

March 8/16

# Reciprocals of Quadratic Functions

Definition: A curve is increasing on an interval if the y-values increase from left to right. It is also where the slopes of the tangents are positive.

What does  $y = \frac{1}{ax^2+bx+c}$  look like?

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

x-int:  $0 = \frac{2}{(x+2)(x+1)}$

No x-int.

y-int:  $f(x) = \frac{2}{2} = 1$

HA:  $y=0$

VA:  $x=-2$   
 $x=-1$

Behaviour:

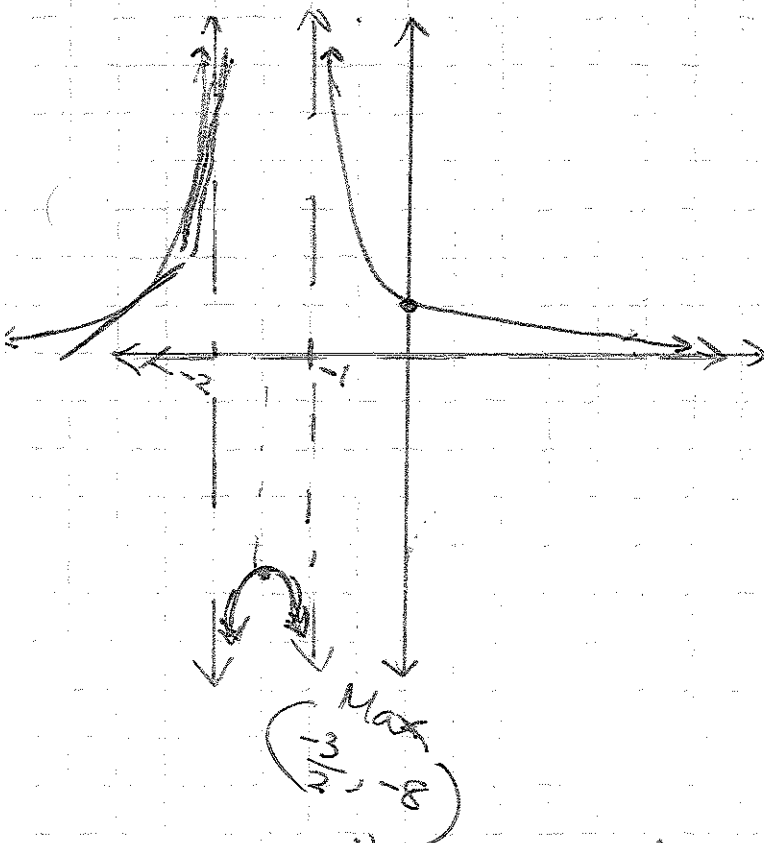
as  $x \rightarrow \pm\infty$ ,  $y \rightarrow 0$  from above  
as  $x \rightarrow \infty$ ,  $y \rightarrow 0$  from above

as  $x \rightarrow -2^-$ ,  $y \rightarrow \infty$

as  $x \rightarrow -2^+$ ,  $y \rightarrow -\infty$

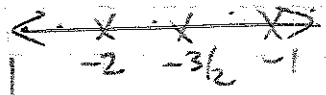
as  $x \rightarrow -1^-$ ,  $y \rightarrow -\infty$

as  $x \rightarrow -1^+$ ,  $y \rightarrow +\infty$



\* in the reciprocal of a quadratic, max is halfway between the VAs.

VHS # 1110x/min PTS.



Intervals	$x < -2$	$-2 < x < -\frac{3}{2}$	$-\frac{3}{2} < x < -1$	$x > -1$
(above/below x-axis) Sign of $f(x)$	positive	Neg.	Neg	Pos.
slope of tangents (increasing?)	positive	+	-	-
change in the slope of the tangents	incr.	decr.	der.	incr.

p. 164 # 2-4, 5ace, 7, 8adgh.