Solution Maths X
Marking Scheme
PART - A

Q.1	17=17 x 1 23=23x1 29=29 x1 So HCF (17,23,29)=1	(Option- C)	1
Q.2	LCM X HCF	(Option -D)	1
Q.3	The Number of zeros in quadratic equation $4x^2$-4x-1 will have =2 ['.' Number of zeroes = Highest power of polynomial]	(Option- B)	1
Q.4	P(E) + P(Ē) = 1 ['.' Sum of all types of probability in a system is 1]	(Option -A)	1
Q.5	b^2-4ac>0	(Option -C)	1
Q.6	The next term of the given AP=7 ['.' Here comes diff = -1-(-5)=-1+5=4] So next term = 3+4=7	(Option- b)	1
Q.7	$\text{Sec}^2\,\theta$	(Option- b)	1
Q.8	We have $(8)^2 + (15)^2$ = ………………… 64 + 225 = ……………….. 289 = …..…………… $(17)^2$ = $(17)^2$	(Option- B)	1
Q.9	Ans. Secant Line	(Option -B)	1
Q.10	Ans. Volume of cylinder = $\pi r^2 h$	(Option -B)	1
Q. 11	Ans. n^{th} term of AP = a+ (n-1)d	(Option -B)	1
Q. 12	Given Sin A $\frac{4}{3}$ then Cosec A = $\frac{4}{3}$	(Option-D)	1
Q. 13	Ans .All Square are similar	(Option -A)	1
Q. 14	Ans. 90^o	(Option- C)	1

Q. 15

$$\frac{\frac{4}{3}\pi r1^3}{\frac{4}{3}\pi r2^3} = \frac{64}{27}$$

$$\frac{r1^3}{r2^3} = \frac{64}{27}$$

$$\frac{r^1}{r^2} = \sqrt[3]{\frac{64}{27}}$$

$$\frac{r^1}{r^2} = \frac{4}{3}$$

$\frac{4\pi r1^2}{4\pi r2^2}$ = $\frac{(4)^2}{(3)^2} = \frac{16}{9}$ = 16:9 (Option- B) 1

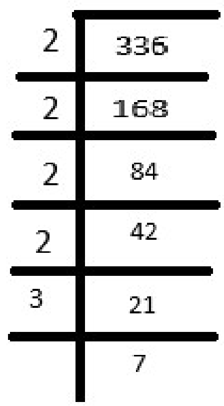
Q.16 The given Polynomial $5y^2-14y+8$

So sum of zeroes $= \frac{-b}{a}$

$= \frac{-(-14)}{5}$

$= \frac{14}{5}$ (Option- C) 1

Q.17. 336 1



336=2X2X2X2X3X7 1

Q.18 Given that

Coordinates of Rama's house $(x_1 , y_1) = (6 , 0)$

" " Shyama's house $(x_2 ,y_2) = (0 , 8)$

Using distance formula

Distance between their houses $= \sqrt{(x^2, x^2\ ) + (y^2, y^2\ )}^2$

$= \sqrt{(0-6)^2 + (8-0)^2}$

$= \sqrt{(-6)^2 + (8)^2}$

$= \sqrt{(36) + (64)}$

$= \sqrt{100}$

= 10 Unit 2

Q.19 Sin 60° Cos 30° + Sin 30° Cos60°

$= \frac{\sqrt{3}}{2} \text{x} \frac{\sqrt{3}}{2} + \frac{1}{2} \text{x} \frac{1}{2}$ 1

$= \frac{3}{4} + \frac{1}{4}$

$= \frac{3+1}{4} = \frac{4}{4} = 1$ 1

Q.20 X + Y = 14 - (I)

X - Y = 4 - (II)

From (II) X – Y = 4

X = 4 + Y - (III)

On substituting X= 4 +Y in (I)

4 + Y +Y = 14

4 +2Y = 14

2Y = 14-4

2y = 10

$Y = \frac{10}{2}$

Y = 5

On putting Y = 5 44 (II)

X = 4 + 5

X = 9

So X = 9 and Y = 5 ans.

Q. 21 The given equation

$\sqrt{2x^2}$+7x+5$\sqrt{5}$ = 0

$\sqrt{2x^2}$+2x+5x+5$\sqrt{5}$ = 0

$\sqrt{2x^2}+(\sqrt{2x})^2$x+5x+5$\sqrt{2}$ = 0

$\sqrt{2x}+(x+\sqrt{2x})$+5(x+$\sqrt{2}$)= 0

($\sqrt{2x}$+5) (x+$\sqrt{2}$)= 0

$\sqrt{2x}$+5=0	½	x+$\sqrt{2}$=0	½	1
$\sqrt{2x}$=-5		x=-$\sqrt{2}$		
$X=\frac{-5}{\sqrt{2}}$				

Q.22 Number of red balls = 3

Number of Black Balls = 5

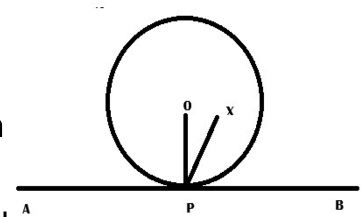
Total numbers of balls = 3+5=8

So probability of getting a red balls = $\frac{\text{number of red balls}}{Total\ numbers\ of\ balls}$ ½

$\frac{3}{8}$ ½

1

Q.23 Given a circle with centre O



And AB the tangent intersecting ½

Circle at point P will pass through

Centre perpendicular proof

We know that tangent to any circle ½

Make an angle of 90^o with radius.

Hence

OP ⊥AB

So ∠OPB = 90^o - (I)

Now lets assume some point X

Such that X P ⊥ AN

Hence ∠ X PB = 90^o - (II)

From eq4 (I) and (II)

∠OPB = ∠XPB = 90^o

Which is possible only if the line XP pass through O

Hence it is proved that perpendicular to tangent passes

through centre. 2

Q.24. Let us assume that 5-$\sqrt{3} = \frac{a}{b}$ ½

(Hence a and b are co prime number

And b‡ 0)

$\sqrt{3} = 5 - \frac{a}{b}$ ½

$\sqrt{3} = \frac{5b-a}{b}$ = rational number

But we know that $\sqrt{3}$ is an irrational number this contradiction

Arose from our wrong prediction that 5-$\sqrt{3}$is a rational number hence

It is proved that 5-$\sqrt{3}$ is an irrational number. 1

Q.25 Given that

$a_3 = 16$

a +(3-1) d = 16

a +(3-1)d = 16

1 + 2d = 16 (equation 1) ½

And

$a_7 - a_5 = 12$

a +(7-1)d – [a+(5-1)d] = 12

a +6d – [a + 4d] = 12

$a + 6d – a\ 4d = 12$ ½

$2d = 12$

$d = \frac{12}{2}$

$d = 6$

on putting d =6 in (equation1)

$a+2(6) = 16$ ½

$a+12 = 16$

$a = 16-12$

$a = 4$

a_2 $=a + (2-1)d$

$=4 +(1)(6)$ ½

$=4+6= 1$

a_3 $=a+ (3-1)d$

$=4+(2)6$ ½

$=4+12$

$=16$

a_4 $=a + (4-1)d$

$=4+3(6)$

$=4+18$ ½

$=22$

So AP : 4, 10, 16, 22……..

Q.27 Let point P(x,y) is equidistant from the paint A(3, 6) and B (-3, 4)

PA = PB ½

By using distance formula we have

$\sqrt{(x-3)^2+(y-6)^2} = \sqrt{[x-(-3)^2+(y-4)^2}$

$\sqrt{(x-3)^2+(y-6)^2} = \sqrt{(x+3)^2+(y-4)^2}$ ½

$(x-3)^2 + (y-6)^2 = (x+3)^2 + (y+4)^2$

$X^2-6x+9+y^2-12y+36 = x^2+6x+9+y^2-8y+16$ 1

$X^2-6x+9+y2-12^y+36-x2-6x-9-y^2+8y-16 = 0$

$-6x-6x-12y+8y+36-16=0$

$-12x-4y+20=0$ 1

$-4[3x+y-5]=0$

$3x+y-5=0$

Hence the relation between x and y is

$3x+y-5=0$

Q. 28 L.H.S. $= \frac{1+sec\theta}{sec\theta}$

$= \frac{1+\frac{1}{Cos\theta}}{\frac{1}{Cos\theta}}$

[‘.’ Sec θ = $\frac{1}{Cos\theta}$ ½

$= \frac{\frac{Cos\theta+1}{Cos\theta}}{\frac{1}{Cos\theta}}$ ½

$= \frac{Cos\theta+1}{Cos\theta}$ x $Cos\theta$

$= Cos\theta + 1$ ½

R.H.S. $= \frac{sin^2\theta}{1\text{-}Cos\,\theta}$

$= \frac{1-\text{Cos}^2\theta}{1-\text{Cos}\ \theta}$

Sin2θ + Cos2θ =1 ½

Sin2θ =1- cos2θ

$= \frac{(1-Cos\ \ )(1+Cos\ \ )}{1-Cos}$

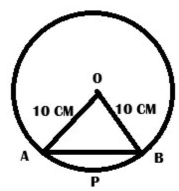
[‘.’ a2-b2 =(a-b)(a+b)] 1

$=$ *1 + Cos θ*

$=$ *cos θ +1*

So L.H.S.=R.H.S.

Q. 29 Given that radius of circle (R) = 10 cm ½



Angle made by chord AB at centre (Ǿ) =90^o

Area of sector Ǿ APB = = $\frac{\theta}{360}\pi r^2$ ½

$= \frac{90}{360}$ X 3.14 X $(10)^2$

4

$= \frac{1}{4}$ X $\frac{314}{100}$ X 100

$= \frac{314}{4}$ = 78.5 CM^2

Area of right angle triangle AOB $= \frac{1}{2}$ x Base x Height

$= \frac{1}{2}$ x OA X OB ½

$= \frac{1}{2}$ x 10 x 10 5

= 50 cm^2

So area of minor segment APB = Area of Sector OAPB - Area of ΔAOB

=78.5-5 ½

28.5 cm^2

(ii) Area of Major Sector = (360^o- Ǿ) x πr^2

360

$= \frac{360-90}{360}$ x 3.4x$(10)^2$

360

$= \frac{\overset{3}{\cancel{270}}}{\underset{4}{\cancel{360}}}$ x 3.14 x $\overset{25}{\cancel{100}}$ 1

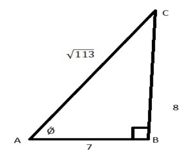
3 x 3.14 x 25

235.5 cm^2

Q. 30 Given

$\cot \acute{\emptyset} = \frac{7}{8}$

$\frac{Base}{Perpendicular} = \frac{7}{8}$ ½



In Triangle ABC

By Pythagoras theorem

$(Hypo)^2 = (prep)^2 + (Base)^2$

$(Ac)^2 = (8)^2 + (7)^2$ ½

$(Ac)^2 = 64 + 49$

$(Ac)^2 = 113$ ½

$Ac = \sqrt{113}$

So $\sin \acute{\emptyset} = \frac{8}{\sqrt{113}}$ $\cos \acute{\emptyset} = \frac{7}{\sqrt{113}}$ ½

$\frac{(1+Sin\acute{\emptyset})(1-Sin\acute{\emptyset})}{(1+cos\acute{\emptyset})(1-cos\acute{\emptyset})} = \frac{1^2-sin^2\acute{\emptyset}}{1-cos^2\acute{\emptyset}} = \frac{1-sin^2\acute{\emptyset}}{1-cos^2\acute{\emptyset}}$

$= 1-\left(\frac{8}{\sqrt{113}}\right)^2$

$= 1-\left(\frac{7}{\sqrt{113}}\right)^2$ ½

$= \frac{1-\frac{64}{113}}{1\frac{-64}{113}} = \frac{\frac{113-}{113}}{\frac{113-49}{113}}$ ½

$= \frac{\frac{49}{\cancel{113}}}{\frac{64}{\cancel{113}}}$ ½ $= \frac{49}{64}$

Q. 31 Let first number =x

So second number = 27-x ½

Given that product of number = 182

So

X(27-x) =182 ½

$27x-x^2 = 182$

$X^2-27x+182=0$

$X^2-13x-14x+182=0$ ½

X(x-13)-14(x-13)=0

(x-14)(x-13)=0 ½

x-14 = 0 x-13= 0

x = 14 x= 13

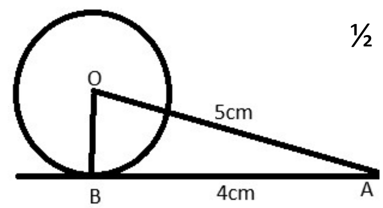
So if first number = 14 ½

Then 2^{nd} ʺ ʺ =27-14=13

And

If first number = 13

Then 2^{nd} ʺ ʺ =27-13=14 ½



Q. 32 AB is a tangent drawn on the Circle from point A

OB⊥ AB

OA = 5cm and AB= 4cm (given)

In ∆ABO

By Pythagoras theorem in ∆ABO [1 all App. Of phyth]

$(OA)^2 = (AB)^2 + (BO)^2$

$5^2 = 4^2 + (BO)^2$

$25 = 16 + (BO)^2$

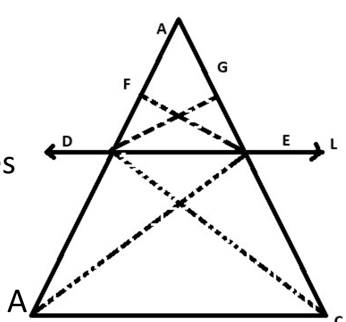
$(BO)^2 = 25 – 16$

$(BO)^2 = 9$

$BO = \sqrt{9}$

BO =3

So radius of circle = 3cm.



Q. 33 Statement : if a line is parallel to a side of triangle which intersect the other sides in to two distinct points, then the line divides those two sides in proportion.

Proof : Let ABC is the triangle the line L II to BC intersect AB at D and AC at A AC at E

We have to prove that

$\frac{AD}{DB} = \frac{AE}{E}$

Join BE, CD

Draw EF⊥ AB, DG⊥ CA

or ΔADE = ½ x AD x EF

or ΔADE = ½ x DB x EF

$\frac{or\ \Delta ADE}{or\ \Delta ADE} = \frac{\cancel{½} X\ AD\ X\ \cancel{EF}}{\cancel{½} X\ DB\ X\ \cancel{EF}} = \frac{AD}{DB}$ ……..(i) ½

Again

or ΔADE = ½ x AE x DG

or ΔADE = ½ x EC x DG

$\frac{or\ \Delta ADE}{or\ \Delta DCE} = \frac{\cancel{½ X}\ AE\ X\ \cancel{DG}}{\cancel{½} X\ EC\ X\ \cancel{DG}} = \frac{AE}{EC}$ ……..(ii) 1

But ΔDBE and ΔDCE are same base DE between the same parallel Straight line BC and DE.

So

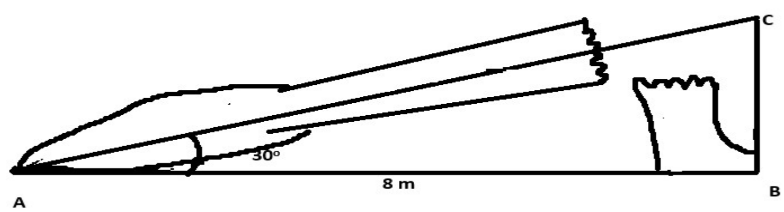
Area of ΔDBE = Area of ΔDCE ……..(iii) 1

From (i),(ii),(iii)

$\frac{AD}{DB} = \frac{AE}{EC}$

(Proved)

Q.34 Given that a tree breaks down due to storm distance between the foot of tree to point whose top of tree touches ground angle of inclination made by broken part (<CAB)=30°



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Let height from which tree is broken = BC

Length of broken part = AC ½

So

Total height of tree = BC + AC

In ΔABC

In $\frac{BC}{AB}$ = Tan 30°

$\frac{BC}{8} = \frac{1}{\sqrt{3}}$ [‘.’ Tan 30° = $\frac{1}{\sqrt{3}}$]

BC = $\frac{8}{\sqrt{3}}$ ……………………(i) 1

Again in ∆ABC

$\frac{AC}{AB}$ = Sec30°

$\frac{AC}{AB} = \frac{2}{\sqrt{3}}$ [‘.’ Tan 30° = $\frac{2}{\sqrt{3}}$]

$AC = \frac{16}{\sqrt{3}}$ ……………………(ii) 1

So total height of tree = BC + AC

= $\frac{8}{\sqrt{3}} + \frac{16}{\sqrt{3}}$ ½

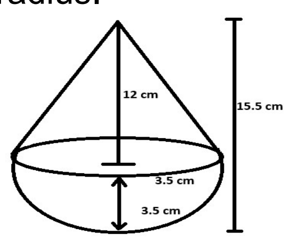
= $\frac{8+16}{\sqrt{3}}$

= $\frac{24}{\sqrt{3}}$

= $\frac{24}{\sqrt{3}}$ X $\frac{\sqrt{3}}{\sqrt{3}}$ ½

= $8\sqrt{3}$

Q. 35 Given that a doll in the shape of cone mounted on hemisphere of some radius.



1

So

Radius of	=	radius of = 3.5 cm	½
Conical part	=	hemispherical par	

Total height of doll = 15.5 cm

So height of conical part = 15.5 -3.5 = 12 cm ½

Let strict height of conical par = L

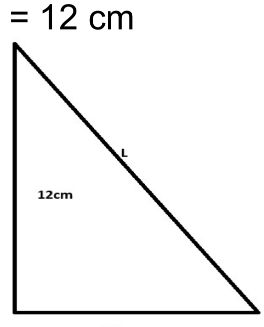
By Pythagoras theorem

L2 = (12)2 +(3.5)2

L2 = 144 + 12.25

L2 = 156.25

L = $\sqrt{156.25}$



L = 12.5 cm

```
        12.5
   1  | 156.25
      | 1
      |------
  22  |  56
      |  44
      |------
 245  |  1225
      |  1225
      |------
      |   X
```

Total surface are of doll = curved surface area of conical part + curved area of Hemispherical Part

$= \pi r L + 2\pi r^2$

$= \pi r\,(L + 2\pi r)$

$= \frac{22}{7} \times 3.5 \times (12.5 \times 2 \times 3.5)$

$= \frac{22}{7} \times 3.5 \times (12.5 + 7)$

$= \frac{22}{\not 7} \times \overset{0.5}{\not{3.5}} \times 19.5$

$= 22 \times 0.5 \times 19.5$

$= 214.5\ cm^2$

So total area to be coloured = $214.5\ cm^2$

Q.36 present age of Nuri = x yrs.

,, ,, sonu = y yrs. 1

Five years age

Age of Nuri = (x-y) Yrs.

A.T.Q.

x-5 = 3(y-5) ½

x-5 = 3y-15

x-3y = -15+5

x-3y = -10 ………………(i) ½

Ten years later

Age of Nuri = (x+10) yrs

,, ,, Sonu = (y+10)yrs ½

A.T.Q.

x+10 = 2(y+10) ½

x+ 10 = 2(y+10)

x – 2y = 20 -10

x - 2y = 10 ………………(ii)

on subtracting (ii) from (i)

~~x~~ – 3 = -10

~~x~~ – 2y = 10 1

\- + -

~~-~~ y = ~~-~~20

Y = 20

On putting Y = 20 in (i)

X - 3(20) = -10 ½

X - 60 = -10

X = -10+60

X = 50

Hence age of Nuri = 50 yrs ½

’’ ’’ Sonu = 20 yrs

Q.37 Here maximum frequency = 61 ½

Hence 60-80 is the modal class

Lower limit of modal class (L) = 60

Frequency of modal class (f_1) =61 ½

Frequency of class preceding

modal class (f0) = 52

’’ ’’ succeeding ’’ ’’ (f2) = 38

Class interval (h) = 20 ½

So

Mode $= L + \left(\frac{f1-f0}{2f1-f0-f2}\right)$ X h 1

$= 60 + \left(\frac{61-52}{2(61)-52-38}\right)$ X 20 ½

$= 60 + \left(\frac{9}{122-90}\right)$ X 20 ½

$= 60 + \frac{9}{32}$ X 20 ½

$= 60 + \frac{180}{32}$ = 60+ 5.625=65.625

So modal take time of electrical 1

components = 65.625 Ans

Q.26 2x+y = 6

4x+2y = 4

2x+y = 6 ½

X	0	1	2
y	6	4	2

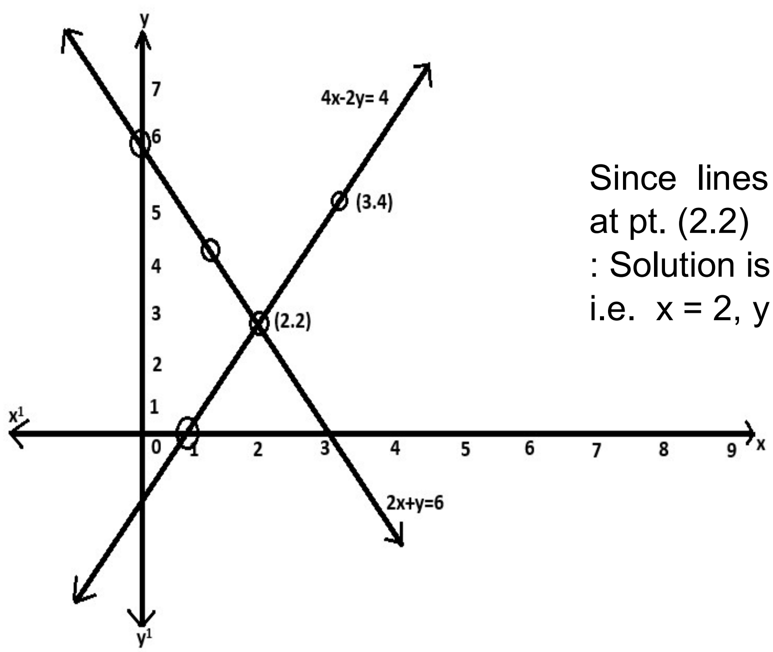
Coordinates are (0,6)(1,4)(2,2)

4x – 2y = 4 ½

X	2	1	3
y	2	0	4

Coordinates are (2,2)(1,0)(3,4)

Graph : - 1



Since lines are intersecting at pt. (2.2)

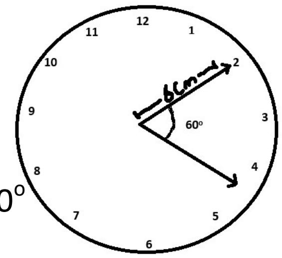
: Solution is (2,2)

i.e. x = 2, y = 2 1

PART –B [Short answer question]

Q. 23 Length of minute hand(r) = 360 ½

‘ ‘ ‘ ‘ $= \frac{360}{60}$



‘ ‘ ‘ ‘10 $= \frac{\overset{60}{\cancel{360}}}{\cancel{60}} \times \cancel{10} = 60^{o}$ ½

So are swept by minute hand in 10 min

$= \frac{\acute{\emptyset}}{360}\ \pi r^{2}$ ½

$= \frac{60}{360} \times \frac{22}{7} \times (6)^{2}$

$= \frac{\cancel{60}}{\underset{6}{\cancel{360}}} \times \frac{22}{7} \times 6 \times \cancel{6}$ ½

$\frac{132}{7}$ cm^{2}

PART –C [Long answer question]

Q. 27 Let number of articles produced on that day= x

So cost of each article = ₹(2x+3) ½

Total cost of production on that day = ₹90 ½

: X x (2x+3) = 90

$2x^{2} + 3x = 90$ ½

2x2 +3x-90 = 0

$X = \frac{-b \pm \sqrt{b^{2}-4ac}}{2a}$ ½

$= \frac{-3 \pm \sqrt{(3)^{2}-4(2)(-90)}}{2(2)}$

$= \frac{-3 \pm \sqrt{9+720}}{4}$ ½

$= \frac{-3 \pm \sqrt{729}}{4}$

27
2 | 729
  | 4
47 | 329
   | 329
   | x

$X = \frac{-3 \pm \sqrt{729}}{4}$

$X = \frac{-3 \pm \sqrt{729}}{4}$

$X = \frac{\overset{6}{\cancel{24}}}{\cancel{4}}$

$X = \frac{24}{4}$

$X = \frac{-3-27}{4}$

$X = \frac{-30}{4}\ \frac{-15}{2} = -7.5$

Negative value (neglected) ½

So number of article produced on that day = 6

cost of article = 2x+3

= 2(6)+3 ½

= 12+3

= ₹ 15

PART –D [Application based]

Q. 34 Let fix charge of taxi = ₹ x

’’ charge per km = ₹ y ½

In the first situation

Taxi charges for 10 km = ₹ 105 ……….(i)

X + 10y = 105

In 2nd situation

Taxi charges for 15 km = ₹ 155 ………………(ii) ½

On subtracting (i) from (ii)

$$\begin{array}{rcl} X + 15y & = & 155 \\ X + 10y & = & 105 \\ - \quad - & & - \\ \hline 5y & = & 50 \\ \hline \end{array}$$

1

5y = 50

$Y = \frac{\cancel{50}^{10}}{\cancel{5}}$ ½

Y = 10

On putting Y = 10

X +10(10) = 105 ½

X + 100 = 105

X = 105-100

X = 5

So for charge of taxi = ₹ 5 1

Charge per km of taxi = ₹ 10

Total taxi charges for the distance 25 km = x+25y

= 5+ 25(10)

=5+250

=₹ 255 1

Q.35 Q.35 Let the radius of cone = r cm

Let slout height of cone = l cm ½

let height of cone = h cm

let radius of cylinder = r_1 cm

let height of cylinder = h_1 cm ½

By Pythagoras theorem,

$l^2 = r^2+h^2$ ½

$l = \sqrt{r^2+h^2}$

$= \sqrt{(2.5)^2+(6)^2}$

$= \sqrt{6.25+36}$

$= \sqrt{42.25}$

l = 6.5cm

Here the conical portion has its circular base resting on the base of the cylinder, but the base of cone is larger than the base of cylinder so a part of the base of the cone caring is to be painted,

So, ½

The area to be painted orange = CSA of cone +Base area of cone-Base are of cylinder

$= \pi rl + \pi r^2 - \pi(r^1)^2$ ½

$= \pi[rl + r^2 - r^{1\,2}]$

$= \pi\ [2.5 \text{ X } 6.5 + (2.5)^2 - (1.5)^2$

$= \pi\ [16.25 + 6.25 - 2.25]$

$= \pi\ [22.5 - 2.25]$

$= \pi\ [20.25]$

= 3.14 X 20.25 1

= 63.585 Cm^2

Now the area to be painted yellow

= CSA of cylinder + Area of on base of cylinder ½

$=2\ \pi r^2 h^1 + \pi(r^1)^2$

$= \pi r^1[2h^1 + r^1]$

= 3.14 X 1.5 (2 X 20 + 1.5)

= 4.71 (40 +1.5) 1

= 4.71 X 41.5

= 195.465 cm^2