

YOU & MATHS Which is a factor of $5x^4 - 135xy^3$?

A $x^2 + 6xy + 9y^2$

D $x^2 + 3xy + 9y^2$

B $x^2 - 6xy - 9y^2$

E $x^2 - 6xy + 9y^2$

C $x^2 - 3xy + 9y^2$

(USA Tennessee Mathematics Teachers Association: 39th Annual Mathematics Contest, 1995)

Let's factor the original polynomial:

$$5x^4 - 135xy^3 =$$

$$5x(x^3 - 27y^3) =$$

$$5x(x - 3y)(x^2 + 3xy + 9y^2).$$

As we can see, the polynomial $x^2 + 3xy + 9y^2$ is a factor of the original $5x^4 - 135xy^3$, so the correct answer is D.

We also notice that answers A, B, C and E are all second degree and therefore cannot be factors of the other terms of the given polynomial.

So D is the **only** correct answer.