THIRUVANANTHAPURAM EDUCATIONAL DISTRICT

W S 4.1

MATHEMATICS

STANDARD: 10

SECOND DEGREE EQUATIONS

ANSWERS

1

Eg:	$(x-5)^2 = 900$	$x-5 = \sqrt{900} = 30$	$x = 30+5 = 35$
(a)	$(x-10)^2 = 100$	$x-10 = \sqrt{100} = 10$	$x = 10 + 10 = 20$
(b)	$(x+1)^2 = 225$	$x+1 = \sqrt{225} = 15$	$x = 15 - 1 = 14$
(c)	$(x-1)^2 = 100$	$x-1 = \sqrt{100} = 10$	$x = 10 + 1 = 11$
(d)	$(x-3)^2 = 121$	$x-3 = \sqrt{121} = 11$	$x = 11 + 3 = 14$
(e)	$(x+7)^2 = 225$	$x+7 = \sqrt{225} = 15$	$x = 15 - 7 = 8$

2

Numbers = x , $x+8$

$x(x + 8) = 105$

$x^2 + 8x = 105$

$x^2 + 8x + 4^2 = 105 + 4^2$

$\therefore$ The least number added to the given product to get a perfect square = 16

$(x + 4)^2 = 105 + \underline{16}$

$(x + 4)^2 = \underline{121}$

$x + 4 = \sqrt{121}$

$x + 4 = \underline{11}$

$x = \underline{-4} + 11$

$x = \underline{7}$

$x + 8 = \underline{15}$

$\therefore$ Numbers = $\underline{7}$, $\underline{15}$

3

Length of the smaller side = x

Length of the longer side = $\underline{x + 2}$

Area = $x \times \underline{(x + 2)}$

$x \times \underline{(x + 2)} = 224$

$x^2 + 2x = 224$

$x^2 + 2x + \underline{1} = 224 + \underline{1}$

$(x + \underline{1})^2 = 225$

$x + \underline{1} = \underline{15}$

$x = \underline{15 - 1} = \underline{14}$

Length of the sides = $\underline{14}$, $\underline{16}$

4

First term = $\underline{5}$

Common difference = $\underline{2}$

$$x_n = dn + f - d$$

$$= 2n + \underline{3}$$

$$S_n = \frac{n}{2}[x_1 + x_n]$$

$$\frac{n}{2}[5 + \underline{2n+3}] = 140$$

$$\frac{n}{2}[2n + \underline{8}] = 140$$

$$\frac{n}{2} \times 2[n + \underline{4}] = 140$$

$$n(n + \underline{4}) = 140$$

$$n^2 + n \times \underline{4} = 140$$

The number to be added to change it into a perfect square = $\underline{4}$

$$n^2 + 4n + \underline{4} = 140 + \underline{4}$$

$$(n + \underline{2})^2 = \underline{144}$$

$$n + \underline{2} = \underline{\sqrt{144}} = 12$$

$$n = \underline{12} - \underline{2}$$

$$= \underline{10}$$

$\therefore$ The total number of consecutive terms added to get 140 = $\underline{10}$

5

One side of original square = $\underline{x}$

One side of new square = $x + \underline{2}$

Area of square = $\underline{x+2} \times \underline{x+2}$

Area of new square = $\underline{100}$

$$(x + \underline{2})^2 = 100$$

$x + \underline{2} = \sqrt{100}$

$x + \underline{2} = 10$

$x = \underline{10} - \underline{2}$

$= \underline{8}$

One side of the original square = <u>8 cm</u>