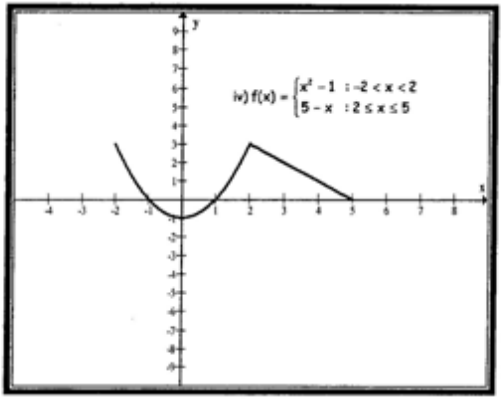
iv) $f(x)=\begin{cases} x^2-1 & : -2 \le x < 2 \\ 5-x & : 2 \le x \le 5 \end{cases}$

$-2 \le x < 2$				$2 \le x \le 5$			
$f(x)= x^2-1$ Vertex (0,-1)				$f(x)= 5-x$			
x	-2	0	2	x	2	3	5
f(x)	3	-1	3	f(x)	3	2	0



- Domain = [-2,5]
- Range = [-1,3]
- f is neither even nor odd
- Discussion of monotony

  $\forall x \in]-2,0[\cup]2,5[$ f is decreasing

  $\forall x \in]0,2[$ f is an increasing

b) i) $$\frac{\left(\frac{1}{9}\right)^{1-m} \times (49)^{m-1} \times (21)^{5-m}}{\sqrt[m]{7^{m^2+3m}} \times \left(\frac{1}{27}\right)^{\frac{-1-m}{3}}}$$

$$= \frac{\left(\frac{1}{3^2}\right)^{1-m} \times \left(7^2\right)^{m-1} \times (3\times 7)^{5-m}}{(7)^{\frac{m^2+3m}{m}} \times \left(\frac{1}{3^3}\right)^{\frac{-1-m}{3}}}$$

$$= \frac{\left(3^{-2}\right)^{1-m} \times 7^{2(m-1)} \times 3^{5-m} \times 7^{5-m}}{(7)^{\frac{m(m+3)}{m}} \times \left(3^{-3}\right)^{\frac{-1-m}{3}}}$$

$$= \frac{3^{-2(1-m)} \times 7^{2(m-1)} \times 3^{5-m} \times 7^{5-m}}{7^{m+3} \times 3^{-3\left(\frac{-1-m}{3}\right)}}$$

$$= \frac{3^{-2+2m} \times 7^{2m-2} \times 3^{5-m} \times 7^{5-m}}{7^{m+3} \times 3^{1+m}}$$

$$= 3^{-2+2m+5-m-1-m} \times 7^{2m-2+5-m-m-3}$$

$$= 3^{-2+2m+5-m-1-m} \times 7^{2m-2+5-m-m-3}$$

$$= 3^2 \times 7^0 = 9 \times 1 = 9$$

ii) $\because \log_x 5 = \frac{1}{2} \Rightarrow 5 = x^{\frac{1}{2}} \Rightarrow (5)^2 = \left(x^{\frac{1}{2}}\right)^2$

$\therefore \boxed{x=25}$ By subistitution

$$\therefore \frac{\log_5 x^2 - \log 4x}{\log_3 (3x+6)} = \frac{\log_5 (25)^2 - \log (4\times 25)}{\log_3 (3\times 25+6)}$$

$$= \frac{\log_5 \left(5^2\right)^2 - \log 100}{\log_3 81} = \frac{\log_5 5^4 - 2}{\log_3 3^4}$$

$$= \frac{4\log_5 5 - 2}{4\log_3 3} = \frac{4\times 1 - 2}{4\times 1} = \frac{4-2}{4} = \frac{2}{4} = \frac{1}{2}$$