.

Maxima and Minima 18.1 Q1

$f(x) = 4x^2 - 4x + 4$ on R

$= 4x^2 - 4x + 1 + 3$

$= (2x-1)^2 + 3$

$\because \quad (2x-1)^2 \geq 0$

$\Rightarrow \quad (2x-1)^2 + 3 \geq 3$

$\Rightarrow \quad f(x) \geq f\left(\frac{1}{2}\right)$

Thus, the minimum value of $f(x)$ is 3 at $x = \frac{1}{2}$

Since, $f(x)$ can be made as large as we please. Therefore maximum value does not exist

Maxima and Minima 18.1 Q2

The given function is $f(x) = -(x-1)^2 + 2$

It can be observed that $(x-1)^2 \geq 0$ for every $x \in \mathbf{R}$.

Therefore, $f(x) = -(x-1)^2 + 2 \leq 2$ for every $x \in \mathbf{R}$.

The maximum value of f is attained when $(x-1) = 0$.

$(x-1) = 0 \Rightarrow x = 1$

$\therefore$Maximum value of $f = f(1) = -(1-1)^2 + 2 = 2$

Hence, function f does not have a minimum value.

Maxima and Minima 18.1 Q3

$f(x) = |x+2|$ on R

$\because \quad |x+2| \geq 0$ for $x \in R$

$\Rightarrow \quad f(x) \geq 0$ for all $x \in R$

So, the minimum value of $f(x)$ is 0, which attains at $x = -2$

Clearly, $f(x) = |x+2|$ does not have the maximum value.

*********** END **********