- Let d and e denote the solutions of $2x^2 + 3x - 5 = 0$. What is the value of $(d-1)(e-1)$?

(A) $-\frac{5}{2}$ **(B)** 0 **(C)** 3 **(D)** 5 **(E)** 6

2003 AMC 10 A, Problem #5— "Use the sum and product of the roots formulas"

- **Solution (B)** If $x = d$ and $x = e$ are the roots of the quadratic equation $ax^2 + bx + c = 0$, then

$$de = \frac{c}{a} \quad \text{and} \quad d + e = -\frac{b}{a}.$$

For our equation this implies that

$$(d-1)(e-1) = de - (d+e) + 1 = -\frac{5}{2} - \left(-\frac{3}{2}\right) + 1 = 0.$$

One can also factor the quadratic directly, find the roots and evaluate the expression!

Difficulty: Easy

NCTM Standard: Algebra Standard for Grades 9–12: Represent and analyze mathematical situations and structures using algebraic symbols; understand the meaning of equivalent forms of expressions, equations, inequalities, and relations; write equivalent forms of equations, inequalities, and systems of equations and solve them with fluency.

Mathworld.com Classification:
Algebra > Algebraic Equations > Quadratic Equations;
Algebra > Polynomials > Vieta's Formulas