Exercise 10D

Question 7:
Let the required number be 3x and 3(x + 1).

Then, $3x \times 3(x+1) = 270 \Rightarrow 3x \times (3x+3) = 270$

$\Rightarrow 9x^2 + 9x - 270 = 0$

$\Rightarrow x^2 + x - 30 = 0$

$\Rightarrow x^2 + 6x - 5x - 30 = 0$

$\Rightarrow x(x+6) - 5(x+6) = 0$

$(x+6)(x-5) = 0$

$(x+6) = 0 \quad \text{or} \quad (x-5) = 0$

$x = -6 \quad \text{or} \quad x = 5$

But -6 is not a positive integer

Hence, required numbers are 15 and 18 since numbers are multiples of 3.

Question 8:
Let the required consecutive positive even integer be 2x and (2x + 2), then

$(2x)^2 + (2x+2)^2 = 340 \Rightarrow 8x^2 + 8x - 336 = 0$

$\Rightarrow x^2 + x - 42 = 0$

$\Rightarrow x^2 + 7x - 6x - 42 = 0$

$\Rightarrow x(x+7) - 6(x+7) = 0$

$\Rightarrow (x+7)(x-6) = 0$

$x + 7 = 0 \quad \text{or} \quad x - 6 = 0$

$x = -7 \quad \text{or} \quad x = 6$

But -7 is not an even positive integer
Hence, the required integers are 12 and 14.

Question 9:
Let the required number be x

Then, $x + x^2 = \dfrac{63}{4} \Rightarrow 4x + 4x^2 = 63$

$\Rightarrow 4x^2 + 4x - 63 = 0$

$\Rightarrow 4x^2 + (18x - 14x) - 63 = 0$

$\Rightarrow 4x^2 + 18x - 14x - 63 = 0$

$\Rightarrow 2x(2x + 9) - 7(2x + 9) = 0$

$\Rightarrow (2x + 9)(2x - 7) = 0$

$\Rightarrow 2x + 9 = 0,\ \text{or}\ 2x - 7 = 0$

$\qquad x = \dfrac{-9}{2},\ x = \dfrac{7}{2}$

Hence, the required number is $\dfrac{-9}{2}$ or $\dfrac{7}{2}$

Question 10:
Let the required number be x, then

$\qquad x + \sqrt{x} = \dfrac{6}{25} \Rightarrow y + y^2 = \dfrac{6}{25}$ where $\sqrt{x} = y$

$\Rightarrow 25y^2 + 25y - 6 = 0$

$\Rightarrow 25y^2 + (30y - 5y) - 6 = 0$

$\Rightarrow 25y^2 + 30y - 5y - 6 = 0$

$\Rightarrow 5y(5y + 6) - 1(5y + 6) = 0$

$\Rightarrow (5y + 6)(5y - 1) = 0$

$\Rightarrow (5y + 6) = 0\ \text{or}\ (5y - 1) = 0$

$\qquad y = \dfrac{-6}{5}\ \text{or}\ y = \dfrac{1}{5}$

$\dfrac{-6}{5}$ is not positive number

$\qquad y = \dfrac{1}{5} \Rightarrow \sqrt{x} = \dfrac{1}{5}$

$\Rightarrow \sqrt{x} = \dfrac{1}{5}$

$\qquad (\sqrt{x})^2 = \left(\dfrac{1}{5}\right)^2$

$\qquad x = \dfrac{1}{25}$

hence, the required number is $\dfrac{1}{25}$

Question 11:
Let the required number be x and x - 3, then

$$x(x-3) = 504 \Rightarrow x^2 - 3x - 504 = 0$$

$$\Rightarrow x = \frac{3 \pm \sqrt{9 + 2016}}{2} = \frac{3 \pm \sqrt{2025}}{2} = \frac{(3 \pm 45)}{2}$$

$$\Rightarrow x = \frac{3 + 45}{2} = 24 \quad \text{or} \quad x = \frac{(3 - 45)}{2} = \frac{-42}{2} = -21$$

Hence, the required numbers are (24,21) or (-21 and-24).

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