CHENNAI SAHODAYA SCHOOL COMPLEX
COMMON EXAMINATION
CLASS 10- SET 2 Marking Scheme
MATHEMATICS STANDARD (041)
SECTION A

1. c) - 16
2. b) 2 : 1
3. d) 0
4. d) $(\sqrt{2}x + \sqrt{3})^2 = 2x^2 - 3x$
5. b) a
6. I d) x = 3 , y = 4
7. c) 6.5 cm
8. c) $2\sqrt{3}$ cm
9. a)12
10. a)2
11. d) $\frac{1}{2}$
12. a)30 ^{o}
13. c) 14 cm
14. c) 8 cm
15. c)$4\pi r^2$
16. b) 14
17. c) $\frac{3}{17}$
18. b) 15 cm
19. (b) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.
20. (c)Assertion is correct but Reason is incorrect.

SECTION B

21. Solve for x and y : 49x + 51y = 499 ; 51x + 49 y = 501

Sol : Adding eq 1 and 2
100x + 100y = 1000
x+y = 10
Subtracting eq 1 and 2
2x – 2y = 2

$x-y = 1$
Solving the 2 equations
$X = 11/2$; $y = 9/2$

22. Sol : OA=OB= Radius
$OA^2=OB^2$
using distance formula, we get
$(-1-2)^2+[y-(-3y)]^2=(5-2)^2+[7-(-3y)]^2$
$9+16y^2=9+(7+3y)^2$
$16y^2=49+42y+9y^2$
$7y^2-42y-49=0$
$7(y^2-6y-7)=0$
$y^2-7y+y-7=0$
$y(y-7)+1(y-7)=0$
$(y+1)(y-7)=0$
Therefore, $y=7$ or $y=-1$

23. Sol :Total number of products = 6 × 6 = 36 -------------------(1/2 m)

Number of odd products = 9

Probability that product is odd = 9/36 = **1/4** ------------------(1 ½ m)

[OR]

Sol : possible numbers (805, 815, 825, 835, 845, 855, 865, 875, 885, 895). -----(1/2 m)

The total number of three-digit numbers ranges from 100 to 999 = 900 possible numbers.

Probability = 10/900 = 1/90. ----------------------(1 ½ m)

24. Sol :Length of the yard = 18 m 72 cm =1872 cm

Breadth of the yard =13 m 20 cm = 1320 cm

The size of the square tile of same size needed to the pave the rectangular yard is equal the HCF of the length and breadth of the rectangular yard.

$1872=2^4 \times 3^2 \times 13$

$1320=24 \times 32 \times 13$

$HCF=2^3\times 3 = 24$ -------------- (1 m)

∴ Length of side of the square tile = 24 cm

Number of tiles required = Area of the courtyard /Area of each tile

= 1872 × 1320 /24 x 24 = 4290 ------(1/2 + ½)

[OR]

Prove that 5 - √7 is irrational, given that √7 is irrational

25. Sol :Squaring $4x^2 = \text{cosec}^2\Theta$; $4/x^2 = \cot^2\Theta$

$\text{cosec}^2\Theta - \cot^2\Theta = 4(x^2 - 1/x^2)$

$1 = 4(x^2 - 1/x^2)$

$½ = 2(x^2 - 1/x^2)$

SECTION C

26. Sol :

$\alpha+\beta = -5/5 = -1$

$\alpha\beta = 1/5$

$\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\alpha\beta} = \frac{\alpha+\beta}{\alpha\beta} + \frac{1}{\alpha\beta} = -5 + 5 = 0$

27. Sol: (i) not from A, B and C = 6/23

(ii) Either from C or E = 9/23

(iii) Neither from A nor D = 17/23

28. $\sin\theta + \cos\theta = \sqrt{3}$

Squaring on both sides,

$(\sin\theta + \cos\theta)^2 = (\sqrt{3})^2$

$\sin^2\theta + \cos^2\theta + 2\sin\theta\cos\theta = 3$

Using the identity $\sin^2 A + \cos^2 A = 1$,

$1 + 2\sin\theta\cos\theta = 3$

$2\sin\theta\cos\theta = 3 - 1$

$2\sin\theta\cos\theta = 2$

$\sin\theta\cos\theta = 1$

$\sin\theta\cos\theta = \sin^2\theta + \cos^2\theta$

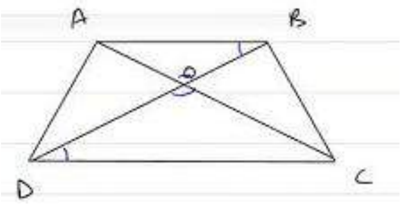
$\Rightarrow (\sin^2\theta + \cos^2\theta)/(\sin\theta\cos\theta) = 1$

$\Rightarrow [\sin^2\theta/(\sin\theta\cos\theta)] + [\cos^2\theta/(\sin\theta\cos\theta)] = 1$

$\Rightarrow (\sin\theta/\cos\theta) + (\cos\theta/\sin\theta) = 1$

$\Rightarrow \tan\theta + \cot\theta = 1$

29.



---------- (fig ½ m)

In ΔAOB and ΔCOD

∠AOB = ∠COD (Vertically opposite angles)

∠ABD = ∠ODC (Alternate angles)

∴ ΔAOB ~ ΔCOD (AA similarity criterion) -------- (1 m)
⇒ AB/CD = AO/OC = BO/OD [Corresponding sides of similar triangles are proportional.]
⇒ AB/CD = BO/OD -------(½ m)
⇒ AB/CD =2/1 ------- (½ m)
⇒ AB=2 CD ------ (½ m)

[OR]

In ΔLPQ and ΔPQR
∠Q=∠Q [Common]
∠QPL=∠PRQ [Given]
∴ΔLPQ~ΔPRQ [By A.A. axiom of similarity] --------- (2m)
⇒PQ/QR=QL/PQ
⇒PQ^2=QL×QR --------- (1 m)
Hence, proved.

30. Let the usual speed of plane be x km/hr and the reduced speed of the plane be (x-200) km/hr
Distance = 600 km [Given]
,(time taken at reduced speed) - (Schedule time) = 30 minutes = 0.5 hours.
600/(x− 200) − 600/x = 1//2
X^2 - 200x − 240000 = 0
X^2 -600x + 400x −240000 = 0
x(x- 600) + 400(x-600) = 0
(x-600)(x+400) = 0 x = 600 or x = −400
But speed cannot be negative. ∴ The usual speed is 600 km/hr
duration of the flight is 600/600 = 1 hour

31. Sol : D = (3, -2) (using midpoint formula) ------- (½ m)

E = (-1, 0) ------- (½ m)
DE = √20 (using distance formula) ------- (1 m)
BC = √80 = 2√20 ------- (1 m)

(or)

Sol :P divides *AB* in the ratio 1:2

∴p=1(2) +2(3)/(1 + 2)

p=7/3 ------------ (1 ½ m)

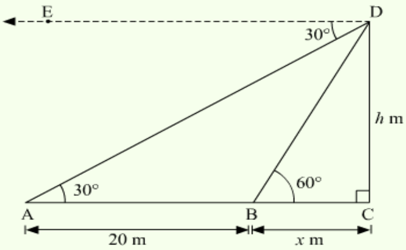
Q divides AB in the ratio 2:1

q=2(2) +1×(−4)/(1 + 2)

q=0 ----------- (1 ½ m)

SECTION D

32. Sol:



Let CD be the tower.
Suppose BC = x m and CD = h m.
Given, ∠ADE = 30° and ∠CBD = 60°.
∠DAC = ∠ADE = 30° (Alternate angles)
In ΔACD,

$$\text{Tan } 30 = \frac{CD}{AC}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{20+x}$$

In ΔBCD,

$$\text{Tan } 60 = \frac{CD}{BC}$$

$$\sqrt{3} = \frac{h}{x}$$

From (1) and (2), we have

∴ 20 + x = 3x
⇒ 2x = 20
⇒ x = 10

∴ Height of the tower =
Distance of tower from A = AC = (20 + x) m = (20 + 10) m = 30 m

33. The following distribution gives the marks scored by of 40 students of a class :

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50
Number of students	9	19	27	35	40
f	9	10	8	8	5

Median : l = 20 ; f = 8 ; cf = 19 ; h = 10

Median = 21.25

Mode : f1 = 10 ; f0= 9 ; f2 = 8; h = 10

Mode = 30

34. Sol : Volume of cylinder = 3.14 x 4 x 4 x 11 = 552.64 cu cm --------- (2 m)

Volume of 2 hemispheres = 2 x $\frac{2}{3}$ x 3 x 3x 3 = 113.04 cu cm ---------- (2 m)

Volume of water left = 552.64 – 113.04 = 439.6 cu. Cm ------ (1 m)

[OR]

Sol : the diameter of the half cylinder is 7 m and its height is 15 m.

required volume = volume of the cuboid +1/2 volume of the cylinder
= 15×7×8+1/2×22/7×7/2×7/2×15=1128.75 ------ (2 m)
=$1128.75m^3$ -------- (½ m)

Amount of metal required = πrh + πr^2 + 2h(l + b) + lb
= 11 x 15 + 38.5 + 16 x 22 + 15 x 7
= 165 + 38.5 + 352 + 85 ------- (2m)
= 640.5 sq cm ------- (½ m)

35. OS = OT = OU = 6 cm (Radii of the circle)

QT = 12 cm and TR = 9 cm
QR = QT + TR = 12 cm + 9 cm = 21 cm
Now, QT = QS = 12 cm (Tangents from the same point)
TR = RU = 9 cm
Let PS= PU = x cm
Then, PQ = PS + SQ = (12 + x) cm and PR = PU + RU = (9 + x) cm
It is clear that
ar (ΔOQR) + ar (ΔOPR) + ar (ΔOPQ) = ar (ΔPQR)

$$Ar(PQR) = Ar(POR) + Ar(QOR) + Ar(POQ)$$

$$\Rightarrow 189 = \frac{1}{2}\times OU \times PR + \frac{1}{2}\times OT \times QR + \frac{1}{2}\times OS \times PQ$$

$$\Rightarrow 189 = \frac{1}{2}[(6)\times(x+9)+(6)\times(12+9)+(6)\times(12+x)]$$

$$\Rightarrow 189\times 2 = [(6)\times(x+9)+(6)\times(12+9)+(6)\times(12+x)]$$

$$\Rightarrow 378 = 6\times(x+9)+6\times(21)+6\times(12+x)$$

$$\Rightarrow 63 = x+9+21+x+12$$

--------- (3 m)

X = 21/2 = 10.5 --------- (1 m)

Thus, PQ = (12 + 10.5) cm = 22.5 cm ------ (½ m)

PR = 9 + 10.5 = 19.5 cm ------ (½ m)

[OR]

Length of two tangents drawn from the same point to the circle are equal.
∴ CF = CD = 6 cm
∴ BE = BD = 8 cm
∴ AE = AF = x

AB = AE + EB = x + 8
BC = BD + DC = 8 + 6 = 14
CA = CF + FA = 6 + x
Let perimeter of triangle ABC be s.

$\Rightarrow$ 2s = AB + BC + CA
= x + 8 + 14 + 6 + x
= 28 + 2x
$\Rightarrow$ s = 14 + x
Area of Δ ABC = $\sqrt{s(s-a)(s-b)(s-c)}$
$=\sqrt{(14+x)(14+x-14)(14+x-x-6)(14+x-x-8)}$
$=\sqrt{(14+x)(x)(8)(6)}$
$=\sqrt{(14+x)48x}$...(i)
Also, area of Δ ABC = 2 × (area of ΔAOF+ΔCOD+ΔDOB)
=2×[(1/2×OF×AF)+(1/2×CD×OD)+(1/2×DB×OD)]
=2×1/2(4x+24+32)=56+4x...(ii)
Equating equations (i) and (ii) we get,
$\sqrt{(14+x)48x}=56+4x$
Squaring both sides,
48x(14+x)=(56+4x)2
$\Rightarrow$48x=[4(14+x)]2(14+x)
$\Rightarrow$48x=16(14+x)
$\Rightarrow$48x=224+16x
$\Rightarrow$32x=224
$\Rightarrow$ x = 7 cm
So, AB = x + 8 = 7 + 8 = 15 cm
CA = 6 + x = 6 + 7 = 13 cm.
Hence, AB=15 cm , CA = 13 cm

SECTION E

36.

(i) Find the angle subtended by one slice in pizza marked I and II - 60^o and 45^o

(ii) Find the area of one slice of pizza marked (I) 77/3 sq cm

(iii) 4 : 3

37. a,a+d,a+2d,..,a+30d=527

$\Rightarrow$Sn=527

$\Rightarrow$3122a+30d=527

$\Rightarrow$31a+15d=527

$\Rightarrow$a+15d=17 ……..(1)

As the length of the largest side is sixteen times the smallest. So,

a+30d=16a

$\Rightarrow$30d=15a

$\Rightarrow$a=2d …..(2)

Substitute (2) in (1) to determine the value of d.

(2d)+15d=17

$\Rightarrow$17d=17

$\Rightarrow$d=1

Substitute the value of d in (2) to determine the value of a.

a=2(1)

⇒a=2

Therefore, the smallest side is of length 2 cm and the common difference is 1 cm.

Smallest side = 2 cm
Largest side = 32 cm
Sum = 34 cm

[OR]

6: 22 = 3 : 11

38 [i] length = 2x - 10
[ii] $x^2 - 5x - 300 = 0$
[iii] breadth = 20 m ; length = 30 m Area = 600 sq m

[OR]

perimeter of the field = 2(20 + 30) = 100 m

******* End of the Paper *******