

Piecewise and Periodic Functions

1 N09/P1/Q4(part)

4 It is given that

$$f(x) = \begin{cases} 7 - x^2 & \text{for } 0 < x \leq 2, \\ 2x - 1 & \text{for } 2 < x \leq 4, \end{cases}$$

and that $f(x) = f(x + 4)$ for all real values of x .

(i) Evaluate $f(27) + f(45)$.

[2]

(ii) Sketch the graph of $y = f(x)$ for $-7 \leq x \leq 10$.

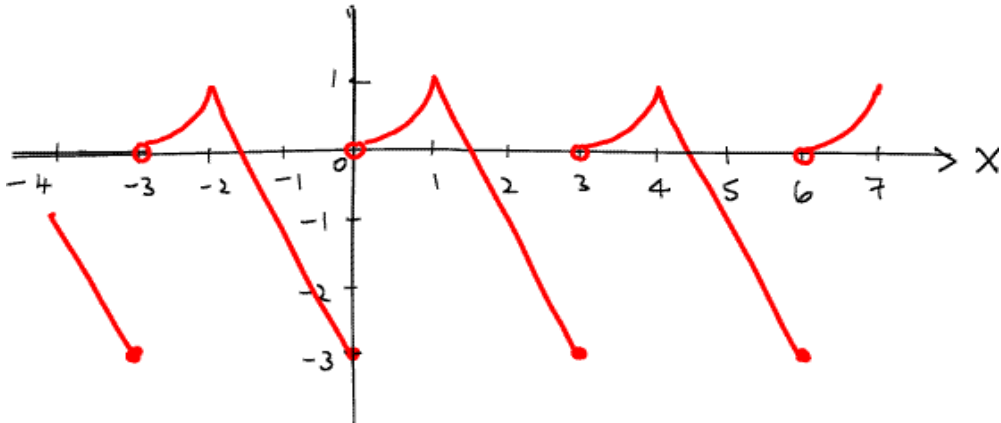
[3]

Solution

<p>4i) $f(27) + f(45)$ $= f(23) + f(41)$ $= f(19) + f(37)$ \vdots \vdots $= f(3) + f(1)$ $= 5 + 6$ $= 11$</p>	
<p>(ii)</p>	<p>Teaching Point: Students should be advised to sketch a clear and properly-labelled graph.</p>

2. Given $f(x) = x^2$ for $0 < x \leq 1$,
 $f(x) = 3 - 2x$ for $1 < x \leq 3$
 and $f(x + 3) = f(x)$ for all values of x .
 Sketch the graph for $-4 \leq x \leq 7$. Evaluate $f(26)$.

Solution:



$$f(26) = f(24 + 2) = f(2) = -1$$

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