**KENDRIYA VIDYALAYA SANGATHAN, ERNAKULAM REGION**

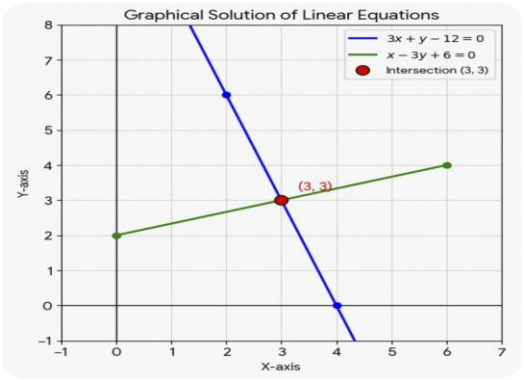
**PRE-BOARD EXAMINATION 2026–27**

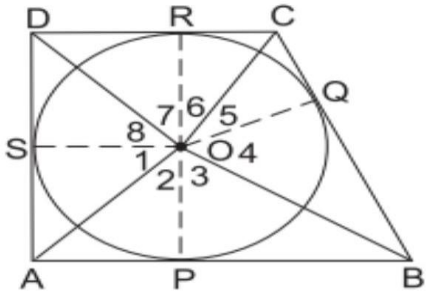
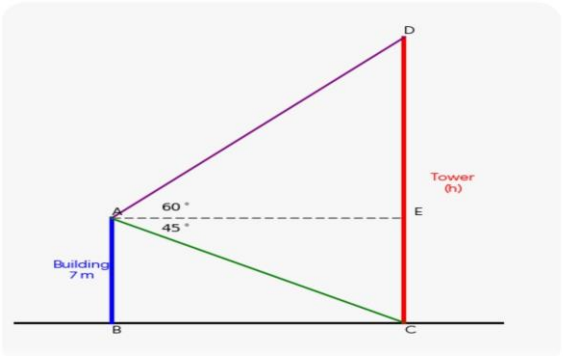
**MATHEMATICS [BASIC] (241) – ANSWER KEY / MARKING SCHEME**

**CLASS X | MAX. MARKS: 80**

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| Q. No. | Answer / Value Points | Marks |
|---|---|---|
| | **SECTION A** | |
| 1 | (d) ab | 1 |
| 2 | (c) $x^2 - x - 12$. | 1 |
| 3 | (c). sin 30° = cos 30° | 1 |
| 4 | (c). l + 2r | 1 |
| 5 | (b). 594 $cm^2$. | 1 |
| 6 | (b)$3/(2\sqrt{2})$ | 1 |
| 7 | (a) 2x + 3y = 9 and 4x + 6y = 18. | 1 |
| 8 | (a)$b^2 = 4ac$. | 1 |
| 9 | (c)1:4 | 1 |
| 10 | (c) 24 cm. | 1 |
| 11 | (b) −7/2. | 1 |
| 12 | (c) 6/5 cm. | 1 |
| 13 | (b) −3. | 1 |
| 14 | (d) RHS | 1 |
| 15 | (c)10 cm. | 1 |
| 16 | (a)30 cm | 1 |
| 17 | (b) 60°. | 1 |
| 18 | (b) 2.2 cm. | 1 |
| 19 | (a) | 1 |
| 20 | (b) | 1 |
| | **SECTION B** | |
| 21 | Let the numbers be 15x and 11x. HCF = x = 13.<br>Hence numbers 15×13 = 195 and 11×13=143. | 1<br>1 |
| 22 | Let P=(0,y).<br>$PA^2=PB^2$: $36+(y-5)^2 = 16+(y-3)^2$.<br>Solving gives y=9. Therefore P=(0,9). | ½<br>1<br>1/2 |
| 23 | $\tan\theta + 1/\tan\theta = 2$. Squaring: $\tan^2\theta + 1/\tan^2\theta + 2 = 4$.<br>Hence $\tan^2\theta + 1/\tan^2\theta = 2$. | 1<br>1 |
| 24 | For the larger circle, r=10 cm and perpendicular distance from centre to chord = 6 cm.<br>Half-chord = $\sqrt{(10^2-6^2)}$=8 cm. Hence chord = 16 cm. | 1<br>1 |
| 25 | $\sin 3A=1 \Rightarrow 3A=90° \Rightarrow A=30°$.<br>Therefore $\cos 2A \cdot \tan^2 45° = \cos 60° \cdot \tan^2 45$<br>$= ½ \times 1 = 1/2$. | ½<br>1<br>1/2 |
| | **SECTION C** | |
| 26 | Correct proof | 3 |

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| 27 | For $p(x)=x^2-5x+4$, $\alpha+\beta=-b/a=5$ and $\alpha\beta=c/a=4$.<br>$\alpha^2+\beta^2=(\alpha+\beta)^2-2\alpha\beta$<br>$=25-8=17$. | 1<br>1<br>1 |
| 28 | Let son's present age be x years and man's present age $x^2$ years.<br>One year ago: age of son =x-1 and man's age $x^2-1$<br>$x^2-1=8(x-1)$.<br>Thus $x^2-8x+7=0 \Rightarrow (x-1)(x-7)=0$. $x=7$<br>Son=7 years; man=49 years. | ½<br>½<br>1<br>½<br>½ |
| 29 | Statement<br>Correct figure , given, proof | 1<br>1<br>1 |
| 30 | LHS = $(1+\cot^2A)/(1+\tan^2A) = \operatorname{cosec}^2A/\sec^2A$<br>$= \cot^2A$.<br>RHS = $[(1-\cot A)/(1-\tan A)]^2 = [\frac{1-cosA/sinA}{1-sinA/cosA}]^2$<br>$= [\frac{(sinA-cosA)/sinA}{(cosA-sinA)/cosA}]^2$<br>$= [\frac{cosA}{sinA}]^2 = \cot^2A$. Therefore LHS=RHS. | 1<br>1<br>1 |
| 31 | From the given figure, the three sectors have total central angle 180°<br>Shaded area = $\frac{<P}{360}\pi r^2 + \frac{<Q}{360}\pi r^2 + \frac{<R}{360}\pi r^2$<br>$= \frac{\pi r^2}{360}$ $(<P+<Q+<R)$<br>$=\frac{\pi r^2}{360}\times 180 = 98\pi = 308$ cm² (using $\pi=22/7$). | 3 |
| | **SECTION D** | |
| 32 | <br>Correct graph of each equation<br>Their intersection is (3,3). Hence graphical solution: (x,y)=(3,3). | 2+2<br>1 |
| 33 | For parallelogram ABCD,<br>Midpoint of diagonal AC = Midpoint of diagonal BD<br>Let the coordinates of D be (x,y)<br>midpoint formula ,$=\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$<br>$\left(\frac{3+(-6)}{2}, \frac{-4+2}{2}\right) = \left(\frac{-1+x}{2}, \frac{-3+y}{2}\right)$<br>$\left(\frac{-3}{2}, \frac{-2}{2}\right) = \left(\frac{-1+x}{2}, \frac{-3+y}{2}\right)$ | 1<br>1<br>3 |

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| | $\frac{-1+x}{2}=\frac{-3}{2}$ ; x=-2<br>$\frac{-3+y}{2}=\frac{-2}{2}$ ; y=1 | |
| 34 | Given: A quadrilateral ABCD circumscribes a circle with centre O.<br><br><br>To Prove: ∠AOB+∠COD=180<br>Construction: Join OP, OQ, OR and OS.<br>Proof: We know that the tangents drawn from an external point of a circle subtend equal angles at the centre.<br>∴ ∠1=∠2,∠3=∠4,∠5=∠6 and ∠7=∠8.<br>And, ∠1+∠2+∠3+∠4+∠5+∠6+∠7+∠8=$360^0$ (sum of angles at a point)<br>∠2+∠3+∠6+∠7=$180^0$<br>∠AOB+∠COD=$180^0$ | 1<br>1<br>3 |
| 35 | Correct figure<br><br><br>In ΔABC , tan 45 = $\frac{AB}{BC}$<br>1 = $\frac{7}{BC}$ ; BC = 7 m<br>In ΔAED , tan60 = $\frac{DE}{AE}$<br>√3 = $\frac{DE}{7}$ ; DE = 7√3 m<br>Total height of the tower CD =DE+CE<br>= 7√3+7 = 7(√3+1) m ≈19.12 m. | 1<br>11/2<br>11/2<br>1 |
| | **SECTION E** | |
| 36 | (i) Squares: 1,3,5,7,9,…; a=1,d=2.<br>(ii) Triangles: 2,6,10,…; a=2,d=4.<br>(iii)(a)$S_n=\frac{n}{2}[2a+(n-1)d]$<br>$S_{15}$=225 squares; | 1<br>1<br>1 |

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| | each has area 4 cm², so shaded area=900 cm².<br>OR<br>(iii)(b) $S_n = \frac{n}{2}[2a + (n-1)d]$ ; a=1, d=2<br>$S_n = 2n^2$;<br>$S_{10}$=200 | 1<br><br><br>1<br><br><br>1 |
| 37 | (i) ΔABC ~ ΔADE by AA criterion.<br>(ii) AB/AD = BC/DE = AC/AE.<br>(iii)(a) Using the dimensions shown in the figure and similarity,<br>AB/AD = BC/DE<br>height of tree = 7.2 m.<br>OR<br>(iii)(b) 6/15 = h/60 ⇒ h=24 ft. [2] | 1<br>1<br>1<br>1<br><br>2 |
| 38 | (i) Outer diameter=21 cm; cuboidal box dimensions = 21×21×10.5 cm.<br>(ii) TSA of box = 1764 cm². [1]<br>(iii)(a) Box volume=4630.5 cm³; bowl capacity=(2/3)(3.14)(10³)=2093.33 cm³; difference=2537.17 cm³. [2]<br>OR<br>(iii)(b) Area to be painted = 628 + 32.185 = 660.185 cm². [2] | 1<br>1<br>2<br><br>2 |