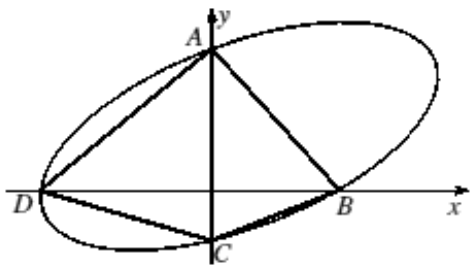
16. The diagram shows the ellipse whose equation is $x^2 + y^2 - xy + x - 4y = 12$. The curve cuts the y-axis at points A and C and cuts the x-axis at points B and D. What is the area of the inscribed quadrilateral $ABCD$?

A 28 B 36 C 42 D 48 E 56



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16. A At points A and C, $x = 0$. So $y^2 - 4y = 12$, i.e. $(y - 6)(y + 2) = 0$, i.e. $y = 6$ or $y = -2$. So C is $(0, -2)$ and A is $(0, 6)$. At points B and D, $y = 0$. So $x^2 + x = 12$, i.e. $(x - 3)(x + 4) = 0$, i.e. $x = 3$ or $x = -4$. So D is $(-4, 0)$ and B is $(3, 0)$.
Therefore the areas of triangles DAB and DBC are $\frac{1}{2} \times 7 \times 6 = 21$ and $\frac{1}{2} \times 7 \times 2 = 7$.
So $ABCD$ has area 28. {*It is left to the reader to prove that area* $ABCD = \frac{1}{2}BD \times AC$.}