MODEL PAPER FOR CLASS X 2013-14

MARKING SCHEME

MATHEMATICS

Max.Mark:90
Time: 3 Hrs

SECTION – A (1 mark each)

1. (d)
2. (d)
3. (c)
4. (b)
5. (a)
6. (c)
7. (b)
8. (c)

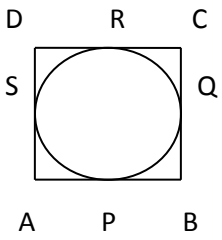
SECTION – B (2 mark each)

9. $B^2 + c^2 - 2bc - 4ac + 4a^2 + 4bc - 4ba = 0$ ----------1/2
   (-2a +b+c)2 =0 ----------1
   -2a+b+c=0
   b+c=2a ----------1/2

10. 13-(2p+1) = 5p- 3-13 ----------1/2
    13-2p-1 = 5p-16
    28=7p
    P=4 ----------1 ½

11. ∠ OBC =∠ OBD = 60^o, ∠OCB = 90^o ----------1/2
    ∠BOC = 30^o
    BC/OB = sin30 = ½
    OB = 2BC
    ----------1 ½

12. Correct figure ----------1/2



AP=AS , BP=BQ,CR=CQ,DR=DS (Tangent from an external point)---------1/2

AB + CD = AP + BP + CR + DR

= AS + BQ +CQ+DS

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

= AD + BC

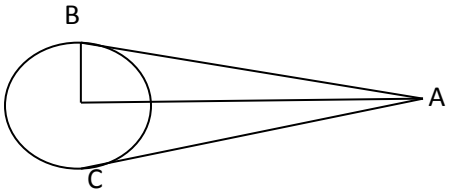
----------1

13. Sin60 = 3/2

Sin30 = ½ ----------(½)

Distance between (5Sin60,0) and (0,5Sin30) = 5 (for correct calculation) ----------1 ½

14.



OB ⊥ AB (Tangent and radius perpendicular)

∠B = 90^{o} --------1/2

∠OAB = ½ X 70^{o} = 35^{o} ---------1/2

∠AOB = 180 – (90+35) = 55^{o} ---------1

15. Let the two consecutive positive integers be X and X+1

x^2+(x+1)2=25 ----------1

x^2 + x-12 =0 ----------1

x= -4 (rejected) , x=3

Two integers are 3 and 4.

----------1

16. 10 X a_{10}= 15 X a_{15}

10 X (a+9d) = 15X(a+14d)

a = -24d

----------1

a_{25} = a + 24d

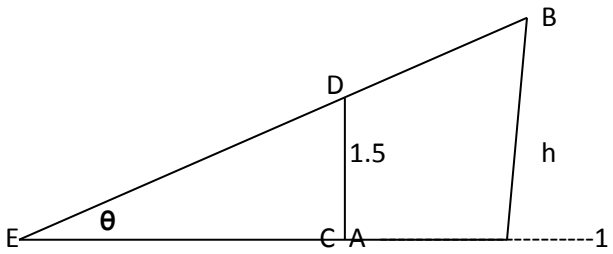
= -24d + 24d

= 0

----------1

For the value ----------1

17.



Let AB be the lamp post and CD be the boy

AEB $=\theta$

From ΔECD , $\tan\theta = \frac{CD}{EC}$ = 1.5 / 4.5 = 1/3 ----------1/2

From ΔEAB , $\tan\theta = \frac{AB}{EA}$

$\frac{h}{4.5+3}$ = 1/3 ----------1/2

h = 2.5 ----------1

18.

$2\pi rh = 264$

$\pi rh = 132$ ----------1/2

$\pi r2h = 924$

r X 132 = 924

r = 7 ----------1 ½

h = 6 m ----------1

19.

Let the original duration of the tour = x days

Total expenditure on tour = Rs. 360

Expenditure per day = Rs. 360 / x ----------1/2

Duration of the extended tour = x+4 days

Expenditure per day according to new schedule = 360 / x+4 ……..1/2

Daily expenses are cut down by Rs.3

$\frac{360}{X} - \frac{360}{X+4}$ = 3 ----------1/2

$x^2 + 4x - 480 = 0$ ----------1/2

x = 20 , x = -24 (Rejected)

original duration of the tour = 20 days.

----------1

20.

For correct construction ----------3 marks

21.

Since the points are collinear $x_1 (y_2 – y_3) + x_2 (y_3 - y_1) + x_3(y_1 – y_2)= 0$----------1/2

$-5 (P+2) + 1 (-2 -1) + 4(1-p) = 0$ ----------1/2

$9P = - 9$

$P = -1$----------2 marks

OR

$X = 2 X 3 + 1 X 5 /3$, $y = 2 X 2 + 1 X 1/3$

$X = 11/3$, $y = 5/3$ ----------1

P lies on $3x – 8y +k =0$

Ie, $3 X 11/3 – 8 X 5/3 +k =0$ ----------1

$-7/3 = -k$

$K = 7/3$ ----------1

22.

Let the number of blue balls be x

P (blue ball) = x/6+x

P(red ball) = 6/6+x ----------1

P(blue ball) = 2 X P(red ball)

x/6+x = 2 X 6/6+x ----------1

x = 12 ----------1

23.

L = $\sqrt{h^2 + (r1 - r2)^2}$ = $\sqrt{24^2 + (15 - 5)^2}$= 26 cm ----------1

Surface area of a bucket = $\pi l(r1 + r2) + \pi r1^2$

= 3.14(26 X 20 +25) = 1711.3 cm^2

----------2

24.

Area of quadrant OACB = ¼πr^2= ¼ X$\frac{22}{7}$ X$\frac{7}{2}$ X$\frac{7}{2}$

= $\frac{77}{8}$ cm^2----------1

Area ofΔ OAD = ½ bh = ½ X$\frac{7}{2}$ X 2

= $\frac{7}{2}$ cm^2---------- 1

Area of ODBC =$\frac{77}{8}$ - $\frac{7}{2}$ = $\frac{49}{8}$ cm^2 ----------1

25.

Let the sides of two squares be x and y (x > y)

X2 + y2 = 640 ---------(i)

4x – 4 y = 64

X – y = 16 ----------(ii)

---------- 1

X = 16 +y

(16 +y)2 + y2 = 640

Y^2 + 16y – 192 = 0 ----------1

(y+24) (y-8) = 0

Y = 8 , y =-24 (rejected)----------1

X = 16+8 = 24.

Sides of the squares are 24m and 8m----------1

26.

$a_n = 7-3_n$

a_1=7-3=4

a_2=7-6=1 ----------1

a = 4 , d = -3 ----------1

S_{25} = n/2 (2a+(n-1)d) = 25/2(8+24 x -3)

= 25/2 x (-24)

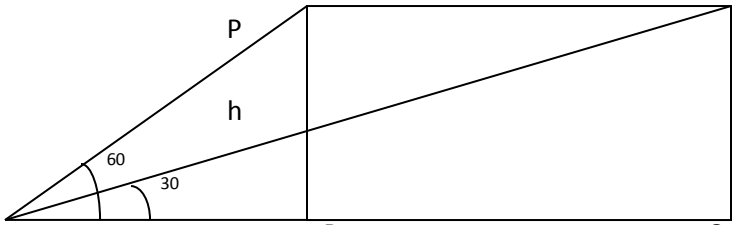
= -800 ----------2

27.

For given , to prove ,figure , Construction -----1/2 mark each

Correct proof ----------2 mark

28.



----------1

Let P and Q be the two positions of the jet plane.

A be the point of observation , ABC is the horizontal line through A

$\angle PAB$ = 60°,

$\angle QAB$=30°

PB = 1500$\sqrt{3}$

In ΔABP , tan60 = BP/AB

$\sqrt{3}$= 1500 $\sqrt{3}$ / AB

AB=1500

In ΔACQ , tan30=CQ/AC

1/$\sqrt{3}$ = 1500 $\sqrt{3}$ /AC ----------1

AC= 1500 X 3 = 4500 m

PQ = BC=AC-AB =3000m

Therefore , the horizontal distance between two positions = 3000m ---------1/2

Speed of the plane = 3000/15 = 200m/s = 200 X 18/5 km/h = 720 km/h ---------1/2

(Iv) The correct value ----------1

29.

Radius of the sphere = 3 cm.

Volume of the sphere = 4/3 πr^3

= 4/3π (3 X 3 X 3)

= 36 π cm^3 ----------1

Let the rise in water level be h cm

Increase in volume when sphere is submerged = π X 6X6Xh cm^3

= 36πh cm^3 ----------1

Rise in volume = volume of sphere

$36\pi h = 36\pi p$----------1 ½

$h = 1$

rise in water level = 1 cm ----------1/2

30.

Let AB be divided by the X- axis in the ratio k :1 at P. Therefore, the co-ordinate of P are

P((-2k+6)/(k+1) , (-5k+3)/(k+1)) ----------1

P lies on X –axis , therefore , ordinate =0 ----------1/2

(-5k+3)/(k+1) = 0

k = 3/5 ----------1

therefore , k:1 = 3:5 ---------1/2

Substituting k = 3/5 in (-2k+6) / (k+1) and simplifying , we get the coordinate of P as (3,0).-----1

31.

here n=20,

(a) E_1 = { 14 ,21,28} , $P(E_1)$ = 3/20 ----------2

(b) E_2 = { 20,25,30} , $P(E_2)$ = 3/20 ----------2

32.

$\sqrt{3}a^2 /4 = 49\sqrt{3}$

$a^2 = 196$

a = 14 m

therefore , r =7 cm 1

Area of one sector = 60/360 X 22/7 X 7 X 7

= 77/3 ----------1

Area of 3 sectors = 3 X 77/3

= 77 ----------1

Area of the triangle not included in the circle = $49\sqrt{3} – 77$

= 84.77 – 77

= 7.77 cm^2 ----------1

33.

Total height of the toy = 31 cm

Height of the conical part = 31 -7 = 24cm

Radius = 7 cm

$l^2 = r^2 + h^2$

$= 72 + 242$

$= 625$

Therefore , l =25 cm. ----------1

Total surface area of the toy = CSA of cone + CSA of hemisphere

$= \pi rl + 2\pi r^2$---------- 1

$= \pi r(l+2r)$

= 22/7 X 7(25+14)

= 22 X 39

= 858 cm^2----------1

(iv) yes he is true , an for correct value ----------1

34.

From the figure BQ = BP, CP=CR , AQ = AR

(Tangent from an external point) ----------1/2

Perimeter ofΔABC = AB + BC + AC ----------1/2

= AB + BP + PC+ AC

= AB + BQ + CR + AC

= AQ + AR

= AQ + AQ

= 2AQ----------2

Therefore , AQ = ½ X perimeter of ΔABC. ----------1