

Section 1.1

Question 4

(a)

$$f(-4) = -2$$

$$g(3) = 4$$

(b)

$$f(-3) = -1, \quad g(-3) = 2$$

Therefore,

$$g(-3) > f(-3)$$

(c)

$$f(x) = g(x) \text{ at } x = -2 \text{ and } x = 2$$

(d)

$$f(x) \leq g(x) \text{ on } [-4, -2] \cup [2, 4]$$

(e)

$$f(x) = -1 \text{ when } x = -3 \text{ and } x = 4$$

(f)

g is decreasing on $[-4, 0)$

(g)

Dom(f):

$$[-4, 4]$$

Range(f):

$$[-2, 3]$$

(h)

Dom(g):

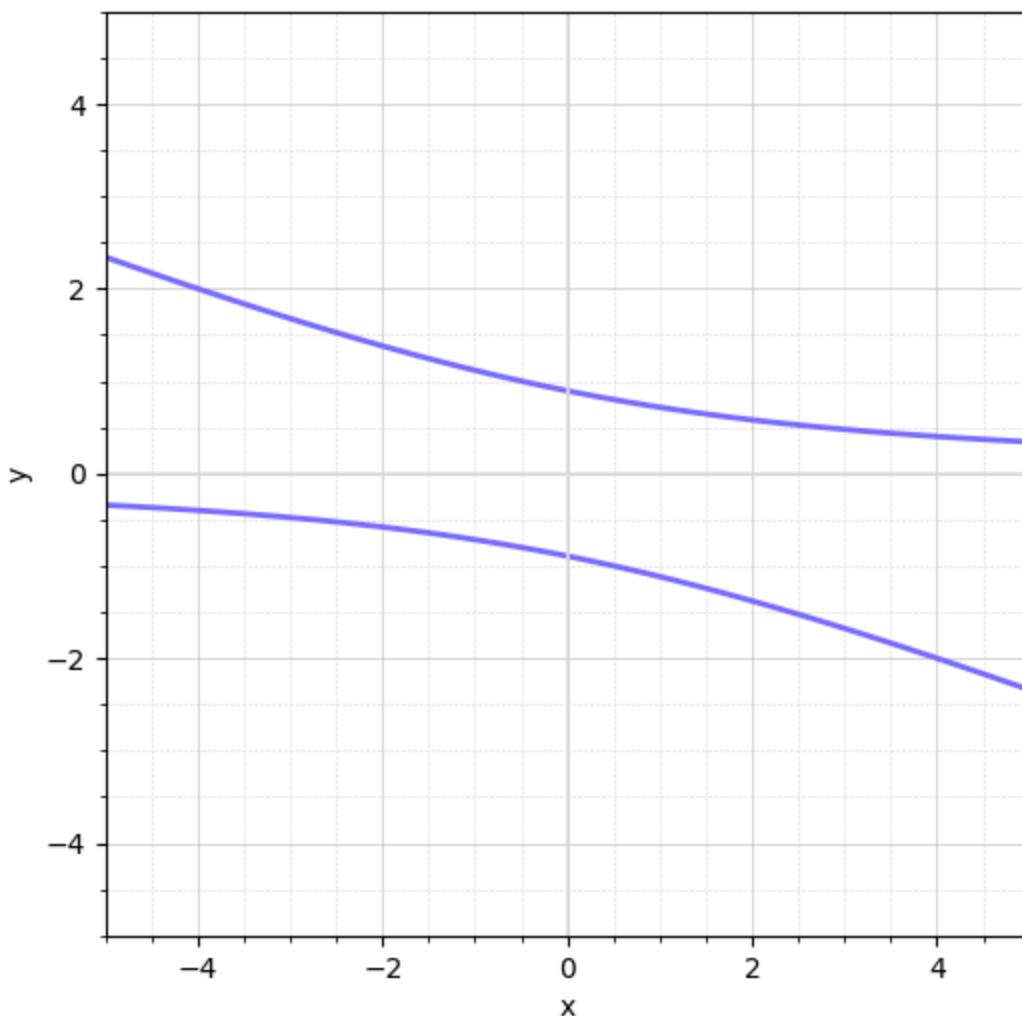
$$[-4, 3]$$

Range(g):

$$[0.5, 4]$$

Question 10

$$2xy + 5y^2 = 4$$



Answer:

No. Solving for y using the quadratic formula gives two values of y for most x ,

so the equation does not define y as a function of x .

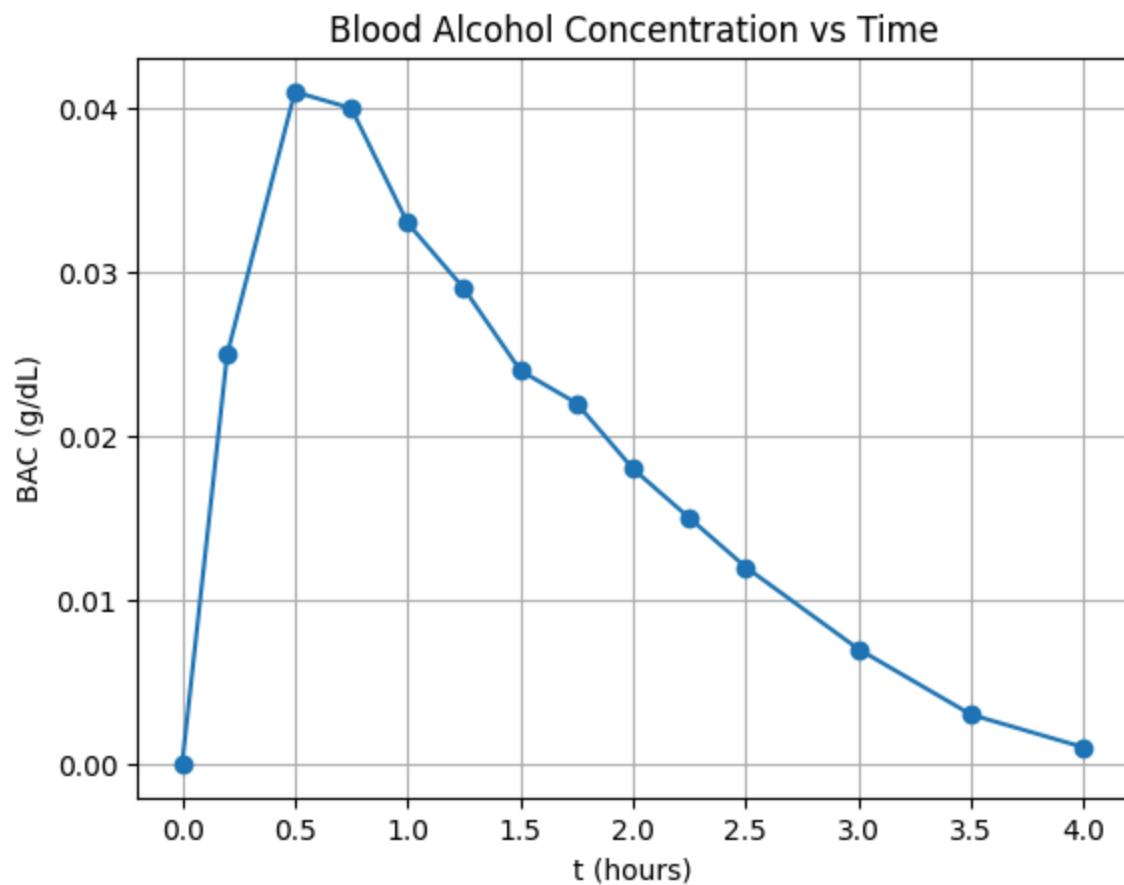
Question 15

Answer:

No. The graph does not pass the vertical line test.

Question 32

(a)



(b)

BAC increases at first, reaches a maximum at 0.040, then decreases.

Question 33

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

$$\boxed{f(2) = 12}$$

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

$$f(-2) = 16$$

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

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

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

$$f(a+1) = 3(a+1)^2 - (a+1) + 2$$

$$f(a+1) = 3a^2 + 5a + 4$$

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

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

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

$$f(2a) = 12a^2 - 2a + 2$$

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

$$f(a^2) = 3a^4 - a^2 + 2$$

$$[f(a)]^2 = [3a^2 - a + 2]^2$$

$$[f(a)]^2 = 9a^4 - 6a^3 + 13a^2 - 4a + 4$$

$$f(a+h) = 3(a+h)^2 - (a+h) + 2 = 3a^2 + 6ah + 3h^2 - a - h + 2$$

$$f(a+h) = 3a^2 + 6ah + 3h^2 - a - h + 2$$

Question 38

$$f(x) = \sqrt{x+2}, \frac{f(x) - f(1)}{x - 1}$$

$$= \frac{\sqrt{x+2} - \sqrt{3}}{x - 1}$$

$$\begin{aligned}
&= \frac{\sqrt{x+2} - \sqrt{3}}{x-1} \cdot \frac{\sqrt{x+2} + \sqrt{3}}{\sqrt{x+2} + \sqrt{3}} \\
&= \frac{(x+2) - 3}{(x-1)(\sqrt{x+2} + \sqrt{3})} \\
&= \frac{x-1}{(x-1)(\sqrt{x+2} + \sqrt{3})} \\
&\boxed{\frac{1}{\sqrt{x+2} + \sqrt{3}}}
\end{aligned}$$

Question 40

$$\begin{aligned}
f(x) &= \frac{x^2 + 1}{x^2 + 4x - 21} \\
x^2 + 4x - 21 &= (x+7)(x-3) \\
x \neq -7, \quad x \neq 3
\end{aligned}$$

$$\boxed{\text{Dom}(f) = (-\infty, -7) \cup (-7, 3) \cup (3, \infty)}$$

Question 42

$$\begin{aligned}
g(t) &= \sqrt{3-t} - \sqrt{2+t} \\
3-t &\geq 0, \quad 2+t \geq 0 \\
-2 \leq t &\leq 3
\end{aligned}$$

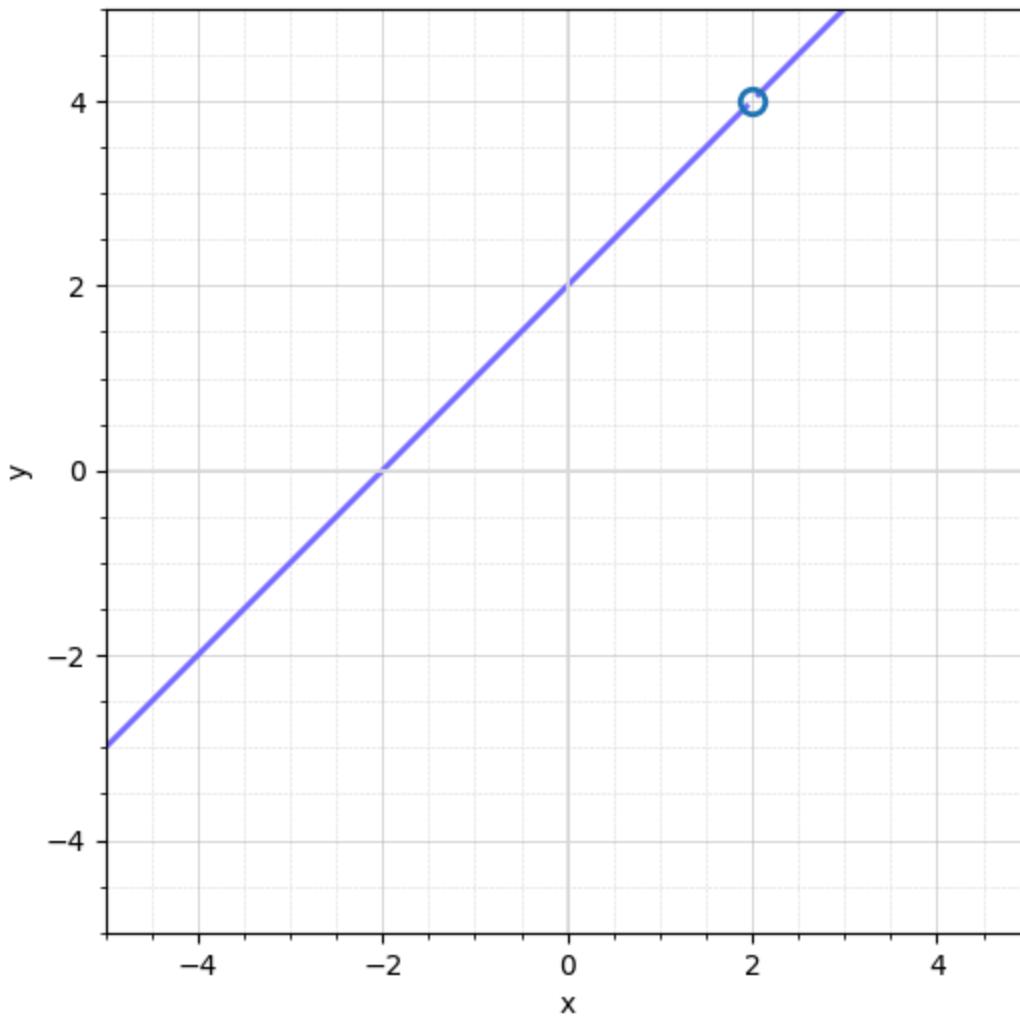
$$\boxed{\text{Dom}(g) = [-2, 3]}$$

Question 48

$$x \neq 2,$$

$$\boxed{\text{Dom}(f) = (-\infty, 2) \cup (2, \infty)}$$

$$f(x) = \frac{x^2 - 4}{x - 2}$$



Question 61

$$x + (y - 1)^2 = 0$$

$$(y - 1)^2 = -x$$

$$y - 1 = \pm\sqrt{-x}$$

$$y = 1 \pm \sqrt{-x}$$

Since the problem asks for the **bottom half** of the curve, we choose the negative branch:

$$\boxed{y = 1 - \sqrt{-x}}$$

For the square root to be defined:

$$-x \geq 0 \Rightarrow x \leq 0$$

$$\boxed{\text{Domain} = (-\infty, 0]}$$

Question 62

$$x^2 + (y - 2)^2 = 4$$

$$(y - 2)^2 = 4 - x^2$$

$$y - 2 = \pm\sqrt{4 - x^2}$$

$$y = 2 \pm \sqrt{4 - x^2}$$

Since the problem asks for the **top half** of the curve, we choose the positive branch:

$$y = 2 + \sqrt{4 - x^2}$$

For the square root to be defined:

$$4 - x^2 \geq 0 \Rightarrow -2 \leq x \leq 2$$

$$\boxed{\text{Domain} = [-2, 2]}$$

Question 78

Graph f is odd because it is symmetric about the origin (180 degree rotation)

Graph g is even because it is symmetric about the y axis