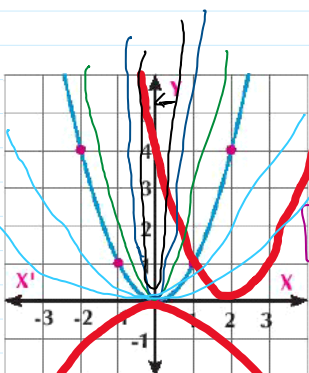


$f(x) = x \rightarrow 1^{st}$ degree

$f(x) = \boxed{+}x + 2 \rightarrow$ y-intercept.

slope: $f(x) = \boxed{-}x - 3 \rightarrow$ y-intercept.

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$f(x) = -x^2 \pm 2$
 \uparrow move up (+) (1,4)

$f(x) = (x \pm 2)^2$
 \downarrow move down (-)

$f(x) = (x \pm 2)^2 + 4$
 \leftarrow left \rightarrow right

$f(x) = (x - (-2))^2$
 \leftarrow left \rightarrow right

$f(x) = a(x - b)^2 + c$

left \leftarrow \rightarrow right

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$a > 1 \rightarrow$ stretching

$0 < a < 1 \rightarrow$ shrinking

$f(x) = (x - 4)^2 + 6$

$f(x) = a(x - b)^2 + c$

$a = 1$

$b = 4 \rightarrow$ right

$c = 6 \rightarrow$ + up

$f(x) = (x - (-3))^2 - 5$

$f(x) = a(x - b)^2 + c$

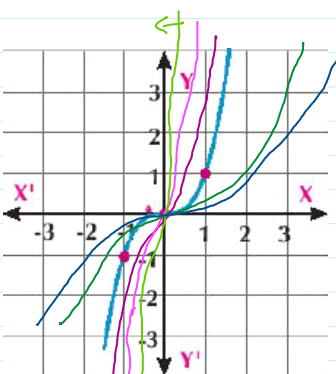
$a = 1$

$b = -3 \rightarrow$ left

$c = -5 \rightarrow$ down

$f(x) = (x - 4)^2 + 6$
 \rightarrow right

$f(x) = (x - (-3))^2 - 5$
 left



$f(x) = x^3$

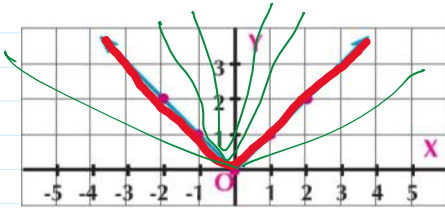
$f(x) = a(x - b)^3 + c$

left \leftarrow \rightarrow right (+)

$a > 1 \rightarrow$ stretching

$0 < a < 1 \rightarrow$ shrinking

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$$f(x) = |x| = \begin{cases} +x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

$$f(x) = a|x-b| \pm c$$

$a > 1 \rightarrow$ stretching

$0 < a < 1 \rightarrow$ shrinking
 $(x-b)^2$

5 The curve vertex point of $f(x) = (2-x)^2 + 3$ is:

- a (2, 3)
- b (2, -3)
- c (-2, 3)
- d (-2, -3)

$$f(x) = (-x + 2)^2 + 3$$

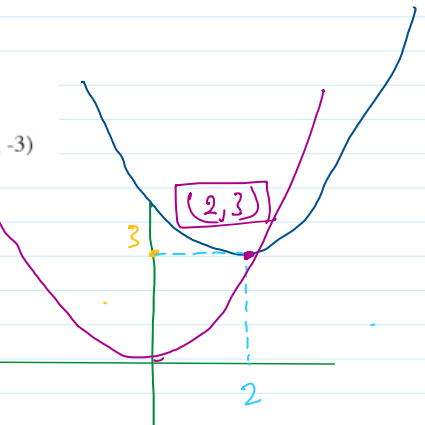
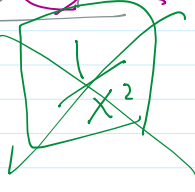
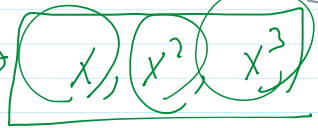
$$= [-1(x - 2)]^2 + 3$$

$$a = -1$$

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

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

$$a(x-b)^2 + c$$



~~sin x~~
~~cos x~~



Learn

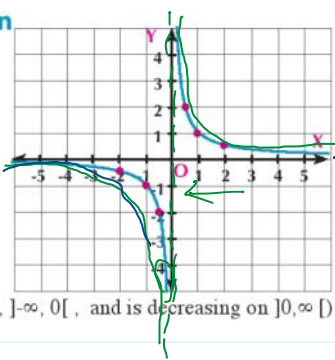
The Rational Function

the simplest form for the rational function is:

$$f(x) = \frac{1}{x}, x \in \mathbb{R} - \{0\}$$

the function f joins the number by its multiplicative inverse and is represented graphically by a curve whose point of symmetry is $(0, 0)$. It consists of two parts one of them lies on the first quadrant and the other lies on the third quadrant. Each part approaching to the two axes does not intersect them ($x=0, y=0$ asymptotical line)

(check: its range = $\mathbb{R} - \{0\}$, f is odd and is decreasing on $]-\infty, 0[$, and is decreasing on $]0, \infty[$)



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

$x=0 \rightarrow$ error \rightarrow V.A Vertical Asymp.

$$y=0 \text{ H.A}$$

$$\begin{aligned} \text{V.A} &\Rightarrow x = \\ \text{H.A} &\Rightarrow y = \end{aligned}$$

Example

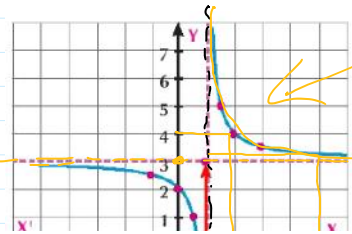
5 Draw the curve of the function g where $g(x) = \frac{1}{x-1} + 3$ and from the graph, determine the range of the function, and discuss its monotony:

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

$$x-1 = 0$$

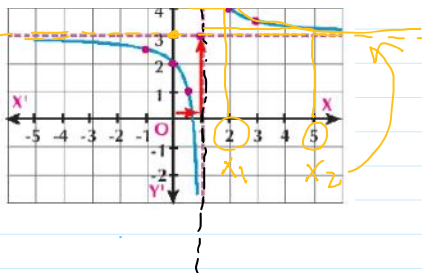
$$x=1 \text{ V.A}$$

$$y=3 \text{ H.A}$$

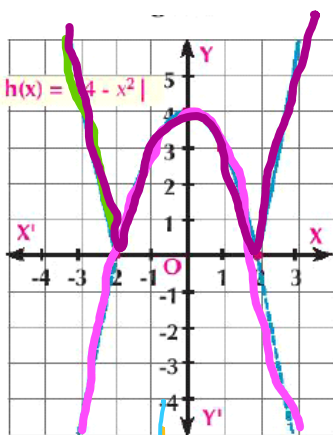
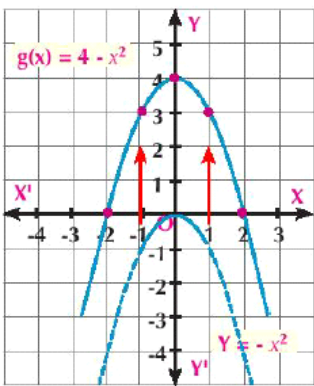


$x_1 < x_2$
 $y_1 > y_2$ } decrease

$y = -3$ H.A



7 Use the suitable transformation to graph the curves of the two functions g and h where $g(x) = 4 - x^2$ and $h(x) = |4 - x^2|$



$h(x) = |4 - x^2|$

$4 - x^2$

$-(4 - x^2)$

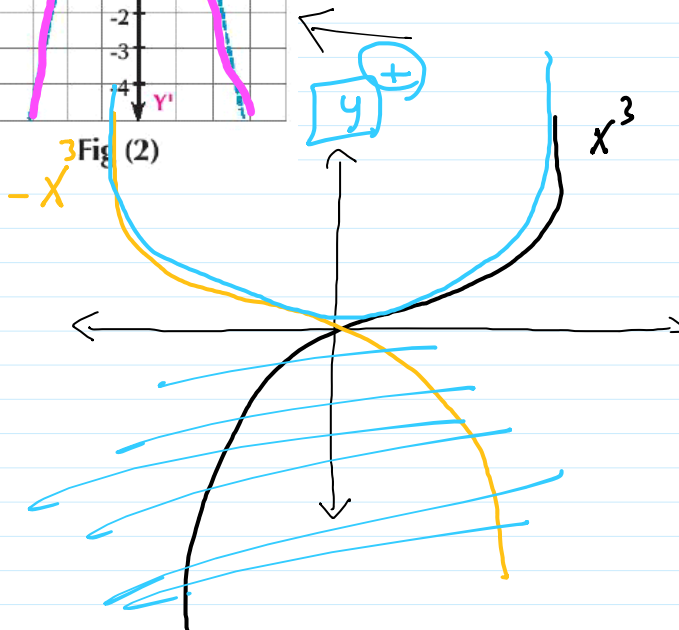
$x^2 - 4$

Range = $\{ \}$

$f(x) = x^2$

$f(x) = |x|$

$f(x) = |x^3|$



Trigonometric Functions the curve of the sine function:

standard

$f(x) = \sin(x)$

