)$

B. Divide the polynomials using synthetic division. Express your answer as $P(x) = D(x) \cdot Q(x) + R$.

1. $(5x^2 - 10x - 47) \div (x - 4)$
2. $(x^3 - x^2 - x - 2) \div (x - 2)$

3. $(x^4+9x^3+4x^2+50x+9)\div(x+8)$

4. $(x^4-8x^3+10x^2+2x+4)\div(x-2)$

5. $(x^5+6x^4-3x^2-22x-29)\div(x+6)$

Problem Set

A. Divide the polynomials using the long method. Express your answer as $P(x) = D(x) \cdot Q(x) + R$.

1. $(x^3 - 14x + 8) \div (x + 4)$
2. $(x^2 + 10) \div (x + 4)$
3. $(x^3 + 8x^2 - 3x + 16) \div (x + 5)$
4. $(x^4 - 6x^3 - 40x + 33) \div (x - 7)$
5. $(-10x^5 + 3x - 7) \div (x - 1)$

B. Divide the polynomials using synthetic division. Express your answer as $P(x) = D(x) \cdot Q(x) + R$.

1. $(8x^2 + 30x - 11) \div (x + 4)$

2. $(x^4 - 8x^3 - x^2 + 62x - 34) \div (x - 7)$

3. $(x^4 + 6x^3 + 11x^2 + 29x - 13) \div (x + 5)$

4. $(x^5 - 25x^3 - 7x^2 - 37x - 18) \div (x + 5)$

5. $(x^4 + 10x^3 + 21x^2 + 6x - 8) \div (x + 2)$

Problem Set

1.

$$\begin{array}{r|rrr} -4 & 8 & 30 & -11 \\ & & -32 & 8 \\ \hline & 8 & -2 & -3 \end{array}$$

$8x^2+30x-11 =$
$(x+4)(8x-2)-3$

2.

$$\begin{array}{r|rrrrr} 7 & 1 & -8 & -1 & 62 & -34 \\ & & 7 & -7 & -56 & 42 \\ \hline & 1 & -1 & -8 & 6 & 8 \end{array}$$

$x^4-8x^3-x^2+62x-34 =$
$(x-7)(x^3-x^2-8x+6)+8$

3.

$$\begin{array}{r|rrrrr} -5 & 1 & 6 & 11 & 29 & -13 \\ & & -5 & -5 & -30 & 5 \\ \hline & 1 & 1 & 6 & -1 & -8 \end{array}$$

$x^4+6x^3+11x^2+29x-13 =$
$(x+5)(x^3+x^2+6x-1)-8$

4.

$$\begin{array}{r|rrrrrr} -5 & 1 & 0 & -25 & -7 & -37 & -18 \\ & & -5 & 25 & 0 & 35 & 10 \\ \hline & 1 & -5 & 0 & -7 & -2 & -8 \end{array}$$

$x^5-25x^3-7x^2-37x-18 =$
$(x+5)(x^4-5x^3-7x-2)-8$

5.

$$\begin{array}{r|rrrrr} -2 & 1 & 10 & 21 & 6 & -8 \\ & & -2 & -16 & -10 & 8 \\ \hline & 1 & 8 & 5 & -4 & 0 \end{array}$$

$x^4 + 10x^3 + 21x^2 + 6x - 8 = (x+2)(x^3 + 8x^2 + 5x - 4)$