

Q12. In drilling world's deepest hole it was found that the temperature T in degree Celsius, x km below the earth's surface was given by $T = 30 + 25(x - 3)$, $3 \leq x \leq 15$. At what depth will the temperature be between 155°C and 205°C ?

Sol. We have, $T = 30 + 25(x - 3)$, $3 \leq x \leq 15$

Now given that, $155 < T < 205$

$$\Rightarrow 155 < 30 + 25(x - 3) < 205 \Rightarrow 155 - 30 < 25(x - 3) < 205 - 30$$

$$\Rightarrow 125 < 25(x - 3) < 175 \Rightarrow \frac{125}{25} < x - 3 < \frac{175}{25}$$

$$\Rightarrow 5 < x - 3 < 7 \Rightarrow 5 + 3 < x < 7 + 3$$

$$\Rightarrow 8 < x < 10$$

Hence, at the depth 8 to 10 km, temperature lies between 155° to 205°C .