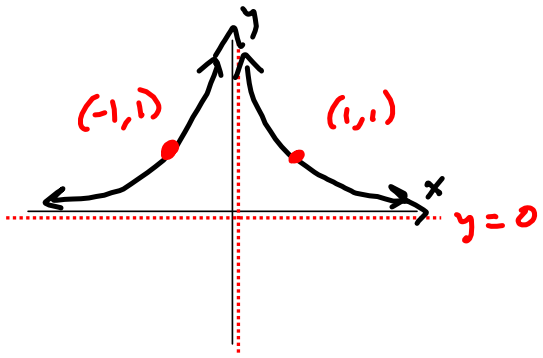
$f(x) = \frac{1}{x^2}$



$g(x) = 3\left(\frac{1}{(6x+18)}\right)^2 - 5$

$= 3\left(\frac{1^2}{(6x+18)^2}\right) - 5$

$= 3\left(\frac{1}{(6(x+3))^2}\right) - 5$

$\frac{1}{x^2} \longrightarrow 3\left(\frac{1}{x^2}\right) \longrightarrow 3\left(\frac{1}{(6x)^2}\right) \longrightarrow 3\left(\frac{1}{(6(x+3))^2}\right)$

$(1,1) \longrightarrow (1,3) \longrightarrow \left(\frac{1}{6},3\right) \longrightarrow \left(-\frac{17}{6},3\right)$

$\longrightarrow 3\left(\frac{1}{(6(x+3))^2}\right) - 5$

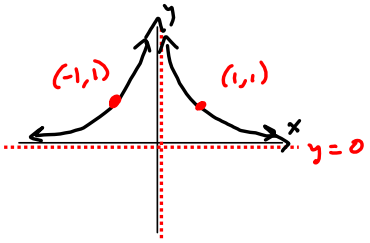
$\frac{1}{6} - 3 = \frac{1-18}{6} = -\frac{17}{6}$

$\longrightarrow \left(-\frac{17}{6}, -2\right)$

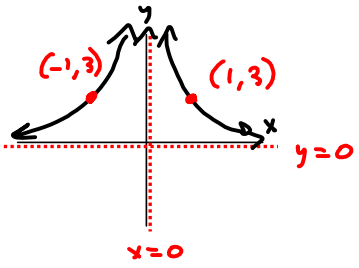
$\frac{1}{x^2} \longrightarrow 3\left(\frac{1}{x^2}\right) \longrightarrow 3\left(\frac{1}{(6x)^2}\right) \longrightarrow 3\left(\frac{1}{(6(x+3))^2}\right)$

$(1,1) \longrightarrow (1,3) \longrightarrow \left(\frac{1}{6},3\right) \longrightarrow \left(-\frac{17}{6},3\right)$

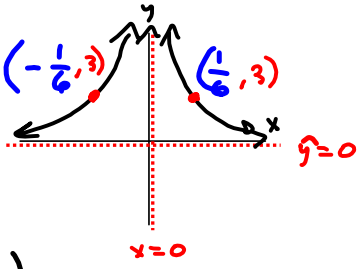
$f(x)=\frac{1}{x^2}$



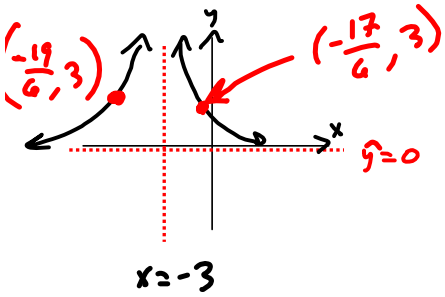
$3f(x)=3\left(\frac{1}{x^2}\right)$



$3\left(\frac{1}{(6x)^2}\right)$

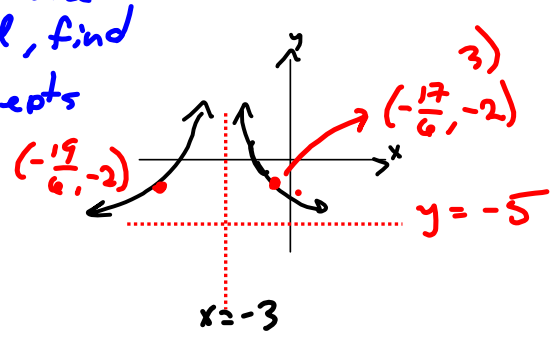


$3\left(\frac{1}{(6(x+3))^2}\right)$



$3\left(\frac{1}{(6(x+3))^2}\right)-5$

Im the sequel, find intercepts



$-\frac{1}{6}-3=\frac{-1-18}{6}=-\frac{19}{6}$

$\longrightarrow 3\left(\frac{1}{(6(x+3))^2}\right)-5$

$\longrightarrow \left(-\frac{17}{6},-2\right)$

$6x+18=6(x+3)$

$\left(-\frac{17}{6},\right.$

$\left(-\frac{19}{6},3\right)$

Union = $\cup$, means "OR" = $\vee$ (in logic)

Intersection = $\cap$, means "AND" = $\wedge$ (in logic

To me, $\cup$, OR, $\vee$ are all the same.

.. .. $\cap$, AND, $\wedge$ .. ..

$A = \{1,2,3,4\}$, $B = \{1,3,5,7\}$

$A \cup B = \{x \mid x \in A \text{ OR } x \in B\}$

$= \{1,2,3,4,5,7\}$

$A \cap B = \{x \mid x \in A \text{ AND } x \in B\}$

$= \{1,3\}$

S1.7 :

Includes

Restricts

(and I'm the "decider")

$|A| > B \Rightarrow$

$A > B$ OR $A < -B$

$|A| < B \Rightarrow$

$A < B$ AND $A > -B$

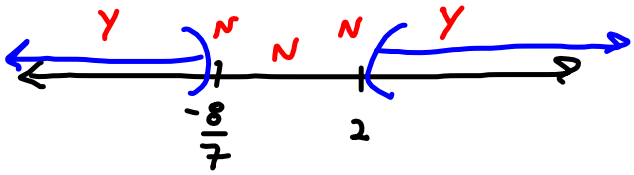
$|3 - 7x| > 11$

$3 - 7x > 11$ OR $3 - 7x < -11$

$-7x > 8$ $\qquad -7x < -14$

$x < -\frac{8}{7}$ $\qquad x > \frac{-14}{-7} = 2$

$\{x \mid x < -\frac{8}{7}$ OR $x > 2\}$ is solution

$=$ 

OR

$= (-\infty, -\frac{8}{7}) \cup (2, \infty)$

① $|3-7x| > -11$ Always! $(-\infty, \infty)$

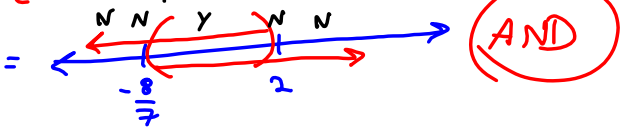
② $|3-7x| < -11$ Never! $\varnothing$

$|3-7x| < 11$

$3-7x < 11$ AND $3-7x > -11$

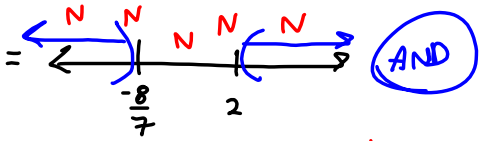
$-7x < 8$ $\quad -7x > -14$

$\{x \mid x > -\frac{8}{7}$ AND $x < 2\}$



$= (-\frac{8}{7}, 2)$

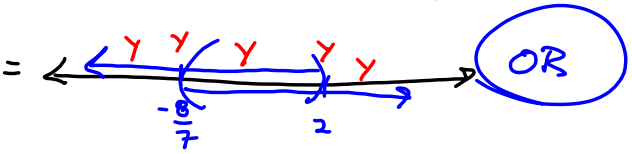
What about $\{x \mid x < -\frac{8}{7}$ AND $x > 2\}$?



$= \varnothing$ This is where you end up, if you don't SEE ②, immediately, but your technique is good.

② $|3-7x| < -11$

What about $\{x \mid x > -\frac{8}{7}$ OR $x < 2\}$?



$= (-\infty, \infty)$! if you missed "seeing" ①, but your analysis is solid

① $|3-7x| > -11$

$7x^2 + 9x - 11$

$a = 7, b = 9$

$\frac{18}{14} = \frac{9}{7}$

$\frac{b}{2a} = \frac{9}{14}$

$7\left(x + \frac{9}{14}\right)^2 = 7\left(x^2 + \frac{9}{7}x + \frac{81}{196}\right)$

$= 7x^2 + 9x + \frac{81}{28}$ → what got added

So,

$7\left(x + \frac{9}{14}\right)^2 - 11 - \frac{81}{28} = 7\left(x + \frac{9}{14}\right)^2 - \frac{389}{28}$

↑ subtract this, because we added it to get that

$7x^2 + 9x - 11$

$= 7\left(x^2 + \frac{9}{7}x - \frac{11}{7}\right)$

$= 7\left(x + \frac{9}{7}x + \left(\frac{9}{14}\right)^2 - \frac{81}{196} - \frac{11}{7}\right)$

$= 7\left((x+\frac{9}{14})^2 + -\frac{81 - 308}{196}\right)$

$= 7(x+\frac{9}{14})^2 + 7\left(\frac{389}{196}\right)$

$= 7(x+\frac{9}{14})^2 + \frac{389}{28}$?

$\frac{28}{11}$
$\frac{28}{308}$

308
-81
227