Example #a p. 10 Ch. 11

Given a random equation can you tell if it is a hyperbola, ellipse, parabola or degenerate.

$4x^2 + 9y^2 - 36y = 0$

- Notice x^2 and y^2's so 1st Complete the square on the y's

    Step1: Remove the numeric coefficient

    $$4x^2 + 9(y^2 - 4y\quad) = 0$$

    Step 2: Complete the square

    $$(\tfrac{1}{2} \bullet 4)^2 = (2)^2 = 4$$

    $$4x^2 + 9(y^2 - 4y + 4) = 0 + 36$$

    Remember that 9•4 is actually what was added in on the left

    Step 3: Rewrite

    $$4x^2 + 9(y - 2)^2 = 36$$

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- Finish by making the constant 1. Divide every term by 36.

$$\frac{4x^2}{36} + \frac{9(y - 2)^2}{36} = \frac{36}{36}$$

$$\frac{x^2}{9} + \frac{(y - 2)^2}{4} = 1$$

- This is a shifted ellipse, since both variables are squared and it is plus between them.