

$$x^2 + bx = x^2 + bx + \left(\frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2$$

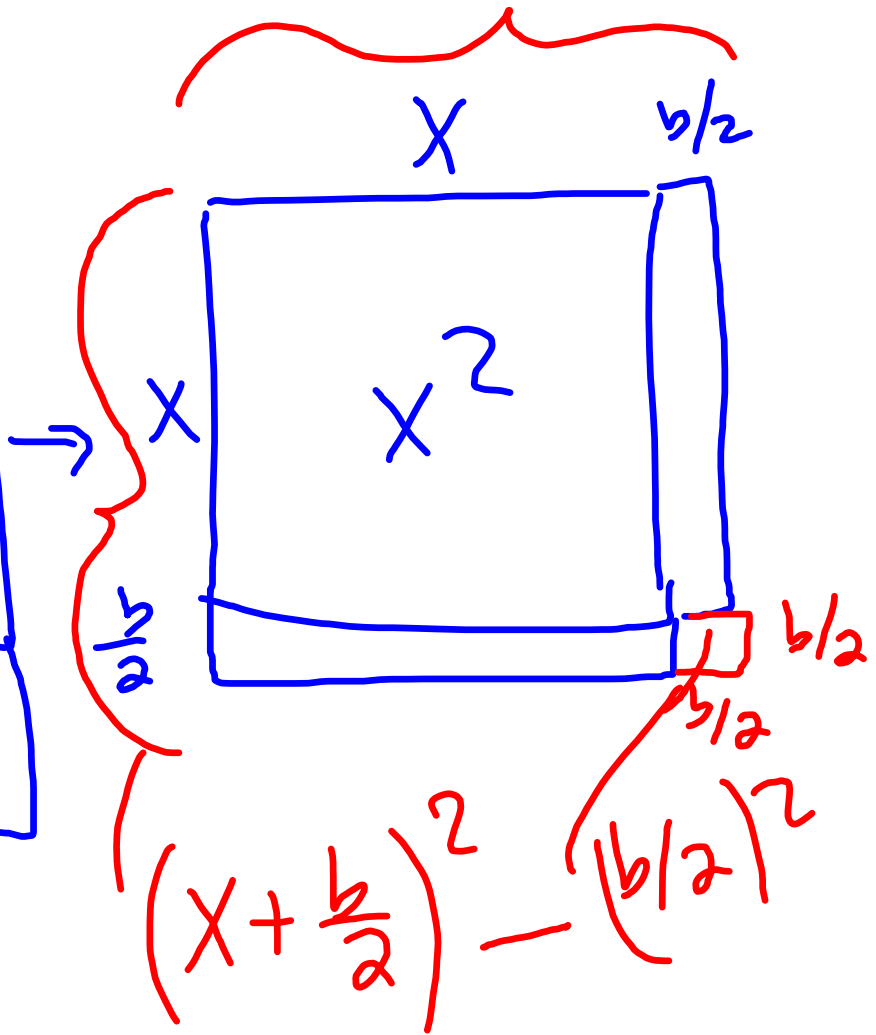
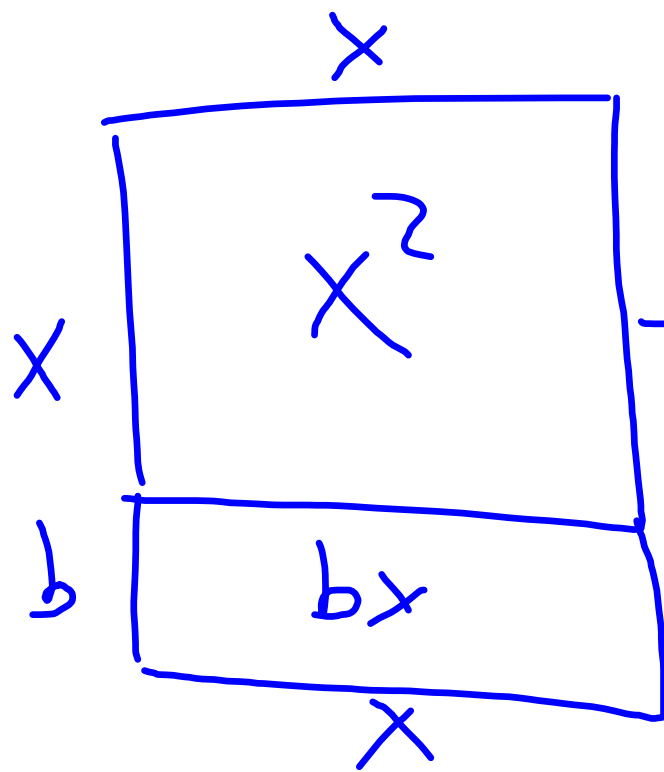
$$= \left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2$$

trick

Formula:

$$x^2 + bx = \left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2$$

$$x^2 + bx$$



#9 goal  $(x-h)^2 + (y-k)^2 = r^2$

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

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

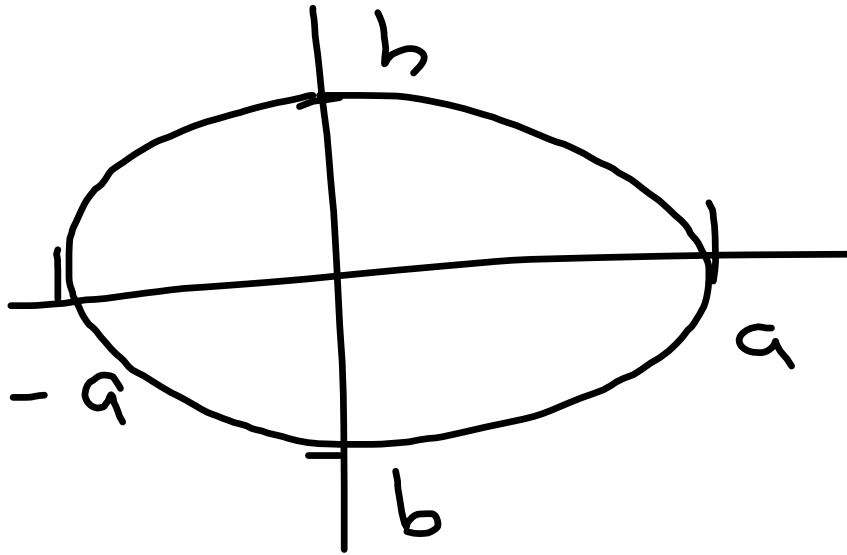
$$x^2 - \frac{x}{2} + \left(\frac{1}{4}\right)^2 + y^2 + \frac{y}{2} + \left(\frac{1}{4}\right)^2 = \frac{1}{2} + \left(\frac{1}{4}\right)^2 + \left(\frac{1}{4}\right)^2$$

$$\left(x - \frac{1}{4}\right)^2 + \left(y + \frac{1}{4}\right)^2 = \frac{5}{8}$$

cent  $\left(\frac{1}{4}, -\frac{1}{4}\right)$  radius  $\sqrt{\frac{5}{8}}$

Ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$



Circle

$$\frac{x^2}{r^2} + \frac{y^2}{r^2} = 1$$

#31

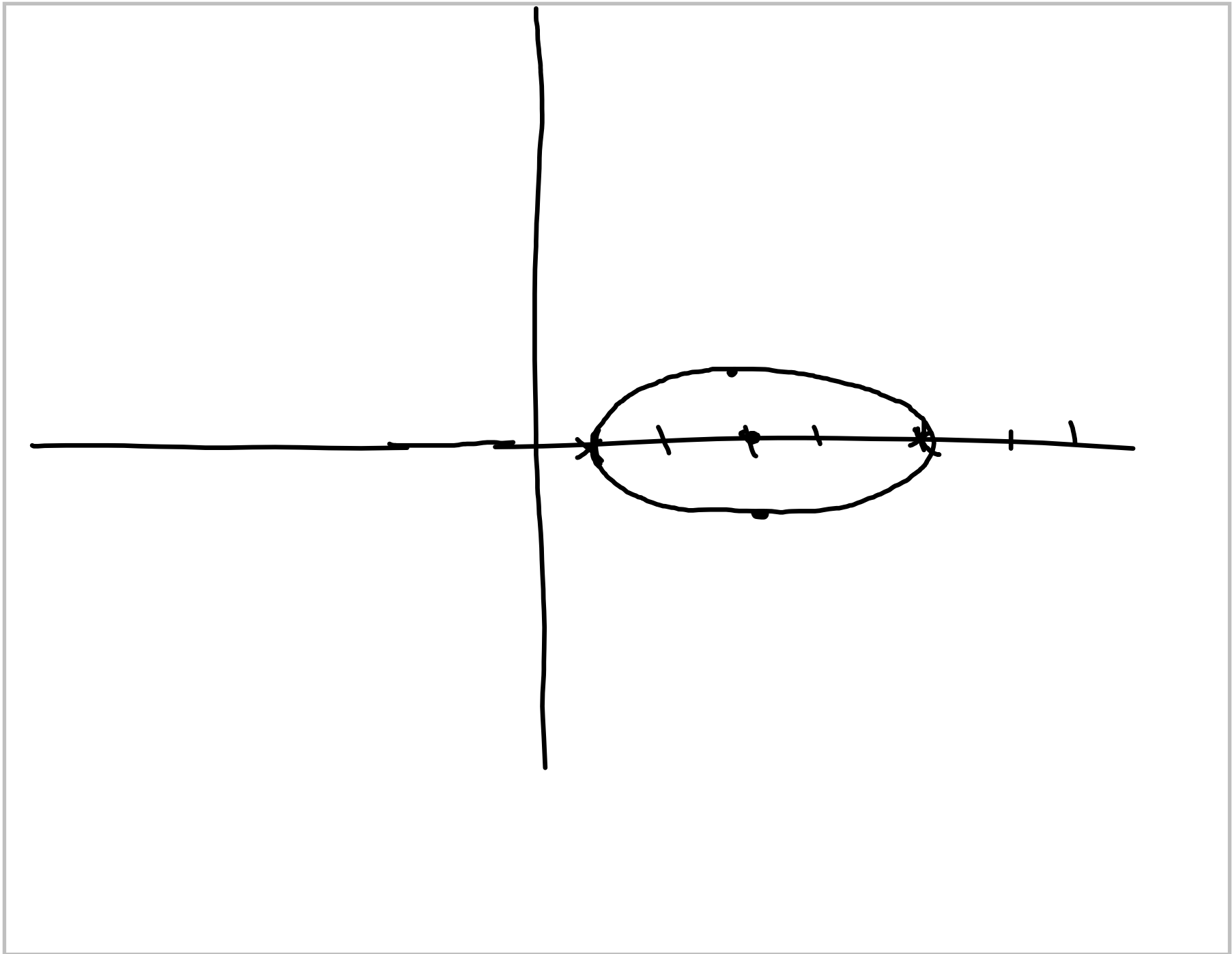
$$x^2 - 6x + 4y^2 + 5 = 0$$

$$x^2 - 6x + 4y^2 = -5$$

$$x^2 - 6x + 9 + 4y^2 = -5 + 9$$

$$(x-3)^2 + 4y^2 = 4$$

$$\frac{(x-3)^2}{4} + \frac{y^2}{1} = 1 \rightarrow \frac{(x-3)^2}{2^2} + \frac{y^2}{1^2} = 1$$



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eg complete square:

$$3x^2 + 2x$$

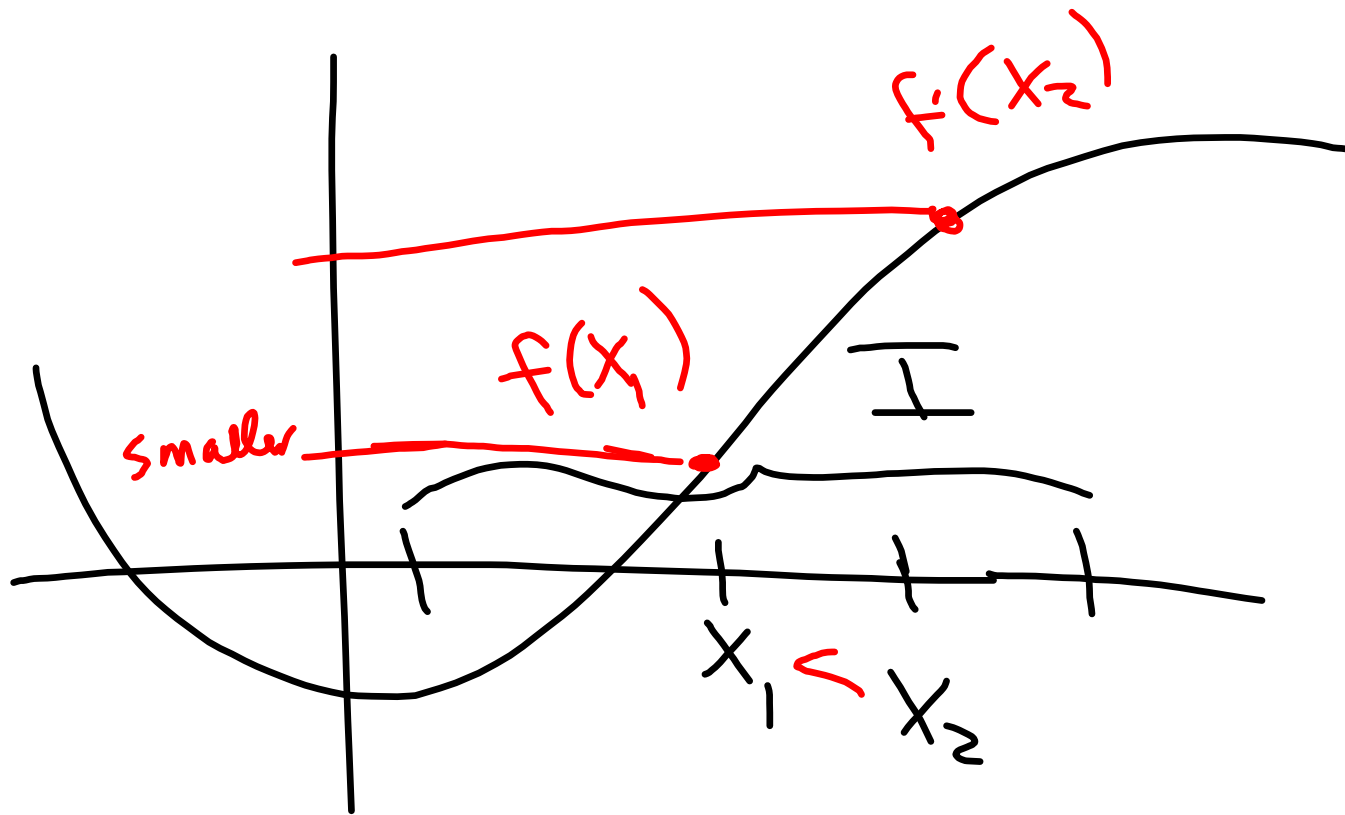
$$= 3 \left( x^2 + \frac{2}{3}x \right)$$

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

$$= 3 \left( \left(x + \frac{1}{3}\right)^2 - \frac{1}{9} \right) = 3 \left(x + \frac{1}{3}\right)^2 - \frac{1}{3}$$

def<sup>n</sup>

A function is increasing  
(i.e. going up as you read from  
left to right) on an  
interval  $I$  if  
 $f(x_1) < f(x_2)$  whenever  
 $x_1 < x_2$  in  $I$



A function  $f(x)$  is decreasing  
on an interval  $I$  if

$$f(x_1) > f(x_2)$$

whenever

$$x_1 < x_2 \text{ in } I.$$

