**MATHEMATICS STANDARD – Code No. 041**
**MARKING SCHEME**
**CLASS - X (2025 - 26) STANDARD (041)**

| | | |
|---|---|---|
| **SECTION - A** | | |
| Q. No. | ANSWERS | Marks |
| 1 | C | 1 |
| 2 | B | 1 |
| 3 | C | 1 |
| 4 | D | 1 |
| 5 | B | 1 |
| 6 | B | 1 |
| 7 | C | 1 |
| 8 | A | 1 |
| 9 | A | 1 |
| 10 | C | 1 |
| 11 | C | 1 |
| 12 | A | 1 |
| 13 | B | 1 |
| 14 | A | 1 |
| 15 | D | 1 |
| 16 | A | 1 |
| 17 | B | 1 |
| 18 | C | 1 |
| 19 | A | 1 |
| 20 | A | 1 |
| **Section –B**<br>**[This section comprises of solution of very short answer type questions (VSA) of 2 marks each]** | | |
| 21 | Let the incomes of two persons be Rs 9x and 7x and their expenditures be Rs 4y and 3y respectively.<br>Then, $9x-4y=2000$ and $7x-3y=2000$<br>Solving the two equations, $x=2000$ and $y=4000$<br>Therefore, their incomes are Rs 18000 and Rs 14000. | ½<br>1<br>½ |
| 22 | $A+B = 90°$ and $A – B= 30°$<br>$A=60°$ and $B =30°$ | 1<br>1 |
| 23 | In $\Delta ABC$, $\angle 1 = \angle 2$<br>$\therefore AB = BD$ ……………………….**(i)**<br>Given, $AD/AE = AC/BD$<br>Using equation **(i)**, we get<br>$AD/AE = AC/AB$ ……………….**(ii)**<br>In $\Delta BAE$ and $\Delta CAD$, by equation (ii),<br>$AC/AB = AD/AE$ | ½<br>½<br>½ |

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| | ∠A= ∠A (common)<br>∴ ΔBAE ~ ΔCAD [By SAS similarity criterion] **OR** | ½ |
| | Given that ΔABE≅ΔACD ∴ AB=AC and AE=AD or AD=AE<br>Dividing , we get, AB/AD=AC/AE<br>In $\Delta ADE$ and $\Delta ABC$<br>AB/AD=AC/AE ⟹AD/AB=AE/AC and ∠BAC=∠DAE<br>∴ By SAS similarity criterion, ΔADE~ΔABC | ½<br>½<br><br>½<br>½ |
| 24 | Let ∠PTQ=θ , TP=TQ (Equal tangents from external point)<br>∴ TPQ is an isosceles Triangle<br>∴ ∠TPQ=∠TQP= $\frac{1}{2}$(180°− θ) = 90°− $\frac{1}{2}$ θ<br>Also ∠ OPT=90° (radius is perp to tangent at point of contact)<br>Now, ∠OPQ=∠OPT-∠TPQ =90° − (90°− $\frac{1}{2}$ θ)= $\frac{1}{2}$ θ = $\frac{1}{2}$ ∠PTQ<br>∴ ∠PTQ= 2∠OPQ | ½<br><br>½<br><br>½<br>½ |
| 25 | Area of sector with angle 30°= $\frac{30}{360}\pi r^2$ = $\frac{1}{12}$ ×3.14×16 =4.19cm$^2$<br>Area of major sector = area of circle – area of minor sector=50.24-4.19=46.05cm$^2$<br>**OR**<br>Angle between two consecutive ribs=$\frac{360}{8}$ =45°<br>Area between two ribs= area of sector=$\frac{45}{360}\times\frac{22}{7}$ ×45×45 =<br>795.54cm$^2$ | 1<br>1<br><br>½<br>1<br>½ |
| **Section –C**<br>**[This section comprises of solution short answer type questions (SA) of 3 marks each]** | | |
| 26 | Let √5 be a rational number.<br>∴ √5=p/q, where q≠0 and p & q are co−prime.<br>5q$^2$ = p$^2$ ⟹ p$^2$ is divisible by 5<br>⟹ Let p is divisible by 5----- (i)<br>⟹ p = 5a, where ‘a’ is a postive integer<br>25a$^2$ = 5q$^2$ ⟹ q$^2$ = 5a$^2$ ⟹q$^2$ is divisible by 5<br>⟹ q is divisible by 5 ----- (ii)<br>(i) and (ii) leads to contradiction as ‘p’ and ‘q’ are co-prime.<br>∴ √5 is an irrational number | 1<br><br>½<br><br>1<br><br>½ |
| 27 | Given that f(x) = kx$^2$+4x+4<br>∴ α +β=$\frac{-4}{k}$ and αβ =$\frac{4}{k}$<br>α$^2$+β$^2$ =24 ⟹ ( α +β)$^2$ − 2αβ=24<br>$\frac{-4}{k}$ )$^2$ − 2× $\frac{4}{k}$=24 ⟹ $\frac{16}{k2}$ − $\frac{8}{k}$ =24 ⟹ 16−8k=24k$^2$ ⟹3k$^2$+k−2=0<br>⟹(k+1)(3k-2)=0, Hence k=−1 or k=2/3 | ½<br>½<br>1<br>1 |
| 28 | For infinite number of solutions,<br>A1/a2=b1/b2=c1/c2<br>⟹ | 1<br>1 |

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| | $\frac{2}{p+q} = \frac{3}{2p-q} = \frac{7}{21} \Rightarrow \frac{2}{p+q} = \frac{1}{3}$ and $\frac{3}{2p-q} = \frac{1}{3}$<br>$\Rightarrow p+q=6$ and $2p-q=9$<br>adding $p+q+2p-q = 6+9$<br>$\Rightarrow p=5$ and $q=1$<br>OR<br>Let the cost price of the Tea-set and Lemon-set be Rsx and Rs y respectively.<br>Case:1 Loss on Tea-set =Rs 5x/100 = Rs x/20<br>Gain on Lemon-set= Rs 15y/100=Rs 3y/20<br>$\Rightarrow$ 3y/20–x/20=7 $\Rightarrow$ 3y–x=140 $\Rightarrow$ x–3y+140=0 .............(i)<br>Case II Total gain = 5x/100+10y/100 $\Rightarrow$ x/20+ y/10<br>$\Rightarrow$ x/20 +y/10 =13 $\Rightarrow$ x+2y–260=0 ...............................(ii)<br>Solving (i) and (ii)<br>X=100 and y= 80<br>Hence cost of Tea –set is Rs 100 and cost of Lemon-set is Rs80 respectively. | 1<br>½<br>½<br>½<br>1<br>½ |
| 29 | Given, $1 + \sin^2\theta = 3 \sin\theta \cos\theta$<br>Dividing both sides by $\cos^2\theta$,<br>$\frac{1}{\cos^2\theta} + \tan^2\theta = 3\tan\theta$<br>$\sec^2\theta + \tan^2\theta = 3\tan\theta$<br>$1 + \tan^2\theta + \tan^2\theta = 3\tan\theta$<br>$1 + 2\tan^2\theta = 3\tan\theta$<br>$2\tan^2\theta - 3\tan\theta + 1 = 0$<br>If $\tan\theta = x$, then the equation becomes $2x^2 - 3x + 1 = 0$<br>$(x-1)(2x-1) = 0$, $\therefore$ $x=1$ or $x=\frac{1}{2}$<br>Therefore $\tan\theta = 1$ or ½<br>**OR**<br>$\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \frac{1-\sqrt{3}}{1+\sqrt{3}}$<br>Dividing the numerator and denominator of LHS by cosθ, we get<br>$\frac{1-\tan\theta}{1+\tan\theta} = \frac{1-\sqrt{3}}{1+\sqrt{3}}$<br>Which on simplification (or comparison) gives $\tan\theta = \sqrt{3}$<br>Or $\theta = 60°$ | ½<br>½<br>½<br>½<br>1<br>1<br>1<br>1 |
| 30 | In ΔAPO and ΔACO<br>AP=AC (Tangents from External Point)<br>AO=AO (common)<br>OP=OC (radii)<br>ΔAPO ≅ ΔACO (SSS congruence Criterion)<br>∴ ∠POA=∠COA and ∠QOB=∠COB (CPCT) .....................(i)<br>∠POQ=180˚ (PQ is the diameter)<br>∠POA+∠COA+∠QOB+∠COB=180˚<br>2∠COA+2∠COB=180˚ (using (i) )<br>∠AOB = 90° | 1<br>1 |

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| | | 1 |
| 31 | P(Pooja drives the car) $=\frac{2}{8}$<br>as favourable outcomes are HHT,THH<br>P(Manya drives the car) = $\frac{4}{8}$<br>as favourable outcomes are THT,THH,HTH,TTH<br>As $\frac{4}{8} > \frac{2}{8}$<br>∴ Manya has greater probability to drive the car | 1<br>1<br>1 |

**Section –D**

**[This section comprises of solution of long answer type questions (LA) of 5 marks each]**

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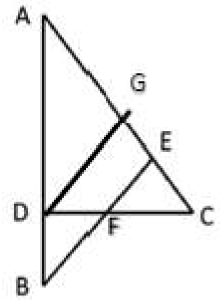
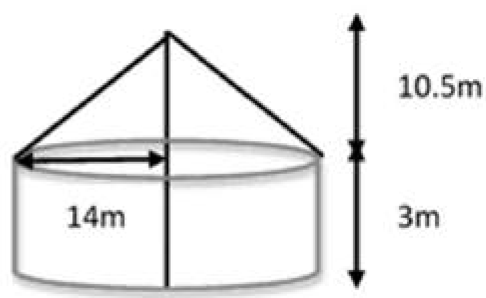
|---|---|---|
| 32 | Let the speed of the stream be x km/h.<br>The speed of the boat upstream = (18 – x) km/h and<br>the speed of the boat downstream = (18 + x) km/h.<br>The time taken to go upstream=Distance/speed = 24 /(18-x) hours<br>Time taken to go downstream= 24/(18+x) hours<br>According to the question $\frac{24}{18-x} - \frac{24}{18+x} = 1$<br>24(18 + x) – 24(18 – x) = (18 – x) (18 + x)<br>$x^2 + 48x - 324 = 0$<br>x = 6 or – 54<br>Since x is the speed of the stream, it cannot be negative.<br>Therefore, x = 6 gives the speed of the stream = 6 km/h.<br>**OR**<br>Let the time taken by the smaller pipe to fill the tank = x hr.<br>Time taken by the larger pipe = (x – 10) hr<br>Part of the tank filled by smaller pipe in 1 hour $=\frac{1}{X}$<br>Part of the tank filled by larger pipe in 1 hour $=\frac{1}{x-10}$<br>The tank can be filled in $9\frac{3}{8}$ =75/8 hours by both the pipes together.<br>Part of the tank filled by both the pipes in 1 hour = $\frac{8}{75}$<br>Therefore, $\frac{1}{X} + \frac{1}{x-10} = \frac{8}{75}$<br>$8x^2 - 230x + 750 = 0$ , x = 25, and 30/8<br>Time taken by the smaller pipe cannot be 30/8 = 3.75 hours, as the time taken by the larger pipe will become negative, which is logically not possible.<br>Therefore, the time taken individually by the smaller pipe is 25 hours and the larger pipe will be 25 – 10 =15 hours. | 1<br>1<br>1<br>1<br>1<br>½<br>½<br>1<br>½<br>1<br>½<br>½<br>½ |

| Q | Solution | | Marks |
|---|---|---|---|
| 33 | (i) Statement – ½<br>Given and To Prove – ½ Figure and Construction ½<br>Proof – 1 ½<br>(ii)<br>Draw DG ∥ BE<br>In Δ ABE, $\frac{AB}{BD} = \frac{AE}{GE}$ [BPT]<br>CF = FD [F is the midpoint of DC] ---(i)<br>In Δ CDG, $\frac{DF}{CF} = \frac{GE}{CE} = 1$ [Mid point theorem]<br>GE = CE ---(ii)<br>∠CEF = ∠CFE [Given]<br>CF = CE [Sides opposite to equal angles] ---(iii)<br>From (ii) & (iii) CF = GE ---(iv)<br>From (i) & (iv) GE = FD<br>$\therefore \frac{AB}{BD} = \frac{AE}{GE} \Rightarrow \frac{AB}{BD} = \frac{AE}{FD}$ |  | 3<br>½<br>½<br>½<br>½ |
| 34(a) | Length of the pond, l= 50m, width of the pond, b = 44m<br>Water level is to rise by, h = 21 cm =21/100m<br>Volume of water in the pond = lbh = 50 x 44 x21/100$m^3$ =462 $m^3$<br>Diameter of the pipe = 14 cm<br>Radius of the pipe, r = 7cm = 7/100m<br>Area of cross-section of pipe = $\pi r^2$= 22/7*7/100*7/100= 154/10000$m^2$<br>Rate at which the water is flowing through the pipe, h = 15km/h = 15000 m/h<br>Volume of water flowing in 1 hour = Area of cross-section of pipe x height of water coming out of pipe =$\frac{154}{10000} \times 15000$ $m^3$<br>Time required to fill the pond = vol of the pond/ volume flowing in 1 hour<br>=$\frac{462\times10000}{154\times15000}$ = 2 hours<br>Speed of water if the rise in water level is to be attained in 1 hour = 30km/h<br>OR | | 1<br>½<br>1<br>1<br>1<br>1/2 |
| | Radius of the cylindrical tent (r) = 14 m<br>Total height of the tent = 13.5 m<br>Height of the cylinder = 3 m<br>Height of the Conical part = 10.5 m<br>Slant height of the cone ($l$) =$\sqrt{h^2 + r^2}$<br>l=$\sqrt{(10.5)^2}$+$(14)^2$= $\sqrt{110.25 + 196}$ =$\sqrt{306.25}$<br>l=17.5mTotal C.S.A. of tent= CSA of cylinder+CSA of cone=2πrh+πrl= πr(2h+l)=22/7×14(2×3+17.5)=44(6+17.5)=1034<br>adding stitching margin= 1034+26=1060$m^2$<br>Cost of canvas @ Rs 500 per $m^2$=500×1060=Rs5,30,000 |  | |
| 35 | | | |

| Marks Obtained | Number of Students | Cummulative Frequency |
|---|---|---|
| 20-30 | P | p |

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|---|---|---|
| 30-40 | 15 | P+15 |
| 40-50 | 20 | P+35 |
| 50-60 | 25 | P+60 |
| 60-70 | q | P+q+60 |
| 70-80 | 8 | P+q+68 |
| 80-90 | 10 | P+q+78 |
| | 90 | |

Marks: 2, ½

$p + q + 78 = 90$  Median class=50-60 ½

$p + q = 12$ ½

Median=$l+ \left(\frac{\frac{n}{2}-c_f}{f}\right)h$ , $50 = 50 + \frac{45-(p+35)}{25} . 10$ ½

$\frac{45-(p+35}{25} . 10=0$ ⇒ p=10 and 10+q=12 ⇒q=2 ½

Modal Class=50-60 ½

MODE= $l+\frac{f1-f0}{2f1-f0-f2}.h$

$= 50+ \frac{25-20}{2.25-20-2} \times 10$ ⇒ 50+50/28 ½

50+1.785= 51.785

## Section –E

**[This section comprises solution of 3 case- study based questions of 4 marks each with three sub parts of 1, 1 and 2 marks each respectively]**

| Q | Solution | Marks |
|---|---|---|
| 36 | First term=300m, d=50 , total number of rounds n=10<br>(i) $a_n=a+(n-1)d$ ⇒ $a_4=300+(4-1)50$ ⇒300+150= 450 mtrs<br>$A_5$=500mtrs and $a_6$=550mtrs<br>(ii) $a_8$= 300+(8-1)50=300+350=650 mtrs.<br>(iii)(a) $Sn=\frac{n}{2}(2a+(n-1)d)$ ⇒ $S_{10}$=10/2 ×(2×300+(10-1)×50)= 5(600+9×50)<br>5(600+450)=5×1050=5250mtrs<br>(iii) (b) Using same formula<br>$S_6$=3×(600+250)=3×850=2550mtrs | 1<br><br>1<br><br>1<br>1<br><br>2 |
| 37 | (i) AB= $\sqrt{(-3-9)2+(-1-5)2}$ =$\sqrt{180}$ =6√5<br>(ii) E( $\frac{5+9}{2}$ , $\frac{-5+5}{2}$ ) ⇒E(7,0)<br>(iii) D( $\frac{-3+5}{2}$ , $\frac{-1-5}{2}$ ) = (I, -3)<br>AD=$\sqrt{(1-9)2+(-3-5)2}$ = $\sqrt{64+64}$ = 8√2<br>OR<br>(iii) BP:PA=1:2, By section formula,<br>1= 1=9-6/3=1 and a=5-2/3=1<br>Q is mid-point of PA ,By mid-point formula<br>b= (1+9)/2=5<br>Therefore, a=1 & b=5 | 1<br>1<br>1<br>1<br><br>1<br><br><br>1 |
| 38 | (i) CD/BD=tan45 ° ⇒ BD=hm<br>(ii) CD/BC=sin45° ⇒ BC=√2h<br>(iii) AE=BD=h ⇒ CE/AE=tan60° ⇒ (h+40)/h= √3 ⇒ h+40=√3h<br>40=1.73h–h ⇒ h=4000/73= 54.79m<br>OR | 1<br>1<br>1 |

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| | (iii) In AEC, AE/AC=cos60 $\Rightarrow$ AE/100=1/2<br>$\Rightarrow$ AE=50m | 1 |