ಕರ್ನಾಟಕ ಶಾಲಾ ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯನಿರ್ಣಯ ಮಂಡಲಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು-560003.

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S.S.L.C EXAM 2023-24 Model Key answers

Class: 8 **Subject : Mathematics 81E** **Marks : 80**

Time : 3 Hours 15 Min

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1. **Answer: (A) 2q+1**
2. **Answer : (D) Parallel to each other**
3. **Answer :** (A) an=a+(n-1)d
4. **Answer: (B)2.**
5. **Answer: (C)** $\sqrt{2}$
6. **Answer: (A)** $PQ^2+PR^2= RQ^2$
7. **Option (A)** $1/3\ \pi r^2 h$.
8. **Option (B)** $\theta=60^0$
9. HCFx LCM = axb

   Answer is 20
10. Degree is 4
11. 5^{th} term is a+4d= 3+4x-2= 3-8 = -5.
12. $3x^2-2x-5=0$
13. Sin A $=\frac{1}{2}$, Cos A= $\frac{\sqrt{3}}{2}$ Then tanA=$\frac{SinA}{CosA}=\frac{1}{\sqrt{3}}$
14. Total outcomes = (H, T) = 2.

    Possible outcomes(H)= 1

    Hence P(E)= $\frac{1}{2}$
15. $\angle APB+\angle AOB=180^0$.

    $\angle APB+2\angle APB=180^0$ ($\angle AOB=2\angle APB$)

    $3\angle APB=180^0$

    $\angle APB = 60^0$.
16. C.S.A of frustum of a cone = $\prod l(r_1+r_2)$
17. Solution: Let us assume that 2 +√3 is a rational number with p and q as co-prime integer and q ≠ 0

    ⇒ 2+√3 = p / q

    ⇒ √3 = p / q - 2

    ⇒ √3 = (2q - p) / 2q

    ⇒ (2q - p) / 2q is a rational number

However, $\sqrt{3}$ is in irrational number

This leads to a contradiction that $2+\sqrt{3}$ is a rational number.

OR

To find HCF of 64 & 332

```
64)332(5
    320
   -----
    12)64(5
       60
      -----
       4)12(3
         12
```

Hence HCF of 64 and 332 is 4

18. Solution:

let two equations be $2x+3y=14$ ---------(1)

$2x+y=10$ ---------(2)

By elimination method,

Subtract above two equations we get

We get $2x+3y=14$

$2x+y=10$

$2y=4$

$y=2$

Put this y value in any one equation we get x value.

Equation (2) becomes $2x+3y=14$

$2x+3(2)=14$

$2x=8$

$x=4$

19. Given A,P is 3, 7, 11, …………

Here a=3 and d=4 n=30

We have to find S_{30}.

We know formula, $S_n=\frac{n}{2}(2a+(n-1)d)$

$S_{30}=\frac{30}{2}(2x3+(30-1)x4)$

$= 15(6+29x4)$

$= 15x122$

$= 1830$

20. Here a= 1, b=-7 & c=12

We have x= $\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ = $\frac{-(-7)\pm\sqrt{(-7)^2-4x1x(12)}}{2x1}$ = $\frac{7\pm\sqrt{49-48}}{2}$ = $\frac{7\pm\sqrt{1}}{2}$

x=$\frac{7+1}{2}$ or x=$\frac{7-1}{2}$

x=4 or x=3

21. Sin30^0+cos60^0+tan45^0=sec60^0.

= $\frac{1}{2}$ + $\frac{1}{2}$+1 = 2

2=2

Hence the proof

OR

$$LHS = \frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A}$$

$$= \frac{\cos^2 A + \sin^2 A + 1 + 2\sin A}{(1+\sin A)\cos A}$$

$$= \frac{2+2\sin A}{\cos A(1+\sin A)} = \frac{2(1+\sin A)}{\cos A(1+\sin A)}$$

$$= 2\sec A = RHS.$$

22. Given m:n=3:2 (2, 1), (7, 6)

By section formula (x, y)=($\frac{21+4}{5}$, $\frac{18+2}{5}$)

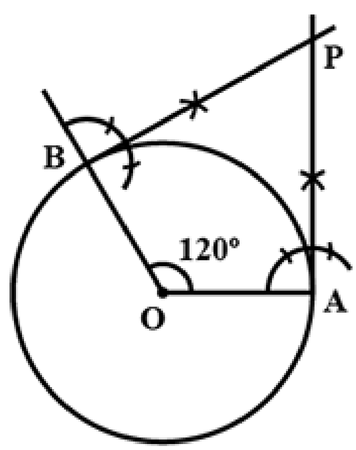
Thus coordinates are (5, 4)

23. Solution: Total outcomes = (1,2,3,4,5,6,7,8,9,10,11,12,13,14,15) = 15

Possible outcomes(prime numbers) =(2, 3, 5, 7, 11, 13)= 6

Probability P(E)= $\frac{6}{15}$

24.



25. We have

$x^2+0x-1)x^4+0x^3-3x^2+4x+5(x^2+0x-2$

$x^4+0x^3-1x^2+$

$0x^3-2x^2+4x$

$0x^3-2x^2-0x$

$-2x^2+4x+5$

$-2x^2+4x+5$

$4x+3$

$Q(x)= x^2+0x-2 \quad r(x)= 4x+3$

OR

$x^3-3x^2+x+2 = g(x)(x-2)+(-2x+4)$

$x^3-3x^2+x+2+2x-4= g(x)(x-2)$

$\frac{x3-3x2+3x-2}{x-2} = g(x)$

$x-2)\ x^3-3x^2+3x-2(x^2-x+1$

x^3-2x^2

x^2+3x

x^2+2x

$1x-2$

$1x-2$

0

Hence $g(x)= x^2-x+1$

26.

Solution: Given that the length of the diagonal of the rectangular field is 20 m and more than shorter side.

Thus, Diagonal =20+b

Since the longer side is 10m less than longer side, b=l-10 or l=b+10

We know,

$(\text{Diagonal})^2=(\text{Length})^2+(\text{Breadth})^2$

[By Pythagoras therorem]

$\therefore (20+b)^2=(b+10)^2+b^2$

$400+b^2+40b=100+b^2+20b+b2$

$b^2-20b-300=0$

$b^2-30b+10b-300=0$

$(b-30)+10(b-30)=0$

$(b-30)(b+10)=0$

$\Rightarrow$ b=30 or +-10

As breadth cannot be negative

∴ Breadth (b)=30 m

Now,length of rectangular field=(30+10) = 40 m

27. Solution: given points are P (1, 6), Q (3, 2) and R (10, 8).

Area of triangle PQR = $A=\frac{1}{2}\{x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\}$

$A=\frac{1}{2}\{1(2-8)+3(8-6)+10(6-2)\}$

$=\frac{1}{2}\{1(-6)+3(-2)+10(4)\}$

$=\frac{1}{2}\{-6-6+40\}$

$=\frac{1}{2}$ x 28

= 14 sq units

OR

A(1, 4), B(-2, -2), C(4, -2) if AD is median to BC, We hae to find length AD.

By section formula $(x, y)=(\frac{mx2+nx1}{m+n}, \frac{my2+ny1}{m+n})$ to find D.

Vertices D = $(x, y)=(\frac{x2+x1}{2}, \frac{y2+y1}{2})$

$(x, y)=(\frac{-2+4}{2}, \frac{-2-2}{2})$

=(1, -2)

Then length of AD=Length of median AD, A(1, 4), D(1, -2)

By distance formula AD=$\sqrt{(x_2-x_{1)}{}^2+(y_2-y_{1)}{}^2}$

$=\sqrt{0+36}$

= 6 sq units

28. Solution: by direct method

Mean $(\bar{x})=\frac{\sum x_i f_i}{\sum f_i}$

C.I	f	x	fx
0-10	4	5	20
10-20	6	15	90
20-30	17	25	425
30-40	13	35	455
40-50	7	45	315
50-60	3	55	165
	∑fi=50		∑fixi= 1470

Therefore mean= $\frac{1470}{50}$

Mean= 29.4

OR

To find mode we have mode

$$\text{Mode} = l + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times h,$$

C.I	f
1-5	1
5-10	2
10-15	13
15-20	15
20-25	7
25-30	2

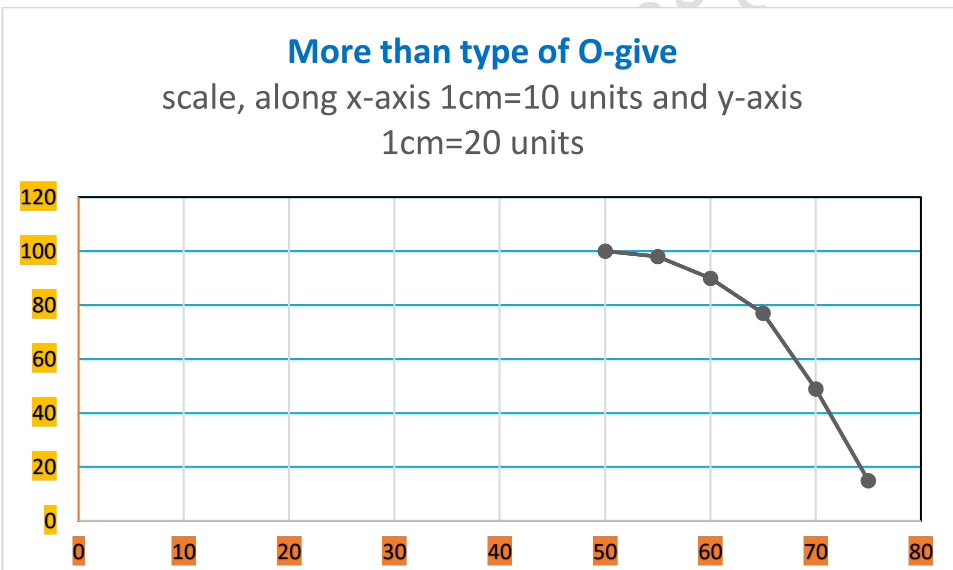
f1=15, f2=7, f0=13, l=15 and h=5

Mode= $15+\frac{2}{30-10}$ x 5

= 15+0.5

Mode = 15.5

29.Solution:



30. **Data:** ∟BAC=∟ADB, BC=8cm, AB=6cm.

To prove: $\frac{ar\ of\ triangle\ ABC}{ar\ of\ triangle\ ABD} = \frac{16}{6}$

Proof: in triangle BAC & ABD,

∟BAC=∟ADB (Given)

∟ABC=∟DBA

And BA=BA (common for both triangles)

Hence two triangles are congruent (by ASA Rule)

Hence $\frac{ar\ of\ triangle\ ABC}{ar\ of\ triangle\ ABD} = \frac{BC^2}{AB^2}$

$$= \frac{8^2}{6^2}$$

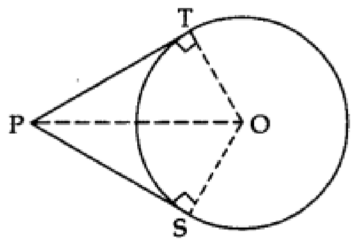
$$= \frac{64}{36} = \frac{16}{9}$$

31. Solution:

Given: PT and PS are tangents from an external point P to the circle with centre O.

To prove: PT = PS

Construction: Join O to P, T and S.



Proof: In ΔOTP and ΔOSP.

OT = OS …[radii of the same circle]

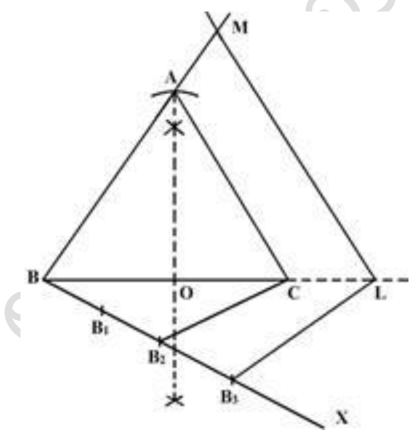
OP = OP …[common]

∠OTP = ∠OSP …[each 90°]

ΔOTP = ΔOSP …[R.H.S.]

PT = PS …[c.p.c.t.]

32.



33. Given: an equilateral triangle of side 8cm and radius of circle r=5cm

If $\angle APB = 60^0$, (An equilateral triangle) then $\angle AOB = 120^0$.

We have to find area of shaded region

Area of shaded region= area of sector of an angle 120^0- area of triangle AOB.

Area of sector = $\frac{\theta}{360} x \prod r2$

$= \frac{120}{360} x \frac{22}{7}$x25

$= \frac{22x25}{21}$ = 26.19

Area of triangle AOB=2($\frac{1}{2}$ x bx h)

= base x height

= 8x3

=24 cm^2.

Area of shaded region = 26.19-24 = 2.19 cm^2.

OR

Given, BC=3xOA, total area= area of semicircle+area of rectangle = 371cm^2.

$\prod r^2/2$+ ABxBC=371

∏(AB/2)2+ABxBC=371

$\frac{22}{14}$x$\frac{AB^2}{4}$ + ABxBC = 371 , BC=3xOA and OA=$\frac{AB}{2}$

$\frac{22AB^2}{56}$ + ABx$\frac{3}{2}$AB= 371

$\frac{22AB^2}{56}$ +$\frac{3AB^2}{2}$ =371

$\frac{212AB^2}{112}$=371 Then AB=14cm

$if\ length\ of\ AB\ is\ 14cm\ then\ radius\ is\ 7cm$

We have to find length of semicircular arc= ∏r

= 22cm

34. Solution:

given equations are x+y=4 and 2x+y=7

We have to find solutions for this

x+y=4

x	**0**	**4**
y	**4**	**0**

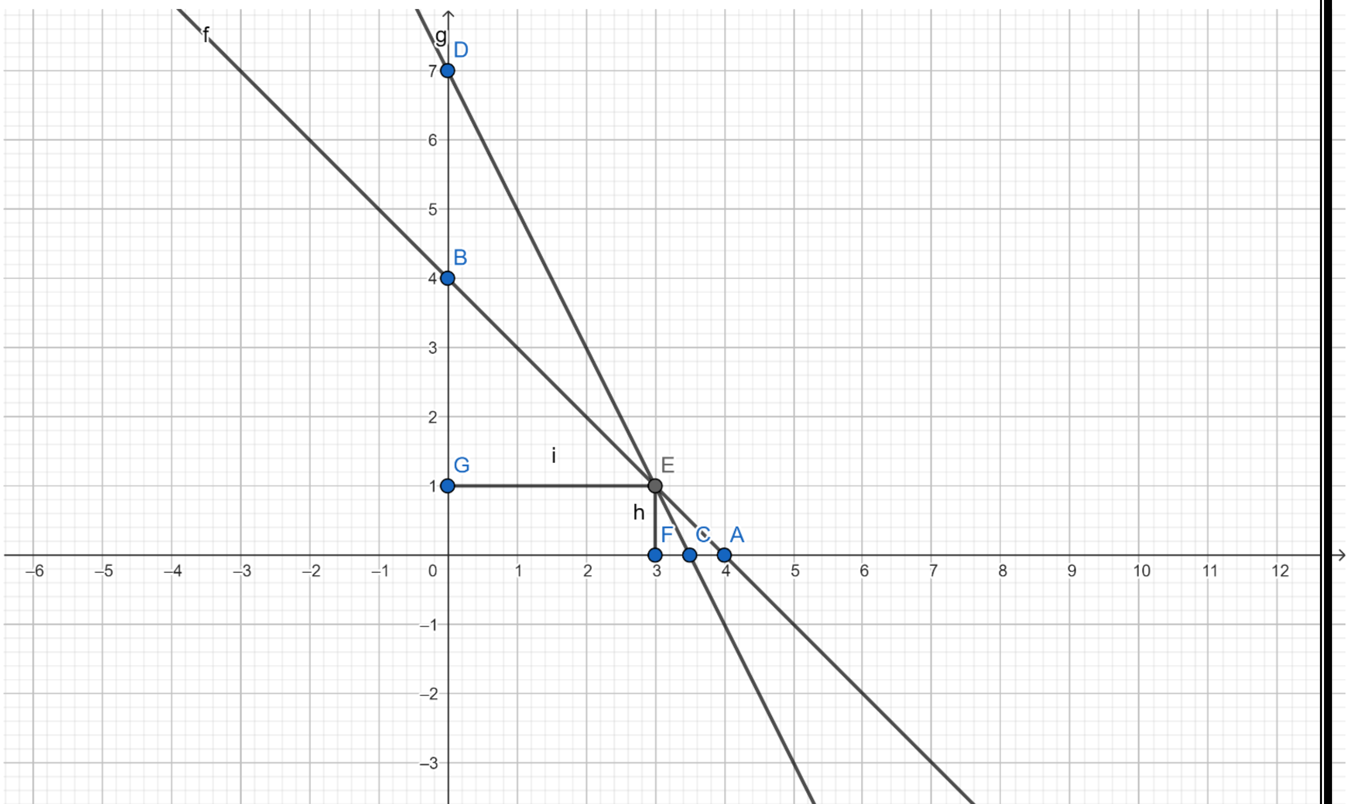
And

2x+y=7

x	**0**	**3.5**
y	**7**	**0**

Then plot the graph

We get



35. **Solution:** according to question

$a+a+5d=0$ and $a_4=2$, $a_5=6$

$a+3d=2$

$a+4d=6$

after subtracting this we get $d=4$

then $a=-10$

arithmetic progression is a, a+d, a+2d

-10, -10+4, -10+8

-10, -6, -2, …………

Also we have to find an=62

$a+(n-1)d=62$

$-10+(n-1)4=62$

$4n-4=72$

$4n=76$

$n=19$

Therefore 19th term of this A.P is 62

36. From figure :

Let h be the height, ϴ is angle at C and 90-ϴ is angle at B. Total distance from C to D is 900 because 9 minutes x 100 = 900m

in triangle ADB, $\tan\theta = \frac{h}{900}$

$$\cot\theta=\frac{900}{h} \text{ -----------}\rightarrow(1)$$

in triangle ADC, **tan(90-Θ)=**$\frac{h}{500}$

$$\cot\theta=\frac{h}{400}\text{--------}\rightarrow(2)$$

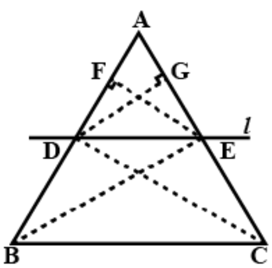
from 1 & 2, $h^2=900\text{x}400$

$h=30\text{x}20$

h=600m

37. Solution:

Statement: Basic Proportionality Theorem states that, “if a line is parallel to a side of a triangle which intersects the other sides into two distinct points, then the line divides those sides of the triangle in proportion”.



Let **ABC** be the triangle.

The line **l** parallel to **BC** intersect **AB** at **D** and **AC** at **E**.

To prove: $\frac{DB}{AD}=\frac{CB}{AE}$

Join **BE**,**CD**

Draw **EF⊥AB**, **DG⊥CA**

Since **EF⊥AB**,

EF is the height of triangles **ADE** and **DBE**

Area of △**ADE=1/2×** base **×** height=**1/2xAD×EF**

Area of △**DBE=1/2×DB×EF**

$$\frac{area of\,\Delta DBE}{area of\,\Delta ADE}=\frac{1/2\times DB\times EF}{1/2\text{x}AD\times EF}\times=\frac{DB}{AD} \quad \text{........}(1)$$

Similarly,

$$\frac{area of\,\Delta DBE}{area of\,\Delta ADE}=\frac{1/2\times CB\times EF}{1/2\text{x}AE\times EF}\times=\frac{CB}{AE} \quad \text{........}(2)$$

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

Area of **ΔDBE**= area of **ΔDCE** ....(3)

From (1), (2) and (3), we have

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

Hence proved.

38. Given: height of the cylinder h=17.5-3.5

h=14cm

radius of the cylinder and hemisphere, r=3.5cm

CSA of test tube = CSA of cylinder + CSA of hemisphere

$= 2\pi rh+2\pi r^2$.

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

$= 22(14+3.5)$

$= 385\ cm^2$.

Now we have to find volume of test tube = Vol.of cylinder + vol.of hemisphere

$= \pi r^2h+\frac{2}{3}\pi r^3$.

$= \pi r^2(h+\frac{2}{3}r)$

$= 11x3.5(14+\frac{2}{3}r)$

$= 38.5(2.33)$

$= 89.83\ cm^3$.