CHENNAI SAHODAYA SCHOOL COMPLEX
COMMON EXAMINATION
CLASS 10- SET 1 – Marking Scheme
MATHEMATICS STANDARD (041)
SECTION A

1. c) - 16
2. d) 5
3. d) $(\sqrt{2}x + \sqrt{3})^2 = 2x^2 - 3x$
4. b) a
5. d) x = 3 , y = 4
6. c) 6.5 cm
7. d) 90^o
8. a)2
9. a)1
10. c) 60^o
11. c) 14 cm
12. c) 5 : 4
13. b) $\frac{\pi r^3}{3}$
14. b) 24
15. b) 14
16. b) $\frac{2}{9}$
17. b) 15 cm
18. b) 2 : 1
19. a) Both Assertion and Reason are correct, but Reason is not the correct explanation of assertion.
20. (d) Assertion is incorrect but Reason is correct

SECTION B

21. 3x+y−1=0(2k−1)x+(k−1)y−(2k+1)=0

Compare the given equations with
a1x+b1y+c1=0 and a2x+b2y+c2=0.
a1/a2=3/2k−1
b1/b2=1/k−1
c1/c2=–1/−2k−1=1/2k+1
For no solutions,
a1/a2=b1/b2≠c1/c2
a1/a2=b1/b2≠c1/c2
3/2k−1=1/k−1≠1/2k+1
3/2k−1=1/k−1
k=2
Hence, for k = 2, the given equation has no solution.

22.

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 × 32 × 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

23. Two dice are rolled together bearing numbers 4, 6, 7, 9, 11, 12. Find the probability that the product of numbers obtained is an odd number.

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:

X + Y = 90

X – Y = 30

2X = 120

X = 60

Y = 30

25. Sol:

Let the point on the x-axis be (x, 0). Using the distance formula,

$\sqrt{(x2 - x1)^2 + (y2 - y1)^2} = \sqrt{41}$
$(x2 - x1)^2 + (y2 - y1)^2 = 41$
$(x - 8)^2 + (0 + 5)^2 = 41$
$(x - 8)^2 + (0 + 5)^2 = 41$
$(x - 8)^2 + (5)^2 = 41$
$(x - 8)^2 + (5)^2 = 41$
$(x - 8)^2 + 25 = 41$
$(x - 8)^2 + 25 = 41$
$(x - 8)^2 = 41 - 25$
The points on the x-axis are (12, 0) and (4, 0).

SECTION C

26. Sol:

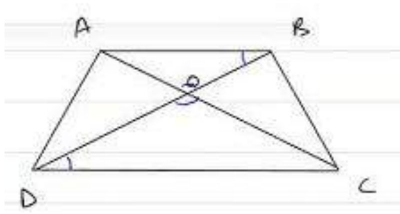
Quadratic equation is
$Ky^2 + 2y - 3k$
Let α and β are its two zeros
The sum of zeros = α + β = -b/a
product of zeros = αβ =ab
Given condition. α + β = 2× αβ
-2 / k = -2×3k/k
-6k = -2
k =2/6
k = 1/3

27. $\frac{sec^2A+tan^2A-2secAtanA+1}{\sec A-tanA}$

$\frac{2sec^2A-2\ secA\ tanA}{\sec A-\tan A}$

$\frac{2secA(\ secA-tanA)}{SecA-tanA}$ = 2secA

28. Sol



---------- (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.

29. Sol :original fraction ---- x/(x+1)

new fraction = (x-2)/(x-1)

(x-1)/(x-2) + 4x/(x+1) = 5
(x-1)(x+1) + 4x(x-2) = 5(x-2)(x+1)
$x^2 - 1 + 4x^2 - 8x = 5x^2 - 5x - 10$
3x - 9 = 0
x = 3
original fraction is 3/4

30. 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

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 : 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)

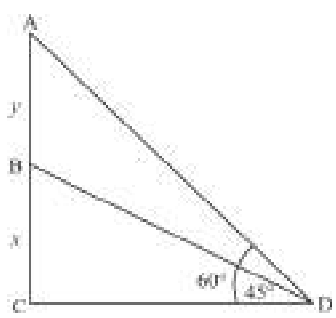
[OR]

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)

33.



Let AB = y m, BC = x m and CD = 70 m.
∠BDC=45 and ∠ADC=60

In a triangleBCD,

$$\Rightarrow \quad \tan D = \frac{BC}{CD}$$

$$\Rightarrow \quad \tan 45° = \frac{x}{70}$$

$$\Rightarrow \quad 1 = \frac{70}{x}$$

$$\Rightarrow \quad x = 70$$

in a triangle ADC,

$$\Rightarrow \quad \tan D = \frac{AB+BC}{CD}$$

$$\Rightarrow \quad \tan 60^{\circ} = \frac{y+x}{70}$$

$$\Rightarrow \quad \sqrt{3} = \frac{y+70}{70}$$

$$\Rightarrow \quad 70\sqrt{3} = 70 + y$$

y=51.24

Hence the height of flag staff is 51.24m and height of tower is 70m.

34.

Class interval	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Frequency	2	5	x	12	17	20	y	9	7	4
CF	2	7	7 + x	19 + x	36 +x	56+x	56+x+y	65+x+y	72+x+y	76+x+y

It is given that n = 100

So, 76 + x + y = 100, i.e., x + y = 24---(1)

The median is 525, which lies in the class 500 - 600

So, l = 500, f = 20, cf = 36 + x, h = 100

Using the formula: Median =l+(n2−cff)h, we get

i.e., 525=500+(50−36−x20)×100

i.e., 525−500=(14−x)×5

i.e., 25=70−5x

i.e., 5x=70−25=45

i.e., x=9

From (1), we get 9+y=24
y = 24 - 9= 15

35. Sol : 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)

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

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

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

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

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

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

--------- (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.
⇒ 2s = AB + BC + CA
= x + 8 + 14 + 6 + x
= 28 + 2x
⇒ 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
⇒48x=[4(14+x)]2(14+x)
⇒48x=16(14+x)
⇒48x=224+16x
⇒32x=224
⇒ 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. a,a+d,a+2d,..,a+30d=527

⇒Sn=527

⇒3122a+30d=527

⇒31a+15d=527

⇒a+15d=17 ……..(1)

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

a+30d=16a

⇒30d=15a

⇒a=2d …..(2)

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

(2d)+15d=17

⇒17d=17

⇒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

37. Sol [i] Find the radius of the circle (1 mark) r = 10

[ii] Find the area of the portion covered with the net (2 marks) 16.2 sq cm

[OR]

[ii] Find the area of the 3 major sectors (2 marks)

[iii] Find the perimeter of the shaded portion (1 mark)31.4 cm

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 *******