

## Answer on Question #56102 – Math – Algebra

7: what is the remainder for the division problem shown?

-1 3 -4 2 -1

-3 7 -9

3 -7 9 -10

A: 3

B: No remainder

C: -10

D: -1

### Solution

The remainder is the last number, the right-bottom, so it is -10.

8:  $x + 3$  is a factor of  $p(x) = x^3 - 7x^2 + 15x - 9$

A: True

B: False

### Solution

Let factor  $p(x)$ :

$$\begin{aligned}x^3 - 7x^2 + 15x - 9 &= x^3 - 6x^2 + 9x - x^2 + 6x - 9 = x(x^2 - 6x + 9) - (x^2 - 6x + 9) = \\ &= (x^2 - 6x + 9)(x - 1) = (x - 1)(x - 3)^2\end{aligned}$$

So,  $x + 3$  is not factor of  $p(x)$ .

9: If  $f(c) = 0$ , which of the following statements must be true?

A: The point  $(0, c)$  lies on the graph of  $f(x)$ .

B:  $x - c$  is a factor of  $f(x)$

C: The point  $(-c, 0)$  lies on the graph of  $f(x)$

D:  $x + c$  divides evenly into  $f(x)$

### Solution

If  $f(c) = 0$  (and  $f(x)$  is polynomial), we can write  $f(x) = (x - c) \cdot Q(x)$ , where  $Q(x)$  is a polynomial, which degree is one less, than degree of  $f(x)$ . So  $x - c$  is factor of  $f(x)$ .

10: If  $x - 1$  is a factor of  $p(x) = x^3 - 5x^2 + 7x - 3$ , which of the following represents the complete factorization for  $p(x)$  ?

A:  $(x-3)(x-1)(x-1)$

B:  $(x-1)(x+3)(x+1)$

C:  $(x-3)(x-1)(x+1)$

D:  $(x-3)(x+3)(x-1)$

**Solution**

$$\begin{aligned} p(x) &= x^3 - 5x^2 + 7x - 3 = x^3 - 2x^2 + x - 3x^2 + 6x - 3 = \\ &= x(x^2 - 2x + 1) - 3(x^2 - 2x + 1) = (x^2 - 2x + 1)(x - 3) = (x - 1)^2(x - 3) = \\ &= (x - 1)(x - 1)(x - 3) \end{aligned}$$

**Answer:** 7: C; 8: B; 9: B; 10: A.