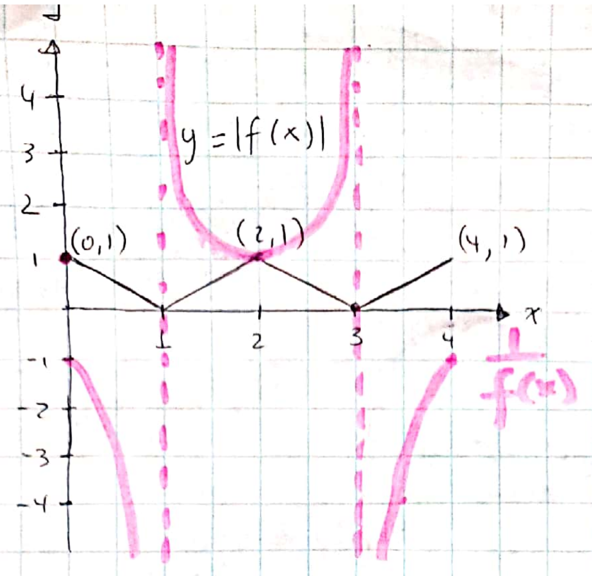
1. a)



b) the y-intercept of $\frac{1}{f(x)}$ is $(0, 1)$

c)

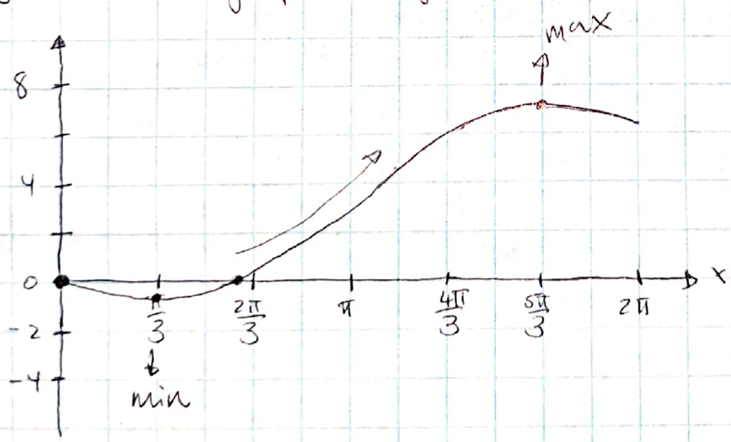
2. $f(x) = \frac{x}{x+2}$, $g(x) = f\left(\frac{x-2}{3}\right)$

$$g(x) = \frac{\frac{x-2}{3}}{\frac{x-2}{3}+2} = \frac{\frac{x-2}{3}}{\frac{x-2+6}{3}} = \boxed{\frac{x-2}{x+4} = g(x)}$$

Domain: $x \neq -2$, $x \neq -4$. OR $\mathbb{R} / \{x = 2, 4\}$.

3. $y = x - 2\sin x$

Using GDC, the graph of y is



y increases from

$x \in \left[\frac{\pi}{3}, \frac{5\pi}{3}\right]$

4. $\log_a c = \log_a b \times \log_b c$

$\log_4 x^3 + \log_2 x^2 = \log_8 128^3$

Using the property given: $\log_4 2 = a$, $\log_8 2 = b$

$\Downarrow$ $a = \frac{1}{2}$ $\Downarrow$ $b = 1/3$

and $\log_4 2 \times \log_2 x^3 = \log_4 x^3$

$\log_8 2 \times \log_2 128^3 = \log_8 128^3$

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Hence, we substitute in $\log_4 x^3 + \log_2 x^2 = \log_8 128^3$

$$\log_2 x^2 + \log_4 2 \times \log_2 x^3 = \log_8 2 \times \log_2 128^3$$

$$\frac{1}{2}\log_2 x^3 + \log_2 x^2 = \frac{1}{3}\log_2 128^3$$

using the multiplicative property of the logarithms.

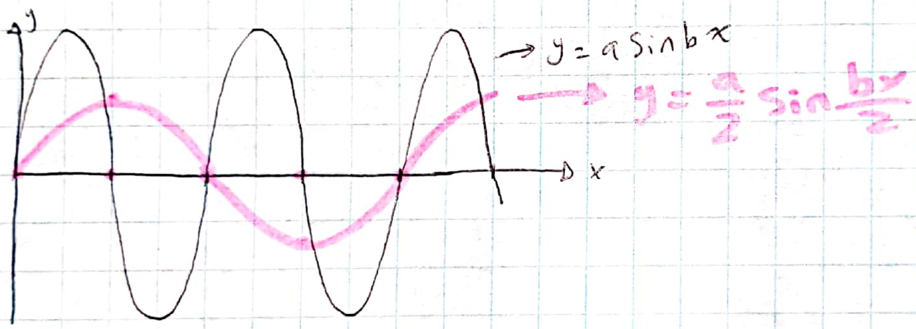
$$\log_2 x^{3/2} + \log_2 x^2 = \log_2 128^3$$

$$\log_2 [x^{3/2} \times x^2] = \log_2 128^3$$

Therefor $x^{7/2} = 2^7$

$$\therefore \boxed{x = 4}$$

5.



$y = \frac{a}{2}\sin\frac{bx}{2}$ → amplitude is half the original: $max = \frac{a}{2}$; $min = -\frac{a}{2}$

The period is twice the original

new period: $T = \frac{2\pi}{b/2} = \frac{4\pi}{b}$

$\therefore$ in this diagram I should see 1 full cycle.