StEP
STUDENTS TOTAL EMPOWERMENT PROJECT

SSLC Top Test Series
Mathematics

Std. 10   (Type - A) **Answer Key**

1. a) $x_1 = 3 + 4 = 7$

  b) $d = 3$

2. a) $\dfrac{7}{11}$

  b) 3

3. a. $x_{14} + x_{16} = 2 \times 40 = 80$

   b. $S_{29} = 29 \times 40$

         $= 1160$

4. a. 43 is not a multiple of the common difference 5. So 43 cannot be the difference of any two terms.

   b. When we divide 41 by 5, the remainder is 1. So 41 can be a term.

5.   1, 3, 5, 7, ...

    4, 12, 20, ...

6.   Probability that the dot is inside the shaded part $= 1/2$

7. a. Probability of both being boys

20B		15B
15G		15G
10A		10B

    $\dfrac{20 \times 15}{35 \times 30} = \dfrac{300}{1050}$

   b. Probability of both being girls

    $= \dfrac{225}{1050}$

   c. Probability of one boy and one girl

    $= \dfrac{525}{1050}$

8. a. 465   b. 1860   c. 1920

9. a) 22, 24, 26, 28

  b) 10

  c) 92 and 110

  d) $92 + 94 + 96 + \ldots \ldots + 110 = \dfrac{10}{2}$

    (92 + 110)

              $= 5 \times 202$

              $= 1010$

Type - B

1. a) 100 is not a term. Since the remainder on dividing 100 by 5 is not 3.

  b) $x_{10} = f + 9d$

       $= 3 + 9 \times 5$

       $= 48$

2.   The sum of any 11 terms cannot be 2000. Since the sum of 11 odd numbers is always odd.

3. a. 6/90   b. 18/90

4.   5/6

5. a) $1 + 3 + 5 + \ldots \ldots + 49 = 25^2$

                $= 625$

  b) 625

6. a. $f = 2/3 + 1/3 = 1$

        $d = 4/3$

   b. $x_n = 4/3\, n - 1/3$

7. a. $S_5 = 150$

      $x_3 = \dfrac{150}{5} = 30$

     $S_{10} = 400$

     $\dfrac{x_3 + x_4 = 400}{5} = 80$

$$x_7 = 50$$

$$d = \frac{50-30}{7-3} = \frac{20}{4} = 5$$

$$f = 20$$

b. $x_n = 5n + 15$

7. $f = 13, \quad d = 4$

$$x_{20} = 13 + 19 \times 4 = 13 + 76 = 89$$

$$\text{sum} = \frac{20}{2}(13 + 89) = 10 \times 102 = 1020$$

8. a. $\dfrac{15}{45}$ (b) $\dfrac{8}{45}$ (c) $\dfrac{37}{45}$

9. a) 21, 23, 25, 27, 29

   b) 45th odd number = 89

   c) 91

   d) 91+93+95+...........+109

$$= \frac{10}{2}(91+109)$$

$$= 1000$$

Type - C

1. a. 1, 2, 3, 4, ...
    b. 3, 5, 7, 9, ...

2. a. 90

    b. $\dfrac{9}{90} = \dfrac{1}{10}$

3. a. 16, 25, 36, 49, 64, 81

    b. $\dfrac{6}{90} = \dfrac{1}{15}$

4. a. $5n + 3 - 5 = 5n - 2$

    b. $x_{11} = 5 \times 11 - 2 = 53, x_{26}$
        $= 5 \times 26 - 2 = 128$

5. a. $x_1 = 3 \times 1 + 5 = 8, x_2$
        $= 3 \times 2 + 5 = 11 \therefore d = 3$

    b. $x_{10} = 3 \times 10 + 5 = 35$

6. a. $\dfrac{45}{90} = \dfrac{1}{2}$ b. $\dfrac{45}{90} = \dfrac{1}{2}$

    c. $1 - \dfrac{9}{90} = \dfrac{9}{10}$

SteP

SSLC Top Test Series
Mathematics

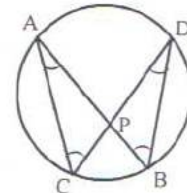**Std. 10**   **(Type - A) Answer Key**

1. a) $\angle ACB = 90^0$

   $\angle B = 20^0$

2.   Construction

3. $\dfrac{n(n+1)}{2} = 465$

   $\therefore n = 30$

4. $x(x+2) + 1 = 576$

   $(x+1)^2 = 576$

   $\therefore x = 23$

   Odd numbers are 23, 25

5. $\angle APB = 55^0$

   $\angle OAP = 30^0$

   $\angle OPB = 25^0$

   $\angle BOP = 130^0$

6.   Construction

7. $x(x+6) = 216$

   $x^2 + 6x + 9 = 225$

   $(x+3)^2 = 225$

   $x = 12, -18$

   $\therefore$ Numbers are 12, 18 or -18, -12

8.   lengths of the sides = 12m, 5cm

9. a) radius $= \dfrac{7+1}{2} = 4$ cm

   b) $PC = \sqrt{7 \times 1} = \sqrt{7}$ cm

   c) Construction

Type - B

1. a) $\angle ABC = 30^0$

   $\angle ADC = 150^0$

2. $PA \times PB = PC \times PD$

   $4 \times 9 = 3 \times PD$

   $\therefore PD = 12$

   $\therefore CD = 12 - 3 = 9$ cm

3.   Side of the original square = 11m

4.   Numbers are 17 and 23

5.   Construction

6. a. $CP = \sqrt{8}$ cm

   b. $CQ = 4$ cm

   $\therefore PQ = (4 - 2\sqrt{2})$ cm

7.   Perimeter = 60cm

   Maximum area

   $= \left(\dfrac{60}{4}\right)^2 = 225$

   So it is not possible to draw a rectangle of area 230cm²

8.   Base = x

   Hypotenuse = 2x + 3

   Third side = x + 7

   $x^2 + (x+7)^2 = (2x+3)^2$

   $\therefore x = 5, -4$

   $\therefore$ Sides are 5cm, 12cm, 13cm

9. a) Consider $\triangle APC$ and $\triangle BPD$

   We have $\angle A = \angle D$

   and $\angle C = \angle B$

   $\therefore$ The two triangles are similar

   $\therefore \dfrac{AP}{PD} = \dfrac{PC}{PB}$

   $\therefore AP \times PB = PC \times PD$

   b) Construction

   b) $PC = \sqrt{7 \times 1} = \sqrt{7}$ cm

   c) Construction

Type - C

1. a. $\angle ACB = 90°$
    b. $\angle A = 45°$
    c. $\angle B = 45°$

2. $(x-1)^2 = 64 \therefore x - 1 = 8$
    $\therefore$ side = 9

3. $x(x+2) - 1 = 196$
    $\therefore x + 1 = 14, \; x = 14 - 1 = 13$
    $x^2 + 2x + 1 = 196$
    Numbers are 13, 15
    $(x+1)^2 = 14^2$

4. Construction of square.

5. a. $\angle D = 180 - 30 = 150$
    (ABDC is a cyclic quadrilateral)
    Central angle of arc BDC = 2×30
    = 60° (Double of the angle on the opposite arc.)

6. $x^2 + 2x = 224$
    $x + 1 = 15$
    $x + 1 = -15$
    $x^2 + 2x + 1 = 224 + 1$
    $\therefore x = 15 - 1$ or
    $x = -15 - 1$
    $(x+1)^2 = 225$
    $x = 14$
    $x = -16$

7. a. $\angle QRS = 180 - 75 = 105°$
        (linear pair)
    b. $\angle PQR = 180 - 100 = 80°$
        (PQRS is cyclic quadrilateral)
    c. $\angle QPS = (180 - 105) = 75°$
        (PQRS is cyclic quadrilateral)
    d. Central angle of arc QPS = 210°
        Central angle of arc QRS = 150°

1. Circumradius $= \dfrac{12}{Sin60} \times \dfrac{1}{2}$

$$= \dfrac{6}{\left(\dfrac{\sqrt{3}}{2}\right)} = \dfrac{12}{\sqrt{3}} = 4\sqrt{3} \text{ cm}$$

2. Area $= 12 \times \dfrac{6}{\sqrt{2}} = 36\sqrt{2} \text{ cm}^2$

3. a. r = 8cm
   $\pi r l = 136\pi$
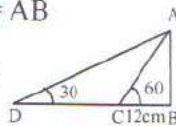 $\therefore l = \dfrac{136}{8} = 17\text{cm}$

   b. $h = \sqrt{l^2 - r^2}$
   $= \sqrt{17^2 - 8^2}$
   $= 15\text{cm}$

4. l = 16cm
   $h = \sqrt{112}\text{cm}$

5. BD = 10m

   BC = 5m

   CD = $5\sqrt{3}$ cm

6. Height of the tree = AB
   $= 12\sqrt{3}$
   $\therefore$ BD = $12\sqrt{3} \times \sqrt{3}$
   $= 36\text{cm}$

7. Radius of the cone = 12cm
   height of the cone = 30cm
   volume of the cone
   $= 1/3\pi \times 12 \times 12 \times 30$
   $= 1440\text{cm}^3$

8. Volume of the sphere
   $= 4/3\pi \times 6 \times 6 \times 6$
   Let the height of the cylinder
   $\pi \times 5 \times 5 \times h$
   $= 4/3\pi \times 6 \times 6 \times 6$
   $h = \dfrac{4 \times 6 \times 6 \times 6}{3 \times 5 \times 5} = 11.52\text{cm}$

9. a) AC = 10cm

   b) AB = $\sqrt{10^2 - 6^2}$ = 8cm

   Cos A = $8/10 = 4/5$

   c) tan A = $6/8 = 3/4$

Type - B

1. Area $= \frac{1}{2} \times 10 \times 8 \times Sin60$

   $= 20\sqrt{3}$ cm^2

2. AB $= \dfrac{10}{\sqrt{2}} = 5\sqrt{2}$ cm

   BC = $5\sqrt{2}$ cm

   AD = 5cm

   CD = $5\sqrt{3}$ cm

   Perimeter = $5\sqrt{2} + 5\sqrt{2} + 5\sqrt{3} + 5$
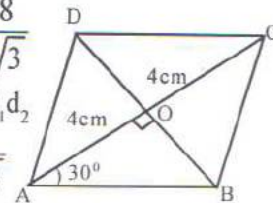
   $= (5 + 10\sqrt{2} + 5\sqrt{3})$cm

3. a = 14cm
   h = 24cm
   $l = \sqrt{24^2 + 7^2} = 25$
   $\therefore$ Base of the isosceles triangle
   $= 14\text{cm}$
   Height of the isosceles triangle
   $= 25\text{cm}$

4. Central angle = $\dfrac{360 \times 8}{32} = 90°$
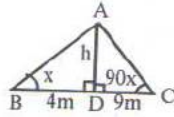
5. OB $= \dfrac{4}{\sqrt{3}}$

   $\therefore$ BD $= \dfrac{8}{\sqrt{3}}$

   Area $= \frac{1}{2} d_1 d_2$

   $= \frac{1}{2} \times 8 \times \dfrac{8}{\sqrt{3}}$
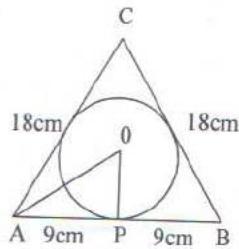
   $= \dfrac{32}{\sqrt{3}}$ cm^2

6. Since ADB and ADC are similar
$h/9 = 4/h$

$\therefore h = 6$ cm

7. $r_1 : r_2 = 2 : 3$, $h_1 : h_2 = 3 : 4$

$\dfrac{v_1}{v_2} = \dfrac{r_1^2 h_1}{r_2^2 h_2} = (2/3)^2 \times 3/4$

$= 1/3 \qquad v_1 : v_3 = 1 : 3$

8. The angles of $\triangle OAP$ are
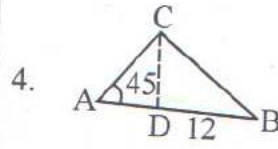$30°, 60°, 90°$
$OP = 9/\sqrt{3} = 3\sqrt{3}$ cm

Volume $= 4/3\pi \times 3\sqrt{3} \times 3\sqrt{3} \times 3\sqrt{3}$
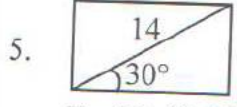
$= 108\sqrt{3}\pi$ cm³

9. a) 2:3

   b) 4:9

   c) 8:27

Type - C

1. $\angle A = \angle C = 45°$

2. $h = \sqrt{13^2 - 5^2} = 12.$

   Volume $= \dfrac{1}{3}\pi \times 5 \times 5 \times 12$

   $= 100\pi$ cm³

3. Slant height $= 18$ cm.

   Bar radius $= 18 \times \dfrac{60}{300} = 3 cm$

4. $AD = CD = \dfrac{10}{\sqrt{2}} = 5\sqrt{2}$

   Area $= \dfrac{1}{2} \times 12 \times 5\sqrt{2} = 30\sqrt{2}$ cm²

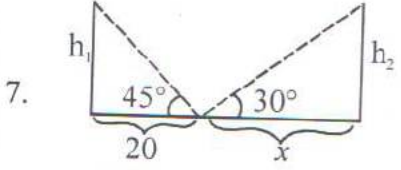5. For 30, 60, 90 triangle

   $1 : \sqrt{3} : 2$
   $\qquad\qquad 14$,

   sides are 7 and $7\sqrt{3}$,

   perimeter $= 2(7 + 7\sqrt{3})$

   Area $= 7 \times 7\sqrt{3} = 49\sqrt{3}$

6. $l = \sqrt{144 + 25} = 13$,
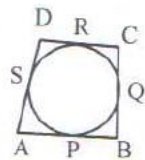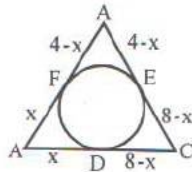
   Area of canvas $= \pi \times 5 \times 13 = 65\pi$ cm²

7.
$\therefore h_1 = 20$ mts $= h_2$

$x = 20\sqrt{3}$ from second triangle

Distance between buildings

$= 20 + 20\sqrt{3}$
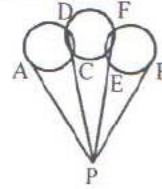
Step   # SSLC Top Test Series
Mathematics
Std. 10   (Type - A) Answer Key

1. In radius $(r) = \dfrac{A}{S} = \dfrac{60}{20} = 3$ cm

2. $\angle ACB = 50^0$

   $\angle APB = 80^0$

3. Construction

4. a. Area $= \frac{1}{2} \times 6 \times 8 = 24$ cm^2

   b. hypotenuse $= 10$ cm

   Perimeter $= 6 + 8 + 10 = 24$ cm

   $r = \dfrac{4}{5} = 24/12 = 2$ cm

5. If BD=x, then

   CD = 8-x

   $\therefore$ CE = 8-x

   BF = x

   $\therefore$ AF = 4-x

   AE = 4-x

   AC=6

   $\therefore$ (4-x) + (8-x) =6

   12-2x = 6

   $\therefore$ x = 3

   $\therefore$ BD = 3cm

6. Construction

7. AB + CD = AP + BP + CR + DR

   = AS + BQ + CQ + DS

   = (AS + DS) + (BQ + CQ)

   = AD+ BC

8. ``PA^2 = PC x PD

        = PE x PF = PB^2

   $\therefore$ PA = PB

9.a) MA×MB = MN^2

   MA×9 = 12^2

   MA = 16cm

   AB = 16-9 = 7cm

   MD×MC = MN^2

   8 × MC = 12^2 $\therefore$ MC =18cm

   CD =18-8 = 10cm

Type - B

1. $\angle$BOC=180-80

       = 100^0

   $\angle$BPC = 130^0

2. Construction

3. a. $\angle$B = 45°, $\angle$P = 45°

   b. PC = 4√2cm

   PB = 4√2 x 2 = 8cm

4. Perimeter of PQR = PQ + PR + QR

        = PQ + PR+ QS + RS

        = PQ + PR + QA + RB

        = PA + PB = PA + PA

        = 2 x PA

   $\therefore$ PA = x perimeter of PQR

5.   Construction

6. $\angle A = 40°$, $\angle B = 80°$, $\angle C = 60°$

7.   Let OAC = x and OCA = y

   $\angle BAC = 2x$ $\angle BCA = 2y$

   $2x + 2y + 70° = 180°$

   $2x + 2y = 110°$ $x + y = 55°$

   $\therefore \angle AOC = 180 - (x+y) = 125$

8.   AP x AB = AD^2 = $(AC/2)^2$

   $= \dfrac{AC^2}{4} - \dfrac{AB^2}{4}$

   $\therefore$ AP = AB/4

   $\therefore$ AB = 4 x AP

9. a) $PC^2 = PA \times PB$

      $= 16 \times 25$

      $\therefore PC = 4 \times 5$

         $= 20cm$

   b) Area of $\triangle PCB = \frac{1}{2} \times 20 \times 25 \times \text{Sin}60^0$

      $= \frac{1}{2} \times 20 \times 25 \times \dfrac{\sqrt{3}}{2}$

      $= 125\sqrt{3}$ cm².

Type - C

1.   a. 90°

   b. $\angle Q = 90 - 54 = 36°$

2.   a. $\angle P = 90°$, $\angle R = 90°$

   b. $\angle Q = 180 - 130 = 50°$

3.   AB × AC = AD^2

   $\therefore AD^2 = 4 \times 16 = 64$ $\therefore$ AD = 8cm

4.   Join OC. Triangle OAC is right angled with angles 30°, 60°, 90°.

   $AC = BC = 12\sqrt{3}$.

5.   Draw a circle with radius 3cm.

   Mark $\angle AOC$ with measure 50°

   Mark $\angle OAB$ with measure 90°

   Join this lines to mark point B.

6.   Construction

7.   Construction