Topic: Factoring quadratic polynomials

Question: Factor the trinomial.

$$x^2 - x - 42$$

Answer choices:

A $(x + 6)(x - 7)$

B $(x - 6)(x + 7)$

C $(x + 6)(x + 7)$

D $(x - 6)(x - 7)$

Solution: A

This is a quadratic polynomial in which the coefficient of the first term is 1. To get x^2, we have to multiply x by x.

$$(x \quad)(x \quad)$$

Now we're looking for a pair of factors of the constant term, -42, whose sum is -1 (the coefficient of the x term). The pairs of factors of -42 are as follows:

-1 and 42	1 and -42
-2 and 21	2 and -21
-3 and 14	3 and -14
-6 and 7	6 and -7

The only pair of factors whose sum is -1 is 6 and -7. Therefore, we can factor the trinomial as

$$(x + 6)(x - 7)$$

Topic: Factoring quadratic polynomials

Question: Factor the quadratic polynomial.

$$x^2 - 4x - 21$$

Answer choices:

A $(x + 21)(x - 1)$

B $(x + 3)(x - 7)$

C $(x + 7)(x - 3)$

D $(x - 21)(x + 1)$

Solution: B

If we start with

$$x^2 - 4x - 21$$

we see that the factors of the first term, x^2, are x and x, so we know that the factored form of this quadratic polynomial will be

$$(x \pm ?)(x \pm ?)$$

The pairs of factors of -21 are 1 and -21, -1 and 21, 3 and -7, and -3 and 7.

The only pair of factors that add up to the coefficient of the x-term, -4, is 3 and -7, so we can now write

$$(x + 3)(x - 7)$$

We can check our work by using the FOIL method.

$$(x + 3)(x - 7)$$

$$x^2 - 7x + 3x - 21$$

$$x^2 - 4x - 21$$

Topic: Factoring quadratic polynomials

Question: Factor the quadratic polynomial.

$$t^2 + t - 20$$

Answer choices:

A $(t - 2)(t + 10)$

B $(t - 5)(t + 4)$

C $(t + 2)(t - 10)$

D $(t - 4)(t + 5)$

Solution: D

If we start with

$$t^2 + t - 20$$

we can say that the factors of t^2 are t and t, so we know this much:

$$(t \ \pm ?)(t \ \pm ?)$$

The factors of -20 are 1 and -20, -1 and 20, 2 and -10, -2 and 10, 4 and -5, and -4 and 5.

The factors -4 and 5 will add up to the middle coefficient, 1, so we now can write

$$(t - 4)(t + 5)$$

We can check our work by using the FOIL method.

$$(t - 4)(t + 5)$$

$$t^2 + 5t - 4t - 20$$

$$t^2 + t - 20$$