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MA 1021-A04
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Pg 22: # 15

$$2x^2 + 2y^2 + 2x - 2y = 1$$

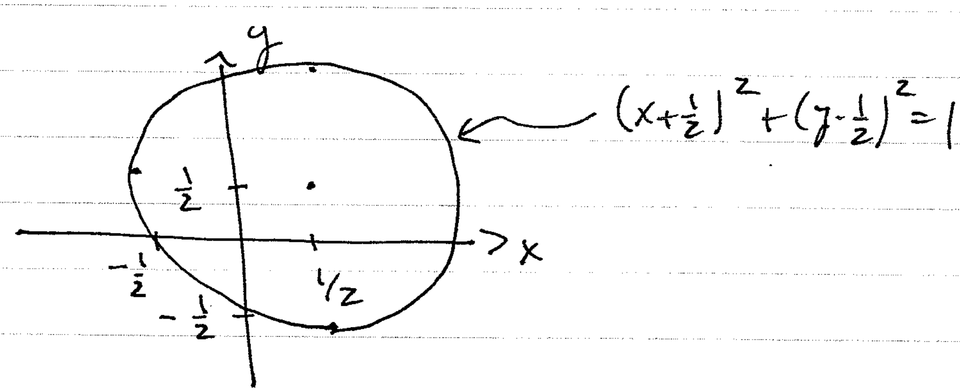
$$\Rightarrow x^2 + x + y^2 - y = \tfrac{1}{2}$$

$$\Rightarrow \left[x^2 + x + \tfrac{1}{4}\right] + \left[y^2 - y + \tfrac{1}{4}\right] = \tfrac{1}{2} + \tfrac{1}{4} + \tfrac{1}{4} = 1$$

$$\Rightarrow \boxed{\left(x + \tfrac{1}{2}\right)^2 + \left(y - \tfrac{1}{2}\right)^2 = 1}$$

UNIT CIRCLE CENTERED AT
$(x, y) = \left(\tfrac{1}{2}, -\tfrac{1}{2}\right)$.

GRAPH:



$\boxed{1/2}$

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#1: $f(x) = x+1$, $-\infty < x < \infty$

$g(x) = x^2+2x-3$, $-\infty < x < \infty$

$\therefore \boxed{(f+g)(x) = x+1+x^2+2x-3 = x^2+3x-2 \quad , \quad -\infty < x < \infty}$

$\boxed{(f \cdot g)(x) = (x+1)(x^2+2x-3) \quad , \quad -\infty < x < \infty}$

$\left(\frac{f}{g}\right)(x) = \frac{x+1}{x^2+2x-3}$

BUT $x^2+2x-3 = (x+3)(x-1) = 0$

WHEN $x = -3, 1$

$\therefore \boxed{\left(\frac{f}{g}\right)(x) = \frac{x+1}{x^2+2x-3} \quad \text{FOR} \quad x \neq -3, 1}$

$\boxed{2/2}$