

# Polynomials.

## Dividing, Roots, and Factors

**X's lie!**

$$\begin{array}{r} -3 \overline{) 2 \ 7 \ 5 \ 5 \ 8} \\ \underline{-6 \ -3 \ -6 \ 3} \\ 2 \ 1 \ 2 \ -1 \ 11 \end{array}$$

$$y = a(x - r_1)(x - r_2)(x - r_3)$$

$$p(x) = d(x) \cdot q(x) + r(x)$$

### Long Division

- 1) Divide small
- 2) Multiply
- 3) Subtract
- 4) Bring Down

2

What is the remainder when  $f(x) = x^3 + 3x^2 - 10x - 14$  is divided by  $(x - 3)$ ?

Write your answer in the space provided.

1

Which is the quotient of  $\frac{x^2 + 7x + 12}{x + 6}$ ?

- A  $x + 1 + \frac{18}{x + 6}$
- B  $x + 1 + \frac{6}{x + 6}$
- C  $x + 13 + \frac{90}{x + 6}$
- D  $x + 13 + \frac{-66}{x + 6}$

3

A polynomial,  $f(x)$ , is divided by three different linear expressions, as listed in the table. The remainder after the division by each linear expression is also shown in the table.

Linear Expression	Remainder
$x$	-2
$x - 1$	-3
$x - 2$	0

Which must be a root of the polynomial equation, when  $f(x) = 0$ ?

- A -2
- B 0
- C 1
- D 2

4

The cubic function  $f(x) = x^3 - 6x^2 + 11x - 6$  has a root at  $x = 3$ .

What are the other roots of the function?

- A  $x = 1, x = 2$
- B  $x = 3, x = 2$
- C  $x = -1, x = -2$
- D  $x = -3, x = -2$

6

Consider the function  $f(x) = x^3 - 9x^2 + 6x + 56$ .

Select all values of  $x$  for which  $f(x) = 0$ .

- A -8
- B -7
- C -4
- D -2
- E 0
- F 2
- G 4
- H 7

5

$(x - 2)$  is a factor of the function  $R(x) = x^4 + 2x^3 - 5x^2 - 6x$ .

What are the zeros of the function  $R(x)$ ?

- A  $x = -3, -1, 2$
- B  $x = -1, 0, 2, 3$
- C  $x = -2, 0, 1, 3$
- D  $x = -3, -1, 0, 2$

7

The polynomial  $g(x)$  is divided by a binomial. The result is shown.

$$x^2 - 3x + 3 + \frac{-9}{3x + 2}$$

What is  $g(x)$ ?