

(J)Graphs of the Form $y = \sqrt{f(x)}$

The graph of $y = \sqrt{f(x)}$ can be sketched by first drawing $y = f(x)$ and noticing;

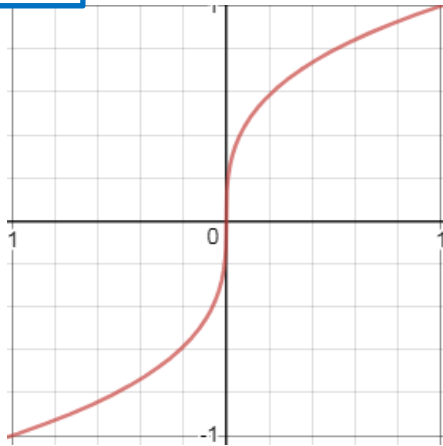
- $\sqrt{f(x)}$ is only defined if $f(x) \geq 0$
- $\sqrt{f(x)} \geq 0$ for all x in the domain
- $\sqrt{f(x)} < f(x)$ if $f(x) > 1$ and $\sqrt{f(x)} > f(x)$ if $f(x) < 1$
- $\frac{dy}{dx} = \frac{f'(x)}{\sqrt{f(x)}}$ implies;

\Rightarrow stationary points must still be stationary points

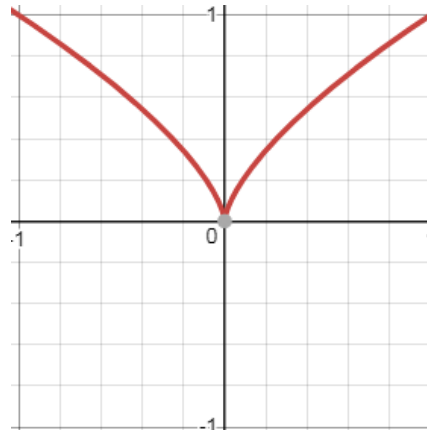
\Rightarrow there are critical points where $f(x) = 0$

$$y = x^{\frac{a}{b}}$$

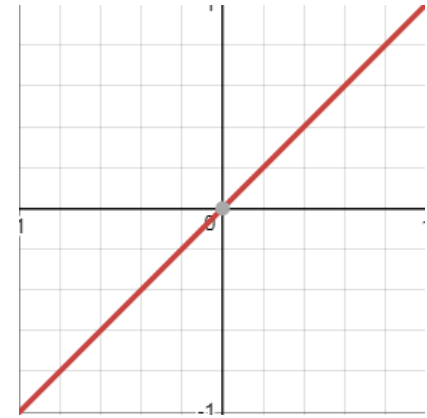
$$y = x^{\frac{1}{3}}$$



$$y = x^{\frac{2}{3}}$$

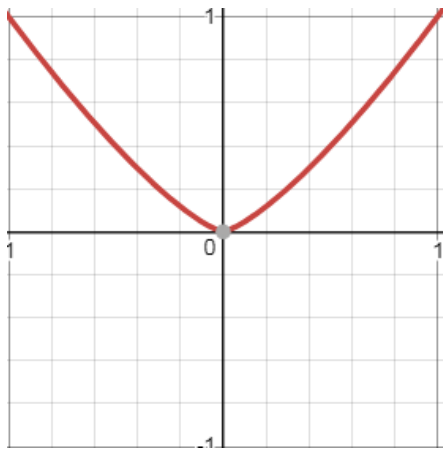


$$y = x^{\frac{3}{3}}$$

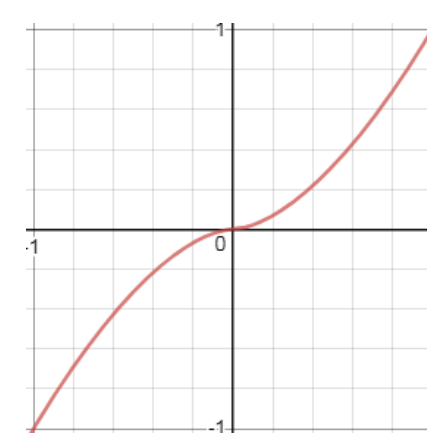


$\frac{a}{b} < 1$ curve is concave down in 1st quadrant (vertical tangent)

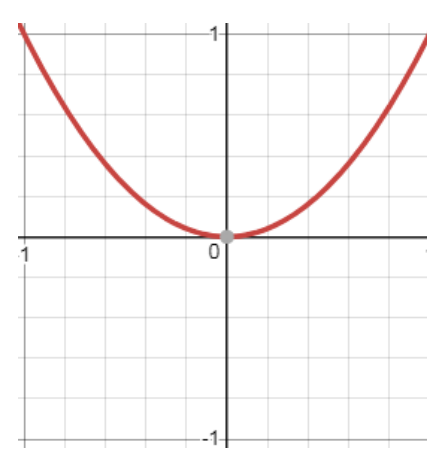
$$y = x^{\frac{4}{3}}$$



$$y = x^{\frac{5}{3}}$$



$$y = x^{\frac{6}{3}}$$



$\frac{a}{b} > 1$ curve is concave up in 1st quadrant (horizontal tangent)

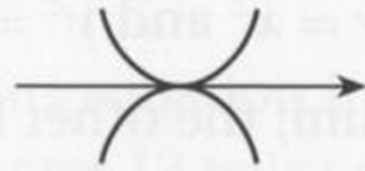
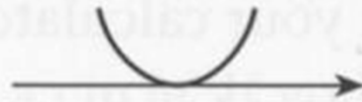
$f(x)$

Graph of $y = f(x)$

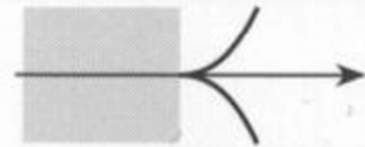
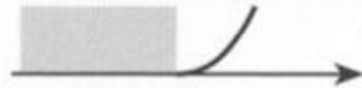
Graph of $y = \sqrt{f(x)}$

Shape of $y^2 = f(x)$

x^4



x^3



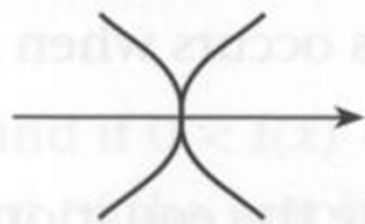
x^2



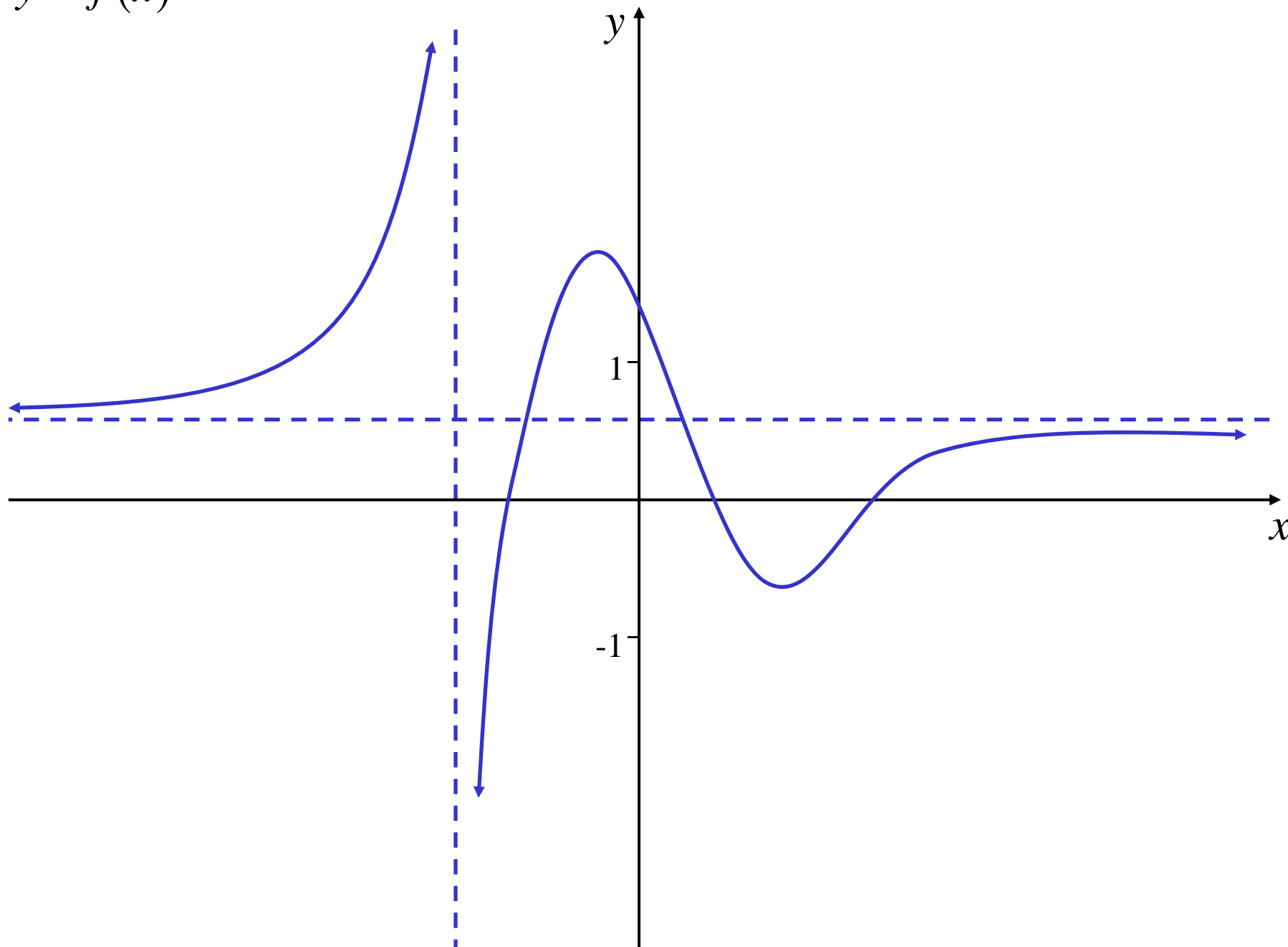
$x^{5/3}$



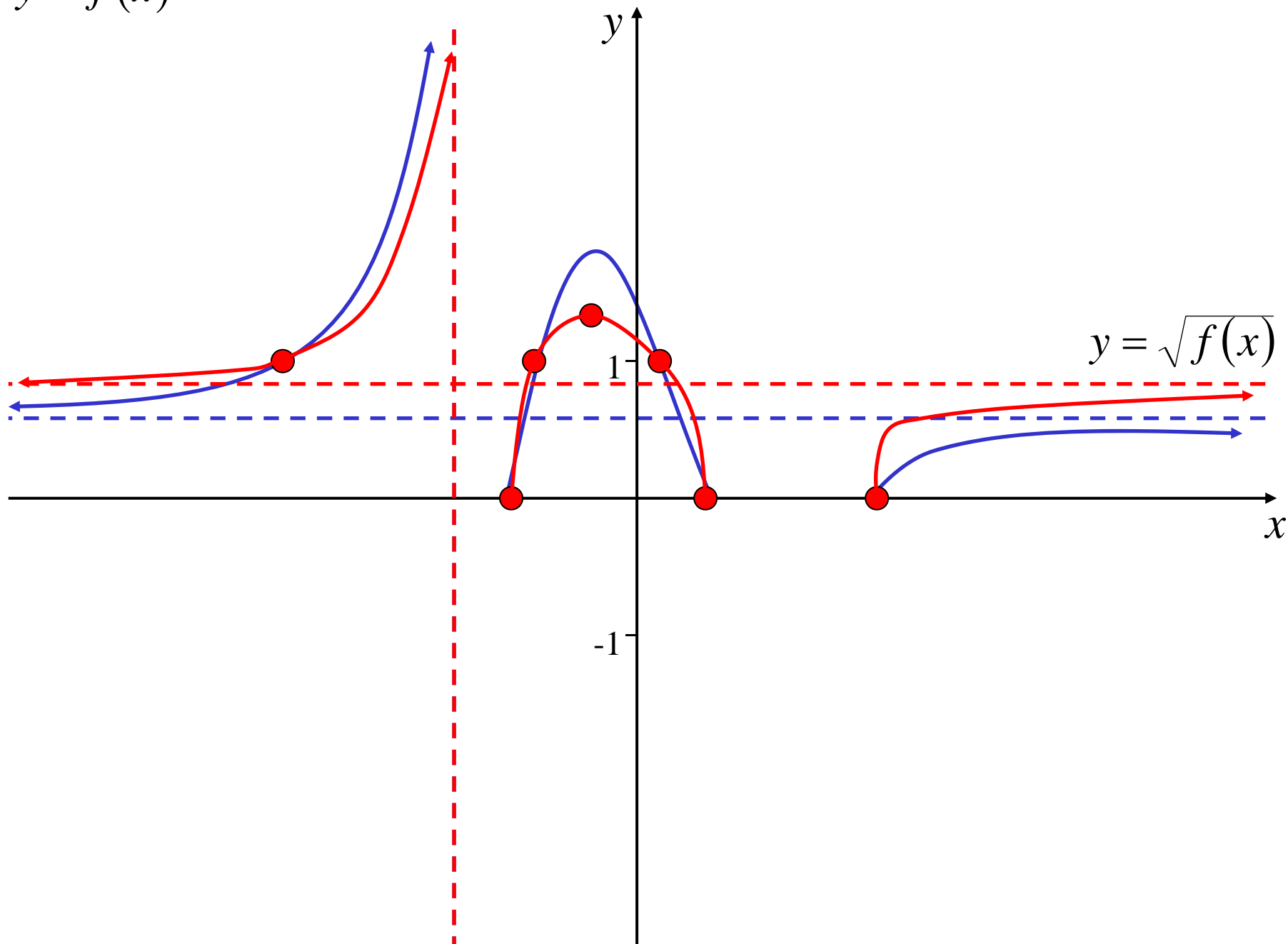
$x^{3/4}$



$$y = f(x)$$



$$y = f(x)$$



$$y = f(x)$$

