SUMMATIVE ASSESSMENT –II 2013-14
CLASS X MATHEMATICS
MARKING SCHEME

SECTION A

1. A **2. D** **3. D** **4. B** **5. B** **6. C**

7. A **8. C**

SECTION B

9. $S_n = 2n^2$

$a_n = S_n - S_{n-1}$ ……. $\frac{1}{2}$ **mark**

$a_7 = S_7 - S_6$ …….. $\frac{1}{2}$ **mark**

a_7 **= 98 – 72** ……. $\frac{1}{2}$ **mark**

a_7 **= 26** ……. $\frac{1}{2}$ **mark**

10. The diagonals of a parallelogram bisect each other …. $\frac{1}{2}$ **mark**

To find the mid point of the diagonals …….. 1 mark

Since the mid points are common, it is a parallelogram $\frac{1}{2}$ **mark**

11. To make the quadratic equation correctly ……. 1 mark
To write the value Helping tendency, Thoughtfulness,
Social responsibility etc …….. 1 mark

12. To write $\angle$ **OPQ = 90° - 60 ° = 30 °** ……. $\frac{1}{2}$ **mark**

Since OP = OQ, $\angle$ **OPQ =** $\angle$ **OQP = 30°** ……. $\frac{1}{2}$ **mark**

$\angle$ **POQ = 180 – 60 = 120** ……. $\frac{1}{2}$ **mark**

$\angle$ **PRQ = Reflex** $\angle$ **POQ = 180 – 120 = 60°** ……. $\frac{1}{2}$ **mark**

13. No …….. 1 mark

To write the prime numbers 2,3,5 and to calculate the probability .. 1 mark
Or
To write the numbers divisible by 7 and to calculate the probability .. 1 mark
To write the probability of numbers not divisible by 7

using P (A') = 1 – P(A) …….. 1 mark

14. Take the height of the given cone = h and using $\frac{OA}{CD} = \frac{OB}{BD}$

Calculate the radius of the cone = r = 2 cm. ……. 1 mark

To find the ratio of the volumes using the fourmula = $\frac{1}{7}$ **… 1 mark**

SECTION C

15. To add x , 2x, 3x and equate the sum to 24 and solve to get x = 4 .. 1 mark

To calculate the number of balls of each type as 4 , 8 , 12 ….. $\frac{1}{2}$ **mark**

P (the ball being not red) = $\frac{20}{24} = \frac{5}{6}$ **……** $\frac{1}{2}$ **mark**

P (the ball being white) = $\frac{8}{24} = \frac{1}{3}$ **……** $\frac{1}{2}$ **mark**

16. $6a^2x^2 - 7abx - 3b^2 = 0$ **, (a≠0)**

$$B^2 - 4AC = \left[(-7ab)^2 - 4x(6a^2)x(-3b^2)\right]$$

= $121a^2b^2$ **……. 1 mark**

X = $\frac{-(-7ab) \pm 11ab}{12a^2}$ **…….. 1 mark**

X = $\frac{3b}{2a} or \frac{-b}{3a}$ **. ……. 1 mark**

OR

Let the present age of the child be ‘ x ’ years.

To write $\frac{1}{x-3} + \frac{1}{x+5} = \frac{1}{3}$ **…….. 1 mark**

To get the quadratic equation $x^2 - 4x - 21 = 0$ **…. 1 mark**

To solve and get x = 7 and x = -3 (rejected) … 1 mark

The present age of the child is 7 years.

17. Let the ratio be k : 1 …….. $\frac{1}{2}$ **mark**

The point of intersection is $\left(\frac{3k-2}{k+1}, \frac{7k+4}{k+1}\right)$ **…… 1 mark**

Substituting the point in the equation of the line and to arrive at the expression 10 k – 4 = 0 ……. 1 mark

Hence k = $\frac{2}{5}$

The required ratio is 2 : 5 …… $\frac{1}{2}$ mark

18. P (getting a red ball) =

1 – (p(getting a white ball)+P (getting a black ball)) .. 1 mark

= 1 – ($\frac{3}{10}+\frac{2}{5}$) = $\frac{3}{10}$ …… 1 mark

Let the total number of balls be 'y' …….. $\frac{1}{2}$ mark

$\frac{20}{y}=\frac{2}{5}$ **and therefore y = 50 ……..$\frac{1}{2}$ mark**

19. To write the A.P as 5,6,7,……, 31 ……. $\frac{1}{2}$ mark

A= 5 , d = 1 and n = 21 days

S_n = $\frac{27}{2}x(5+31)=486$ **…… ……. 1 mark**

Total money left with Ritika = 486 – 150 = Rs.336… $\frac{1}{2}$ mark

Values : Compassion, Sympathy, Sharing and Caring, Concern for elders, Charity etc. …… 1 mark

20. $S_n = 4n-n^2$

$t_{10}=S_{10}-S_9$ **…… $\frac{1}{2}$ mark**

$S_{10}=-60 and\ S_9=-45$

Hence $t_{10}=-60+45=-15$ **. …….. 1 mark**

$t_n=S_n-S_{n-1}$ **……. $\frac{1}{2}$ mark**

$t_n=5-2n$ **…… 1 mark**

OR

a = 9 , d = 8 and S_n **= 636 …… $\frac{1}{2}$ mark**

Using $S_n=\frac{n}{2}[2a+(n-1)d]$ **we get 636 =** $\frac{n}{2}[18+(n-1)8]$ **… 1 mark**

Solving to get n = 12 …… $1\frac{1}{2}$ mark

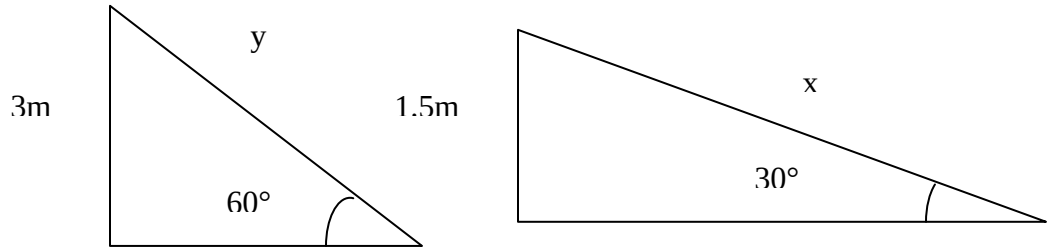
21. To write AP = PB , So , $\angle$ **PAB =** $\angle$ **PBA =** $\frac{1}{2}$ **(180 -** $\angle$**APB)**

= 90 - $\frac{1}{2}$ ∠APB…. 1 mark

∠ OAB = 90 - ∠PAB …….. 1 mark

= 90 – (90 - $\frac{1}{2}$ ∠APB) = $\frac{1}{2}$ ∠APB

Therefore 2 ∠ OAB = ∠APB …… 1 mark



22.

To draw the two diagrams correctly and to take the distances as 'x ' and 'y' … 1 mark

To solve for 'x' and 'y' …… 1 mark each

23. For constructing the triangle correctly as per the given measurements .. 1 mark

To construct the similar triangle as per the scale factor ……. 2 marks

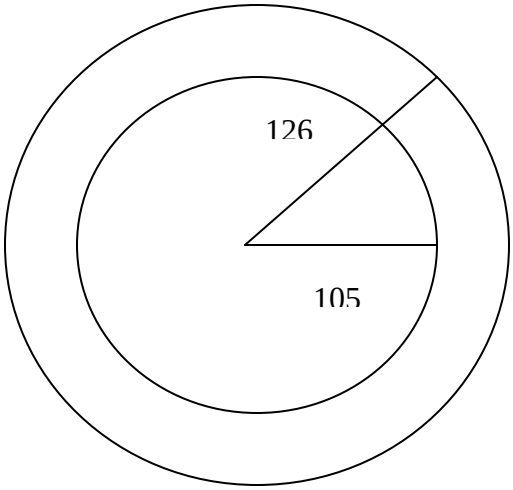
24.Area of the triangle 49 $\sqrt{3}cm^2 = \frac{\sqrt{3}}{4}a^2$

Solve for a = 14 cm …… 1 mark

Area of I sector = $\pi 7^2 x \frac{60}{360} = \frac{49\pi}{6} cm^2$ **…… 1 mark**

Required Area = 49 $\sqrt{3}$ **- 3 x** $\frac{49}{6}$ **x** $\frac{22}{7}$ **=** $7.77 cm^2$ **… 1 mark**

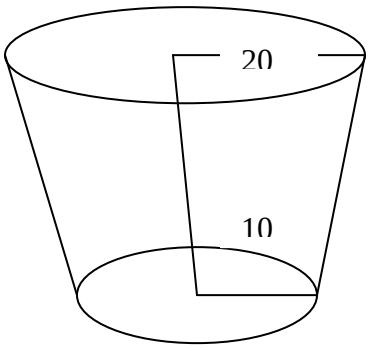
OR



Radius of the park = 105 cm
Radius of the outer circle = 105 + 21 = 126 cm
To calculate the Area of circles …… 2 marks
To calculate the required area ……. 1 mark

SECTION D

25.
R= 20 cm , r = 10 cm and h = 30 cm
To calculate the volume …… 2 marks
To calculate the Total Surface area … 2 marks



26.
Let 'a' be the first term and 'd' be the common difference….. 1 mark
To write $a_{12} = 23$ **or a +11 d = 23 …… (1)**
And $a_{21} = 50$ **or a + 20 d = 50 ……. (2) 1 mark**

Solve and get First term = - 10 and common difference = 3 … 1 mark
To find the nth term of the A.P = a + (n-1) d = 3n-13 …… 1 mark

27. To calculate the volume of the soil dug out

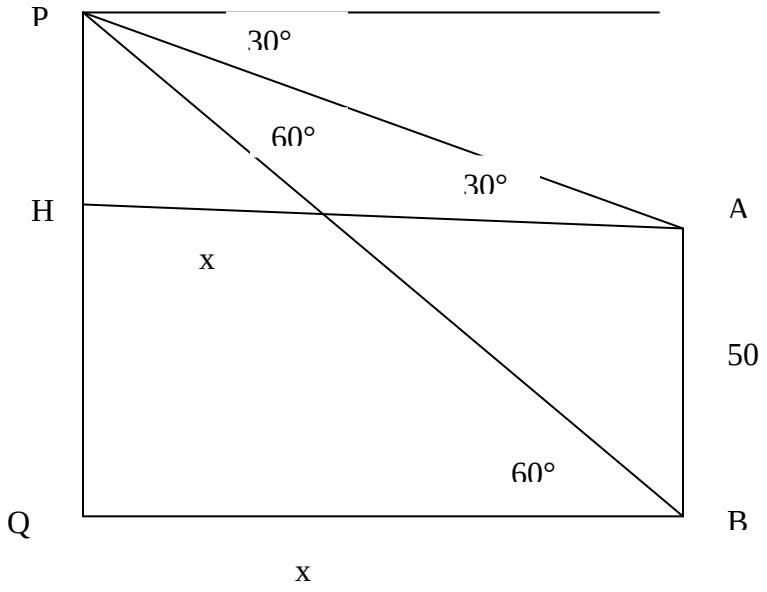
V = $\pi r^2 h = \pi\left(\frac{3}{2}\right)^2 x14$ **…… 1 mark**

To calculate the volume of the embankment = $V_2 = \pi(R^2 - r^2)h$

$= \pi\left[\left(\frac{11}{2}\right)^2 - \left(\frac{3}{2}\right)^2\right]$ **h where 'h' is to be determined. …… 1 mark**

Equating the two volumes and solving for 'h'= $\frac{126}{112}$ **cm ……. 2 marks**

28.



For the correct diagram …….. 1 mark
Let AB be the building and PQ be the tower.
Let 'x' be the horizontal distance and 'H' be the height of the tower .. 1 mark

Taking Tan 60 = $\frac{H}{x}$ **and getting H=** $\sqrt{3}$ **x ……** $\frac{1}{2}$ **mark**

Taking Tan 30 = $\frac{H-30}{x}$ **and getting H-50 =** $\sqrt{3}$ **x …** $\frac{1}{2}$ **mark**

Solving for 'x' and 'H' to get x = 25 $\sqrt{3}$ **m and H = 75m …….. 2 marks**

29.

For the cone r=3m , h=4m and l= $\sqrt{r^2 + h^2}$ **= 5m ……1 mark**

Total curved surface area = $\pi rl+2\pi rh$ ……. $\frac{1}{2}$ mark

= $36\pi m^2$ …… …… 1 mark

Total volume= $\pi r^2h + \frac{1}{3}\pi r^2h$ …… $\frac{1}{2}$ mark

= 22.5π m^3 ……1 mark

OR

To draw the diagram, …….1mark

(i)To calculate the volume of the conical part

r = 4cm, h = 4cm

V= $\frac{1}{3}$ πr^2h = $\frac{1}{3}$ x π x 4^2 x 4 cm^3

= $\frac{64}{3}$ π cm^3 ……1 mark

ii) Volume of the hemispherical part

r= 4cm

v = $\frac{2}{3}$ πr^3 = $\frac{2}{3}$ x π x 4 x 4 x 4 = $\frac{128}{3}$ π cm^3 ……1 mark

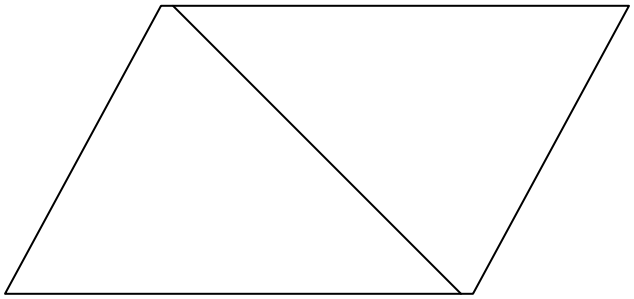
Required volume = ($\frac{64}{3}+\frac{128}{3}\pi$) cm^3

= $\frac{192}{3}$ π cm^3

= 64π cm^3 ……1 mark

30. To draw the diagram and label the vertices taken in order….. 1 mark

A (-5,7), **B (-4,-5),**

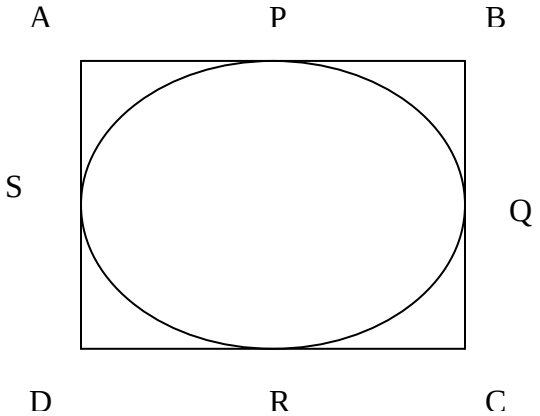


C (-1,-6)

D (4,5)

To Find the area of Triangle ABC using the formula …… 1 mark
To find the area of Triangle ADC …….. 1 mark
To add the two ares to get the required area …… 1 mark

31. To write the proof correctly by the help of a neat diagram .. 2 marks



To prove that AB+CD=AD+BC correctly . …… 2 marks

32. Let x be the original price of a book

Number of books that can be purchased for Rs.300 = $\frac{300}{x}$ **……** $\frac{1}{2}$ **mark**

When the price is reduced by Rs.5

Number of books that can be purchased for Rs.300 = $\frac{300}{x-5}$ **……** $\frac{1}{2}$ **mark**

From the given information

$\frac{300}{x-5}$ - $\frac{300}{x}$ **=5 ……1 mark**

To get x^2 – 5x-300=0 ……..1 mark

Solving ,(x-20)(x+15)=0

X=20 or x= -15(rejected) ……..1 mark

Therfore, the original price of a book is Rs.20.

OR

Let the age of one friend be x year

Age of the other =20-x ……..1 mark

4 years ago there age were x-4 and 20-x-u= 16-x ……1 mark

Using the given condition given,

To get x^2-20x+112=0 ……1 mark

b^2-4ac= -ve

The equation has no real solution.

Hence this situation is not possible. ……1 mark

33. For drawing the Triangle correctly …. 2 marks

For drawing the Similar triangle as per the scale factor …. 2 marks

34. Let θ be the central angle.

Given θ x $\frac{1}{360}$ **x πr^2** = 54 **π ……1 mark**

Therefore, θ x $\frac{1}{360}$ x **36**x**36 = 54**

To get $\theta=15^0$ **……1 mark**

Length of arc = θ x $\frac{1}{360}$ **x 2 πr……1 mark**

= $\frac{15}{360}$ **x 2 πx36 cm**

=3 π cm……1 mark