

8.08 Graphing Rational Functions

Name Key

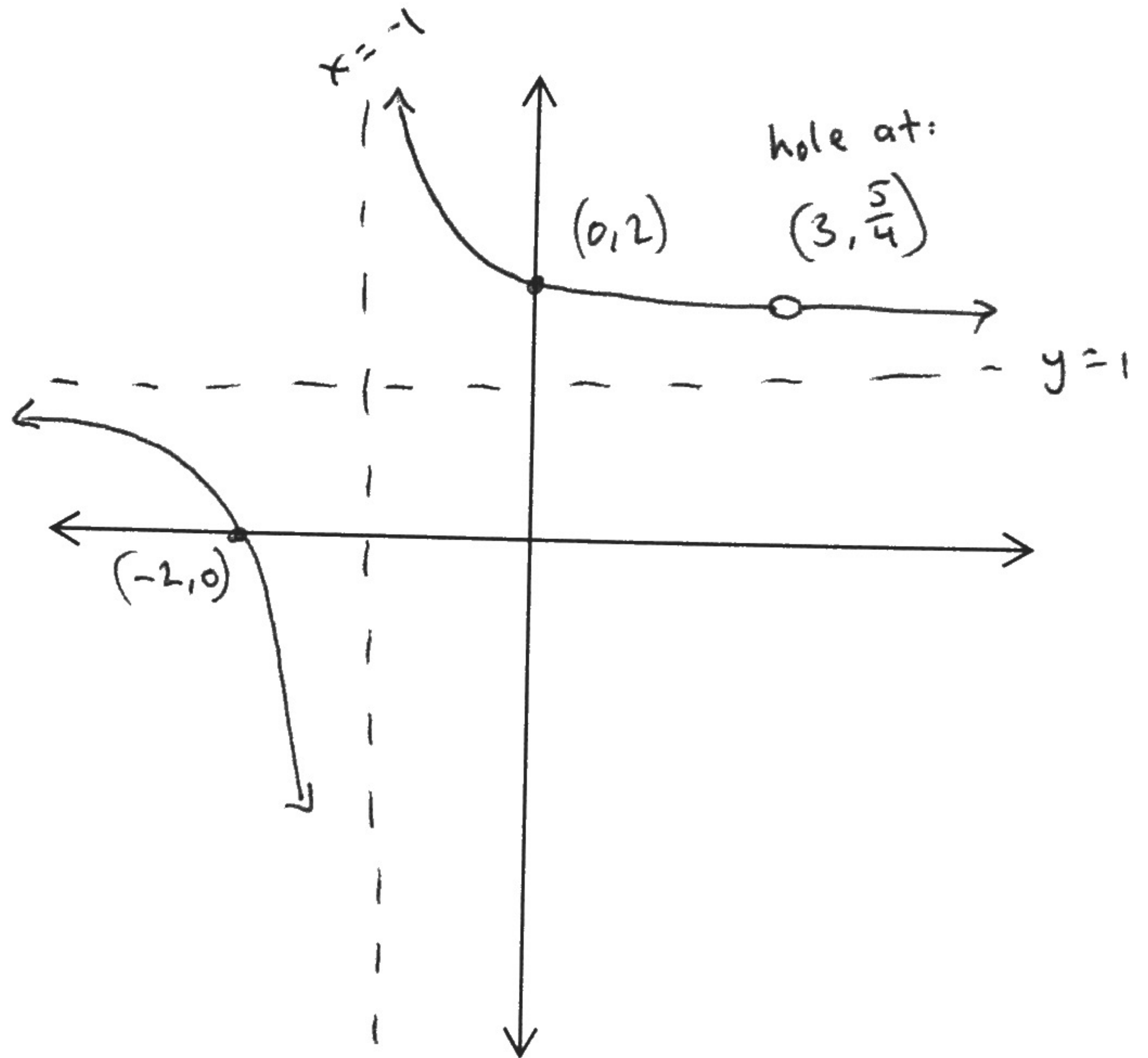
For each function below,

- Identify any holes;
- identify and plot the appropriate asymptotes;
- Identify and plot the intercepts;
- Sketch the branches of the graph according to the work above. If necessary, be sure to include a hole where there should be one, including its y-value to give its precise location.

Show your work.

$$\frac{x^2 - x - 6}{x^2 - 2x - 3}$$

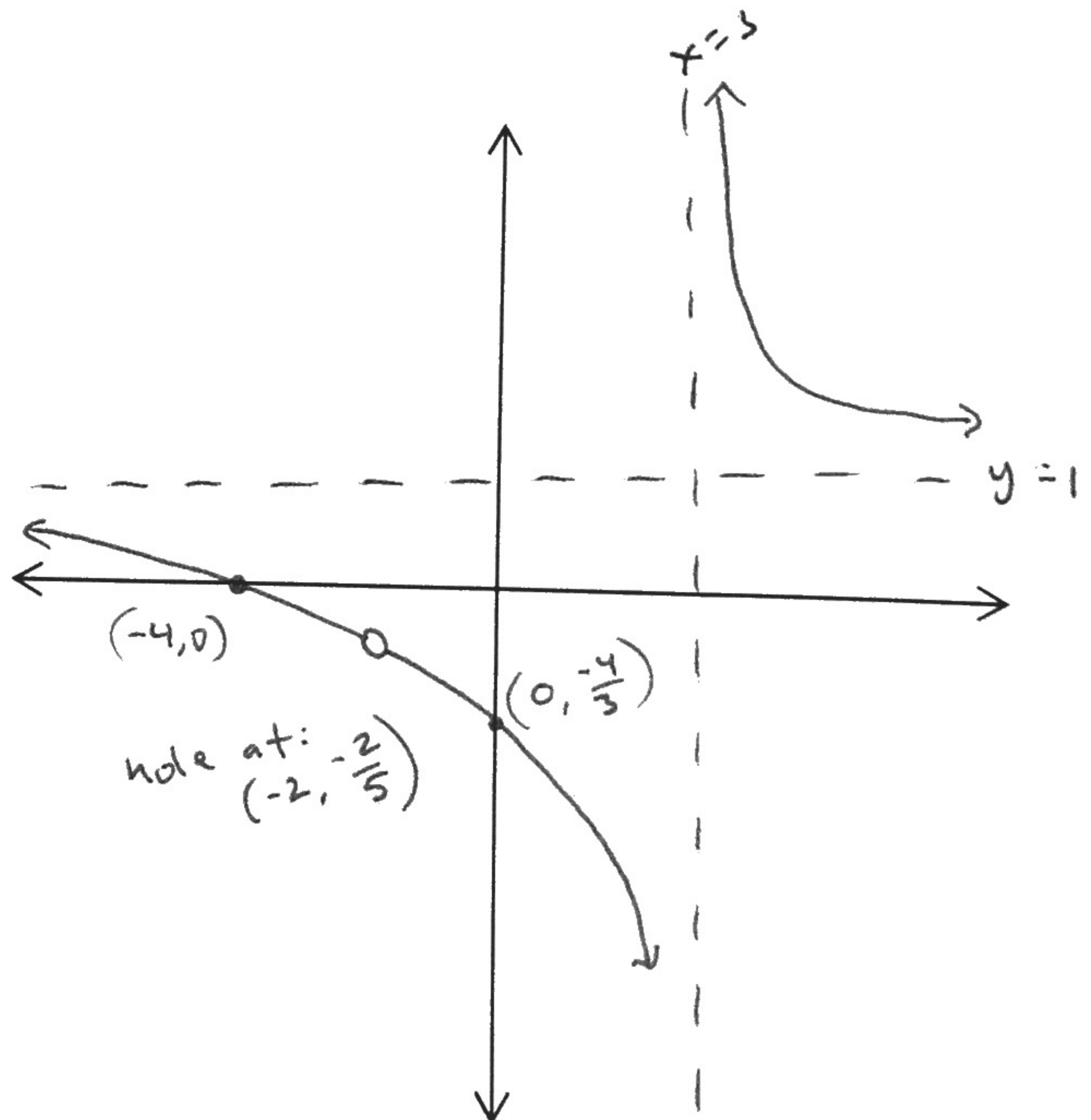
$$\frac{(x-3)(x+2)}{(x-3)(x+1)}$$



$$\frac{x^2 + 6x + 8}{x^2 - x - 6}$$

$$\frac{(x+4)(x+2)}{(x-3)(x+2)}$$

$$\frac{-2+4}{-2-3} = \frac{2}{-5}$$



$$\frac{x^3 - 2x^2 - 9x + 18}{x - 3}$$

hole @  $x = 3$

$$\frac{(x+3)(\cancel{x-3})(x-2)}{(\cancel{x-3})} = (x+3)(x-2)$$

$$= x^2 + x - 6$$

vertex:  $x = \frac{-b}{2a}$

$$x = \frac{-1}{2(1)} = -\frac{1}{2}$$

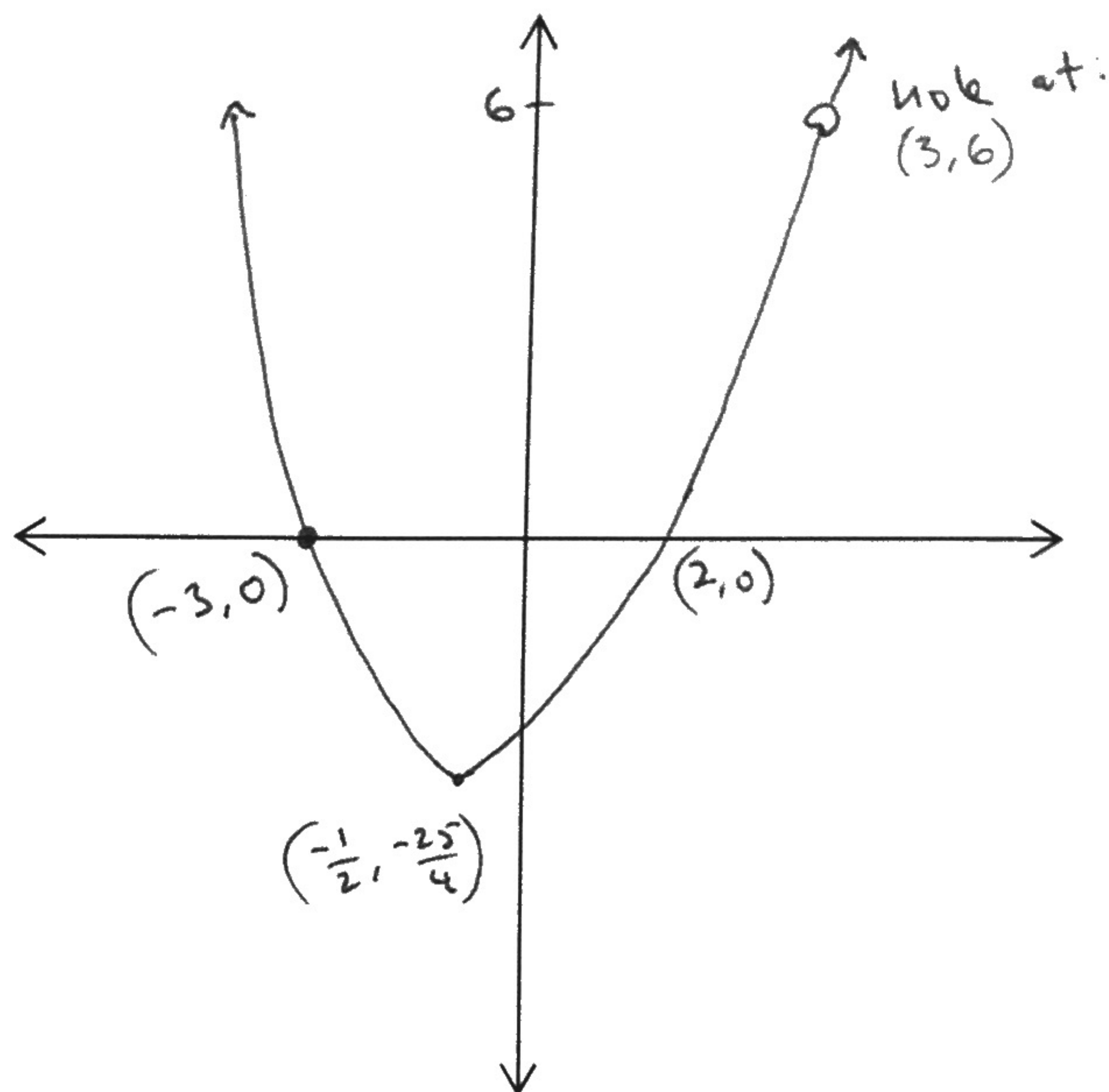
Vertex =  $(-\frac{1}{2}, \frac{-25}{4})$

$$(3)^2 + 3 - 6$$

$$9 + 3 - 6$$

$$= 6$$

$$3, 6$$



$$\frac{x^3 + 5x^2 - x - 5}{x^2 - 2x - 3}$$

hole @  $x = -1$

$$\frac{x^2(x+5) - 1(x+5)}{(x-3)(x+1)} = \frac{(x+1)(x-1)(x+5)}{(x-3)(x+1)}$$

$$= \frac{(x-1)(x+5)}{(x-3)}$$

VA:  $x = 3$

slant:  $y = x + 7$

hole:  $(-1, 2)$

y-int:  $(0, \frac{5}{3})$

x-int:  $(1, 0) (-5, 0)$

hole:  $\frac{(-1)^2 + 4(-1) - 5}{-1 - 3}$

$$\frac{1 - 4 - 5}{-4} = 2$$

hole:  $(-1, 2)$

slant:  $x-3 \overline{) x^2 + 4x - 5}$   
 $(x^2 + 3x)$   
 $7x$

$y = x + 7$

