Maxima and Minima 18.1 Q7

$$g(x) = -|x+1| + 3$$

We know that $-|x+1| \le 0$ for every $x \in \mathbf{R}$.

Therefore, $g(x) = -|x+1| + 3 \le 3$ for every $x \in \mathbf{R}$.

The maximum value of g is attained when $|x+1| = 0$

$$|x+1| = 0$$
$$\Rightarrow x = -1$$

$\therefore$ Maximum value of $g = g(-1) = -|-1+1| + 3 = 3$

Hence, function g does not have a minimum value.

Maxima and Minima 18.1 Q8

$$f(x) = 16x^2 - 16x + 28 \text{ on } R$$
$$= 16x^2 - 16x + 4 + 24$$
$$= (4x-2)^2 + 24$$

Now,

$$(4x-2)^2 \ge 0 \text{ for all } x \in R$$
$$\Rightarrow \quad (4x-2)^2 + 24 \ge 24 \text{ for all } x \in R$$
$$\Rightarrow \quad f(x) \ge f\left(\frac{1}{2}\right)$$

Thus, the minimum value of $f(x)$ is 24 at $x = \frac{1}{2}$

Since $f(x)$ can be made as large as possible by giving difference values to x.

Thus, maximum values does not exist.

Maxima and Minima 18.1 Q9

$f(x) = x^3 - 1$ on R

Here, we observe that the values of $f(x)$ increases when the values of x are increased and $f(x)$ can be made as large as we please by giving large values to x.

So, $f(x)$ does not have the maximum value.

Similarly, $f(x)$ can be made as small as we please by giving smaller values to x.

So, $f(x)$ does not have the minimum value.

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