

2025 年松江区模拟考试试卷九年级数学参考答案

一、选择题 (本大题共 6 题, 每题 4 分, 满分 24 分)

1. C 2. B 3. C 4. A 5. B 6. D

二、填空题 (本大题共 12 题, 每题 4 分, 满分 48 分)

7. 12; 8. $(a+2)(a-3)$; 9. $\begin{cases} x=3 \\ y=-2 \end{cases}$; 10. $a \leq \frac{1}{4}$; 11. 减小; 12. 5.25×10^5 ;

13. $\frac{9}{20}$; 14. -4; 15. $\frac{2}{3}a + \frac{1}{3}b$; 16. 360; 17. $\sqrt{2}$; 18. $\frac{5}{2}$ 或 $\frac{5}{3}\sqrt{3}$.

三、解答题 (本大题共 7 题, 满分 78 分)

19. 计算: $8^{\frac{1}{2}} + |\sqrt{2} - 2| + \left(\frac{1}{2+\sqrt{2}}\right)^0 - (\sqrt{2} - 1)^{-1}$.

$$\begin{aligned} \text{原式} &= 2\sqrt{2} + (2 - \sqrt{2}) + 1 - (\sqrt{2} + 1) \\ &= 2 \end{aligned}$$

$$20. \text{解不等式组: } \begin{cases} 3x - 2 < 2(1 - x), & \text{①} \\ \frac{x - 10}{3} < 2x. & \text{②} \end{cases}$$

$$\begin{aligned} \text{解: 由①得 } 3x - 2 &< 2 - 2x \\ 5x &< 4 \\ x &< \frac{4}{5} \end{aligned}$$

$$\begin{aligned} \text{由②得 } x - 10 &< 6x \\ -5x &< 10 \\ x &> -2 \end{aligned}$$

所以不等式的解集是: $-2 < x < \frac{4}{5}$

21. (1) 联结 OE ,

$\because \odot O$ 与边 AE 相切于点 E

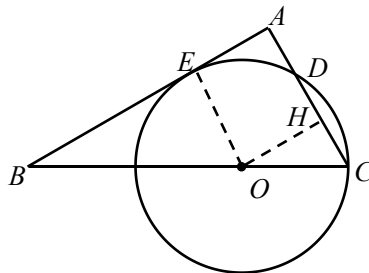
$\therefore OE \perp AB, OE = OC$

$\because \angle B = 30^\circ$

$$\therefore OE = \frac{1}{2}OB$$

$$\therefore 3OE = BC = 12$$

$\therefore OE = OC = 4$ 所以 $\odot O$ 的半径长为 4.



(第 21 题图)

(2) 过点 O 作 $OH \perp AC$, 垂足为 H .

$$\therefore OH \perp AC$$

$$\therefore CH = HD$$

$$\therefore \angle B = 30^\circ, \angle OEB = 90^\circ$$

$$\therefore OE = OC = \frac{1}{2}BO$$

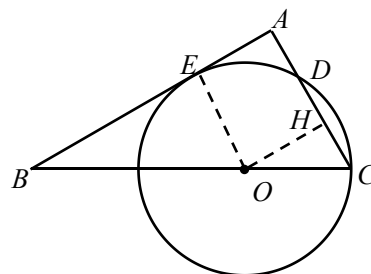
$$\therefore \angle A = \angle OHC = 90^\circ$$

$$\therefore OH \parallel AB$$

$$\therefore \frac{CH}{AH} = \frac{OC}{OB} = \frac{1}{2}$$

$$\therefore CH = HD = AD$$

$$\therefore \frac{AD}{CD} = \frac{1}{2}$$



(第 21 题图)

22. 分别过点 B 、 C 作 QM 的垂线, 垂足分别为 G 、 D ,

过点 B 作 $BN \perp CD$, 垂足为点 N .

$$\therefore \angle CME = 53^\circ, CM = 125$$

$$\therefore CD = CM \sin \angle CME = 125 \times \frac{4}{5} = 100$$

$$\therefore \angle ACM = 106^\circ \quad \angle DCM = 90^\circ - 53^\circ = 37^\circ$$

$$\therefore \angle BCN = 37^\circ, \angle CBN = 53^\circ$$

$$\therefore CN = CM \sin \angle CME = 125 \times \frac{4}{5} = 100$$

$$\therefore BG = DN = 60 \text{ cm}.$$

(2) 作 $CH \perp PQ$, 垂足为 H , 延长 BN 交 PQ 于点 Q

则 $NK \perp PQ$, $CH \perp CD$, $CD = HQ = 100$

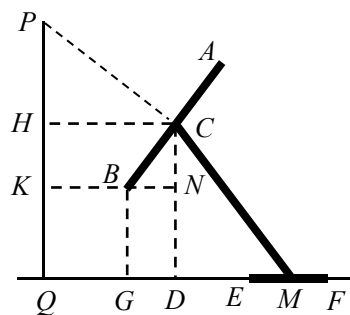
$$\therefore \angle PCH = \angle BCN = 37^\circ, \angle P = 53^\circ$$

$$\therefore PQ = 160, \quad \therefore PH = 60$$

$$\therefore HC = KN = PH \tan P = 60 \times \frac{4}{3} = 80$$

$$BN = BC \cos \angle CBN = 50 \times \frac{3}{5} = 30$$

$$\therefore BK = 80 - 30 = 50 \text{ cm}.$$



(第 22 题图 图 2)

23.(1) $\because$ 在菱形 $ABCD$ 中

$$\therefore \angle ADB = \angle CDB \quad AD = CD$$

$$\text{又} \because PD = PD$$

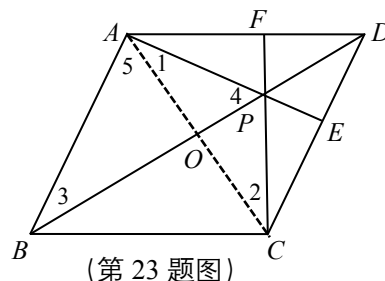
$$\therefore \triangle ADP \cong \triangle CDP$$

$$\therefore \angle PAD = \angle PCD$$

$$\text{又} \because \angle ADE = \angle CDF$$

$$\therefore \triangle ADE \cong \triangle CDF$$

$$\therefore AE = CF$$



(第 23 题图)

(2) 联结 AC 交 BD 于点 O

$$\therefore AC \perp BD, \quad BO = \frac{1}{2}BD$$

$$\because \triangle ADP \cong \triangle CDP$$

$$\therefore AP = CP$$

$$\therefore \angle 1 = \angle 2$$

$$\because \angle APF = \angle 1 + \angle 2 = 2\angle 1 \quad \angle APF = 2\angle 3$$

$$\therefore \angle 1 = \angle 3$$

$$\because \angle 1 + \angle 4 = \angle 3 + \angle 5 = 90^\circ$$

$$\therefore \angle 4 = \angle 5$$

$$\text{又} \angle 3 = \angle 3$$

$$\therefore \triangle ABO \sim \triangle PBA$$

$$\therefore \frac{AB}{PB} = \frac{BO}{AB}$$

$$\therefore BP \cdot \frac{1}{2}BD = AB^2 \quad \text{即} \quad BP \cdot BD = 2AB^2$$

24 (1) $\because y = -x^2 + 4x + c$

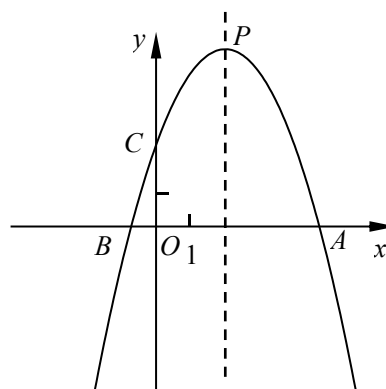
$$= -(x-2)^2 + 4 + c$$

$$\therefore P(2, 4+c)$$

$$\text{令 } x=0 \text{ 得, } y=c$$

$$\therefore C(0, c)$$

$$\therefore PC = \sqrt{2^2 + 4^2} = 2\sqrt{5}.$$



(第 24 题图)

(2) 过点 P 作 $PH \perp y$ 轴, 垂足为 H ,

$$\therefore AC \perp PC$$

$$\therefore \angle HCP + \angle ACO = \angle ACO + \angle CAO = 90^\circ$$

$$\therefore \angle HCP = \angle CAO$$

$$\therefore \angle PHC = \angle COA = 90^\circ$$

$$\therefore \triangle PHC \sim \triangle COA$$

$$\therefore \frac{HP}{CO} = \frac{HC}{OA}$$

$$\text{即 } \frac{2}{c} = \frac{(4+c)-c}{OA}$$

$$\therefore OA = 2c \text{ 得 } A(2c, 0)$$

$$0 = -(2c)^2 + 4(2c) + c$$

$$\text{解得 } c=0 \text{ (舍) 或 } c=\frac{9}{4}$$

$$\therefore y = -x^2 + 4x + \frac{9}{4}$$

(3) $\because$ 点 C 与点 P_1 关于原点对称

$$\therefore P_1(0, -c)$$

直线 CP 的表达式为: $y = 2x + c$

$$\therefore P_1D \parallel PC$$

$$\therefore \text{直线 } P_1D \text{ 的表达式为: } y = 2x - c$$

设 $D(t, 2t-c)$ 代入新抛物线 $y = -x^2 - c$ 得

$$2t - c = -t^2 - c$$

$$t = 0 \text{ (舍) 或 } t = -2$$

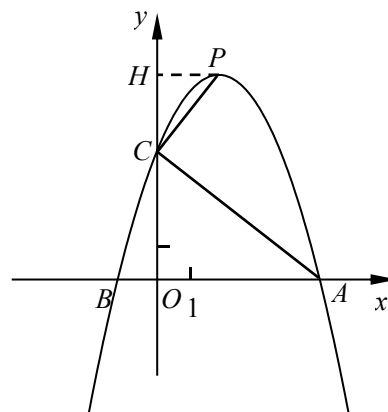
$$\therefore D(-2, -4-c)$$

$$\therefore -4-c = -4-8+c$$

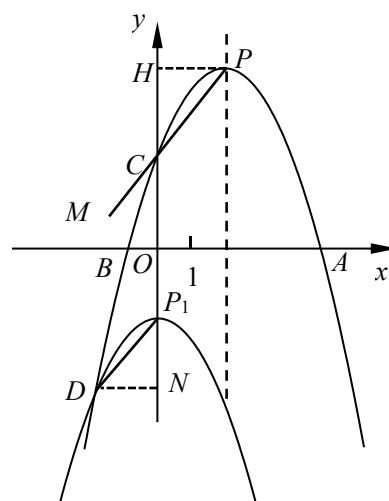
$$\text{解得 } c=4$$

所以 $CP_1=8$,

$$\therefore S_{\triangle P_1PC} = \frac{1}{2} \times 8 \times 2 = 8.$$



(第 24 题图)



(第 24 题图)

25.(1)①联结 OC ，过点 O 作 $OH \perp AC$ ，垂足为点 H 。

$\because C$ 是弧 AB 的中点

$\therefore OC \perp AB$

$\therefore AC = OC$

$\therefore \angle PAO = 45^\circ$

设 $AO = OC = r$

则 $AH = HC = OH = \frac{\sqrt{2}}{2}r$

$$\because \tan P = \frac{OH}{PH} = \frac{\frac{\sqrt{2}}{2}r}{\frac{\sqrt{2}}{2}r + 2\sqrt{2}} = \frac{1}{3}$$

$\therefore r = 2$

$$PO = \sqrt{\left(\frac{\sqrt{2}}{2}r\right)^2 + \left(3\sqrt{2}\right)^2} = 2\sqrt{5}$$

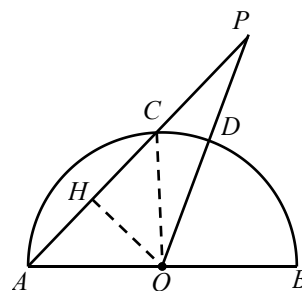
$\therefore PD = 2\sqrt{5} - 2$

(1)②联结 OC 、 CD

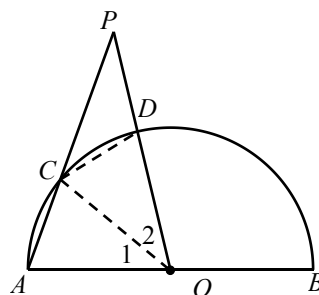
$\because C$ 是弧 AD 的中点

$\therefore AC = CD$ ， $\angle 1 = \angle 2$

$\therefore OA = OC = OD, PA = PO$



(第 25 题 图 1)



$\therefore \angle PAO = \angle POA$ (第 25 题 图 2) $\angle CDO = \angle ODC$

$\angle P = \angle PCD = \angle 1$

$\therefore$ 设 $PD = CD = AC = a, PC = CO = OA = OD = b$

$\therefore \angle PAO = \angle PAO$

$\therefore \triangle AOC \sim \triangle APO$

$$\therefore \frac{AC}{AO} = \frac{AO}{AP} \quad \text{即} \quad \frac{a}{b} = \frac{b}{a+b}$$

$$b^2 - ab - a^2 = 0$$

$$\therefore b = \frac{1+\sqrt{5}}{2}a \quad (\text{负值已舍})$$

$$\therefore \frac{PC}{PD} = \frac{1+\sqrt{5}}{2}$$

(2)联结 OM , 过点 P 作 $PE \perp AB$, 垂足为 E .

则 $OM \perp AP$

设 $\odot O$ 的半径为 r , $\odot P$ 的半径为 R

$\therefore \odot A$ 与 $\odot O$ 相切 (内切)

$\therefore AP = AB = 2r$

$\therefore \odot P$ 与直线 AB 相切

$\therefore PE = PM = R$

$PO = PO$

$\therefore \triangle PMO \cong \triangle PEO$

$\therefore OM = OE$

$\therefore \angle AMO = \angle PEA = 90^\circ \quad \angle MAO = \angle EAP$

$\therefore \triangle AMO \sim \triangle AEP$

$$\therefore \frac{AO}{AP} = \frac{AM}{AE} = \frac{OM}{PE}$$

$$\text{得 } \frac{1}{2} = \frac{OM}{R} \quad \therefore OM = OE = \frac{1}{2}R$$

$$\therefore \frac{1}{2} = \frac{2r - R}{r + \frac{1}{2}R} \quad \therefore R = \frac{6}{5}r$$

$$\therefore \sin \angle PAB = \frac{PE}{AP} = \frac{R}{2r} = \frac{\frac{6}{5}r}{2r} = \frac{3}{5}$$

