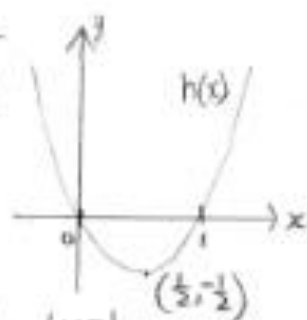


Higher HW 2

1. $m = \frac{1}{3}$ $y - 7 = -3(x + 4)$ 2. $x = 3$
 $m_{\perp} = -3$ $y - 7 = -3x - 12$
 $y = -3x - 5$

3a) $f(g(x)) = f(x^2) = \underline{x^2 - 1}$ i) $g(f(x)) = g(x - 1) = (x - 1)^2 = \underline{x^2 - 2x + 1}$ b. $h(x) = x^2 - 1 + x^2 - 2x + 1 = 2x^2 - 2x = 2x(x - 1)$

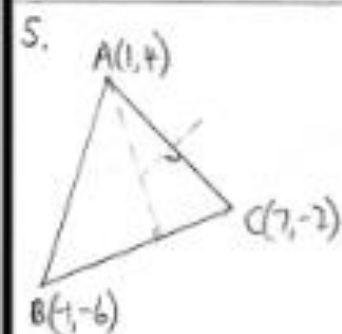
$2x(x - 1) = 0$
 $x = 0, x = 1$



When $x = \frac{1}{2}$, $h(x) = 1 \times -\frac{1}{2} = -\frac{1}{2}$

4a. $f(f(x)) = f\left(\frac{3}{x+1}\right) = \frac{3}{\frac{3}{x+1} + 1} = \frac{3}{1 + \frac{x+1}{x+1}} = \frac{3}{1 + 1} = \frac{3}{2}$

b. $x \in \mathbb{R} : x \neq -4$



a. $m_{CB} = \frac{-2 + 6}{7 + 1} = \frac{4}{8} = \frac{1}{2}$

$m_{\perp} = -2$
 $y - 4 = -2(x - 1)$
 $y - 4 = -2x + 2$
 $y = -2x + 6$

b. $m_{AC} = \frac{4 + 2}{1 - 7} = \frac{6}{-6} = -1$

$m_{\perp} = 1$
 $\left(\frac{1+7}{2}, \frac{4+2}{2}\right) = (4, 1)$
 $y - 1 = 1(x - 4)$
 $y - 1 = x - 4$
 $y = x - 3$

c. $-2x + 6 = x - 3$
 $6 = 3x - 3$
 $9 = 3x$
 $x = 3$

When $x = 3$, $y = 3 - 3 = 0$

$(3, 0)$

$$6. m = \tan 60 = \sqrt{3} \quad y - 0 = \sqrt{3}(x + 2)$$

$$y = \sqrt{3}x + 2\sqrt{3}$$

$$7a. f(x) = 3x - 4$$

$$y = 3x - 4$$

$$y + 4 = 3x$$

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

$$f^{-1}(x) = \frac{x+4}{3}$$

$$g(x) = x^3 + 7$$

$$y = x^3 + 7$$

$$y - 7 = x^3$$

$$\sqrt[3]{y-7} = x$$

$$g^{-1}(x) = \sqrt[3]{x-7}$$

$$b. \text{ Domain: } x \in \mathbb{R}$$

$$\text{Range: } g^{-1}(x) \in \mathbb{R}$$

$$8a. x + 3y + 1 = 0 \quad (1)$$

$$2x + 5y = 0 \quad (2)$$

$$\times (1) \text{ by } -2$$

$$-2x - 6y - 2 = 0$$

$$2x + 5y = 0$$

$$-y - 2 = 0$$

$$y = -2$$

$$\text{Place } y = -2 \text{ into } (2)$$

$$2x - 10 = 0$$

$$2x = 10$$

$$x = 5$$

$$B(5, -2)$$

$$m_{AB} = \frac{-2 - 4}{5 - 7}$$

$$= \frac{-6}{-2}$$

$$= 3$$

$$b. 3y = -x - 1$$

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

$$m_{AB} = 3$$

$$\text{As } m_{AB} = 3,$$

AB is perpendicular

to this line

only

$$5y = -2x$$

$$y = -\frac{2}{5}x$$

$$m_{\perp} = \frac{5}{2}$$