9. A square has vertices at $(0, 0)$, $(1, 0)$, $(1, 1)$ and $(0, 1)$. Graphs of the following equations are drawn on the same set of axes as the square.

$$x^2 + y^2 = 1, \qquad y = x + 1, \qquad y = -x^2 + 1, \qquad y = x, \qquad y = \frac{1}{x}$$

How many of the graphs pass through exactly two of the vertices of the square?

A 1 B 2 C 3 D 4 E 5

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9. **C** Let $O = (0,0)$, $A = (1,0)$, $B = (1,1)$, $C = (0,1)$ be the vertices of the square. The equation $x^2 + y^2 = 1$ gives a circle passing through A and C. The equation $y = x + 1$ gives a straight line passing only through C. The equation $y = -x^2 + 1$ gives a parabola passing through A and C. The equation $y = x$ gives a straight line passing through O and B. The equation $y = \frac{1}{x}$ gives a rectangular hyperbola which has two branches and passes only through B. So, only $x^2 + y^2 = 1$, $y = x$ and $y = -x^2 + 1$ have graphs passing through exactly two of the vertices of the square.