

嘉定区 2024 学年第二学期九年级学业质量调研

数学试卷参考答案

一、1.B; 2.D; 3.A; 4.D; 5.C; 6.C.

二、7.4; 8. $(x+3)(x-3)$; 9. $x > 8$; 10. $x = 3$; 11. $k < -1$; 12. $y = 2x + 5$; 13.六;14. $\frac{1}{6}$; 15. 240; 16. 1; 17. $\frac{1}{3}\vec{b} - \frac{2}{3}\vec{a}$; 18.2.三、19. 解: $(\sqrt{2}+1)^{-1} + 4\cos 45^\circ + |\sqrt{3}-2| - (3.14-\pi)^0$

$$\begin{aligned}
 &= \frac{1}{\sqrt{2}+1} + 4 \times \frac{\sqrt{2}}{2} + (2-\sqrt{3}) - 1 \\
 &= \sqrt{2} - 1 + 2\sqrt{2} + 2 - \sqrt{3} - 1 \\
 &= 3\sqrt{2} - \sqrt{3}
 \end{aligned}$$

20. (1) 解: ①, 理由略

(2) 解: 去分母, 得: $x + 2 - 4 = x^2 - 4$,整理, 得: $x^2 - x - 2 = 0$,解得: $x_1 = -1$, $x_2 = 2$,检验: 当 $x_1 = -1$ 时, $x^2 - 4 \neq 0$; 当 $x_2 = 2$ 时, $x^2 - 4 = 0$,可知 $x_2 = 2$ 是增根, 舍去.所以, 原方程的根是 $x = -1$.21. 解: (1) $\because$ 半径 OB 垂直于弦 AC , $\therefore \widehat{AB} = \widehat{BC}$,

$$\because \widehat{CD} = 2\widehat{AB}, \therefore \widehat{AB} = \frac{1}{3}\widehat{BD},$$

$$\therefore \angle AOB = \frac{1}{3}\angle BOD,$$

 $\because AD$ 是半圆 O 的直径, $\therefore \angle AOB + \angle BOD = 180^\circ$,

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

(2) $\because$ 半径 OB 垂直于弦 AC , $\angle AOB = 45^\circ$

$$\therefore \text{在 } Rt\triangle AEO \text{ 中, } AE = EO = \frac{\sqrt{2}}{2}AO$$

设 $AE = EO = k$, 则 $AO = \sqrt{2}k$

$$\because AO = BO, \therefore BO = \sqrt{2}k$$

$$\therefore BE = (\sqrt{2}-1)k$$

$$\text{在 } Rt\triangle BAE \text{ 中, } \tan \angle BAC = \sqrt{2}-1$$

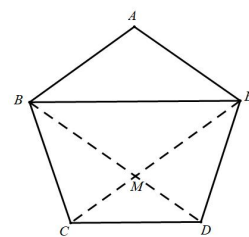
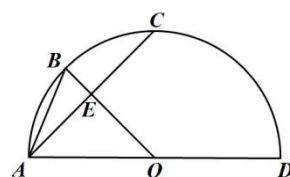


图 1

22. 【初步感知】(1) $\angle ABE = 36^\circ$ 【实践探究】(2) 如图 1 所示, 联结 BD 、 CE 相交于点 M , 菱形 $ABME$ 为所求图形证明: 在正五边形 $ABCDE$ 中, 每个内角都相等且等于 108° , 每条边都相等.可得 $\triangle ABE \cong \triangle CBD$, 从而 $\angle ABE = \angle CBD$

$$\because AE = AB, \angle BAE = 108^\circ, \therefore \angle ABE = \angle AEB = 36^\circ, \text{ 从而 } \angle CBD = 36^\circ.$$

$$\therefore \angle DBE = \angle ABC - \angle ABE - \angle CBD = 108^\circ - 36^\circ - 36^\circ = 36^\circ$$

从而: $\angle AEB = \angle DBE$, $\therefore AE \parallel BD$,

同理可证: $AB \parallel CE$ $\therefore$ 四边形 $ABME$ 为平行四边形,

又 $AE = AB$, $\therefore$ 四边形 $ABME$ 为菱形.

【拓展延伸】(3) 参考图形有: 图 2 或图 3, 设计一种即可

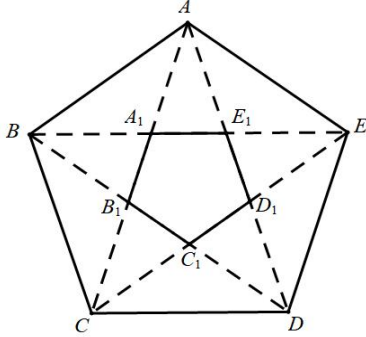


图 2

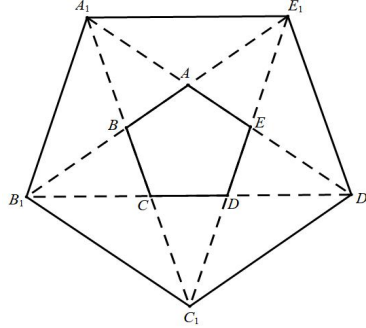


图 3

23. 证明: (1) $\because$ 四边形 $ABCD$ 是平行四边形, $\therefore AB \parallel CD$, $AB = CD$,

$$\because AB \parallel CD, \therefore \frac{AM}{DM} = \frac{EM}{FM}$$

$$\because M \text{ 是边 } AD \text{ 的中点}, \therefore AM = DM$$

$$\therefore EM = MF$$

$$\because CE \perp AB, \therefore \angle CEB = 90^\circ,$$

$$\because AB \parallel CD, \therefore \angle ECD = \angle CEB = 90^\circ,$$

$$\text{在 } Rt\triangle ECF \text{ 中}, \because M \text{ 是斜边 } EF \text{ 的中点}, \therefore MC = \frac{1}{2}EF = MF,$$

$$\therefore \angle F = \angle MCF$$

$$\because AD = 2AB, AB = CD, M \text{ 是边 } AD \text{ 的中点},$$

$$\therefore DM = DC, \therefore \angle DCM = \angle DMC,$$

$$\because \angle EMC = \angle F + \angle MCF = 2\angle F,$$

$$\therefore \angle EMC = 2\angle DMC;$$

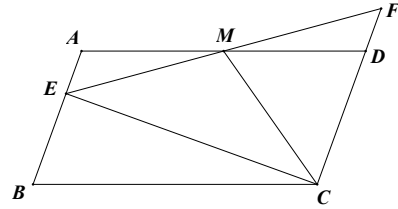
$$(2) \because \angle DCM = \angle DMC, \angle F = \angle MCF, \therefore \angle F = \angle DMC,$$

$$\text{又} \because \angle DCM = \angle MCF, \therefore \triangle CDM \sim \triangle CMF,$$

$$\therefore \frac{CD}{CM} = \frac{CM}{CF},$$

$$\text{即 } CM^2 = CD \cdot CF,$$

$$\because AB = CD, \therefore CM^2 = AB \cdot CF.$$



24. 解: (1) 令 $y = 0$, 即 $y = ax^2 + 2ax - 3a = 0$,

$$\because a < 0, \therefore x^2 + 2x - 3 = 0, \text{ 解得: } x_1 = 1, x_2 = -3,$$

由于点 A 在点 B 左侧, 可得 $A(-3, 0)$, $B(1, 0)$,

从而: $AB = 4$.

$$(2) \text{ 由 } y = ax^2 + 2ax - 3a = a(x+1)^2 - 4a, \text{ 可得: } C(0, -3a), D(-1, -4a)$$

平移后的点 $E(2, -4a + 4)$,

$$\text{方法 1: 设直线 } AD \text{ 表达式: } y = kx + b, \text{ 把 } A、D \text{ 坐标代入 } \begin{cases} -3k + b = 0 \\ -k + b = -4a \end{cases}, \text{ 解得 } \begin{cases} k = -2a \\ b = -6a \end{cases}$$

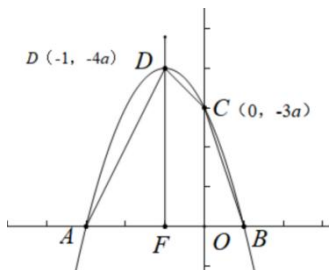
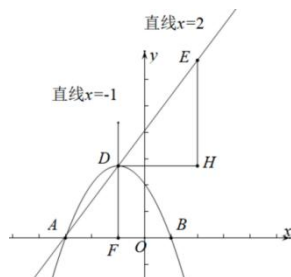
$$\therefore \text{直线 } AD \text{ 表达式: } y = -2ax - 6a.$$

当点 $A、D、E$ 在同一直线时, 把点 $E(2, -4a + 4)$ 代入直线 AD 表达式 $y = -2ax - 6a$,

解得: $a = -\frac{2}{3}$.

$\therefore$ 抛物线 C_1 的表达式: $y = -\frac{2}{3}x^2 - \frac{4}{3}x + 2$.

方法 2: 借助图形, 利用三角比或者相似, 求出 $a = -\frac{2}{3}$.



(3) 由 (1)、(2) 可知: $A(-3, 0)$, $B(1, 0)$, $C(0, -3a)$, $D(-1, -4a)$

设对称轴直线 $x = -1$ 与 x 轴的交点为点 F ,

$S_{\text{四边形}ABCD} = S_{\triangle ADF} + S_{\text{四边形}DFOC} + S_{\triangle COB} = -9a = 9$, 可得 $a = -1$.

从而点 $C(0, 3)$, 可得: $AC = 3\sqrt{2}$

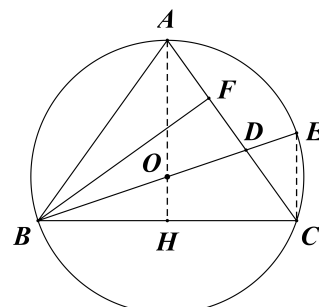
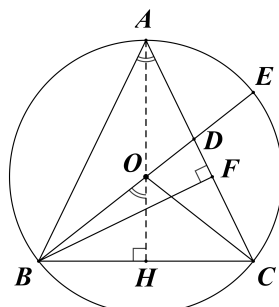
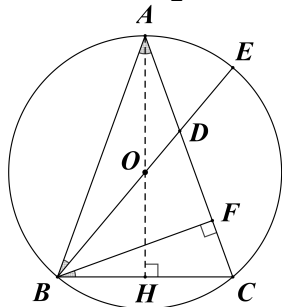
当 $\triangle ACP$ 与 $\triangle ABC$ 相似时, 又点 P 在 x 轴上, 只能是点 P 在 A 点右侧, $\therefore \angle BAC = \angle PAC$

当 $\frac{AP}{AB} = \frac{AC}{AC}$ 时, 点 P 与点 B 重合, 不合题意.

当 $\frac{AP}{AC} = \frac{AC}{AB}$ 时, 即 $\frac{AP}{3\sqrt{2}} = \frac{3\sqrt{2}}{4}$, 解得: $AP = \frac{9}{2}$.

$\therefore$ 点 P 的坐标为 $(\frac{3}{2}, 0)$.

25.



解: (1) 联结 AO 并延长, 交 BC 于点 H ,

在圆 O 中, $\because AB = AC$, $\therefore \widehat{AB} = \widehat{AC}$,

又 $\because AH$ 过圆心 O , $\therefore AH \perp BC$, $BH = CH$,

$\therefore \angle BAH = \angle CAH = \frac{1}{2} \angle BAC$,

$\because BF \perp AC$, $\therefore \angle BFC = 90^\circ$, $\therefore \angle CBF = 20^\circ$, $\therefore \angle C = 70^\circ$, (1 分)

$\because AB = AC$, $\therefore \angle ABC = \angle C = 70^\circ$,

$\because \angle ABC + \angle C + \angle BAC = 180^\circ$, $\therefore \angle BAC = 40^\circ$, $\therefore \angle BAO = 20^\circ$,

$\because OA = OB$, $\therefore \angle BAO = \angle ABO = 20^\circ$,

$\therefore \angle DBF = \angle ABC - \angle ABO - \angle CBF = 70^\circ - 20^\circ - 20^\circ = 30^\circ$.

(2) 在 $Rt\triangle BCF$ 中, $\angle BFC = 90^\circ$, $\sin \angle ACB = \frac{BF}{BC} = x$,

$$\because BC = 2BH, \therefore \frac{BF}{BH} = 2x,$$

$$\because \angle BOH = \angle OAB + \angle OBA, \angle BAC = \angle OAB + \angle OAC, \therefore \angle BOH = \angle BAC,$$

$$\text{又} \because \angle AFB = \angle OHB, \therefore \triangle AFB \sim \triangle OHB,$$

$$\therefore \frac{S_{\triangle ABF}}{S_{\triangle OHB}} = \left(\frac{BF}{BH} \right)^2 = (2x)^2,$$

$$\because S_{\triangle OBC} = 2S_{\triangle OHB}, \therefore y = 2x^2;$$

$$(3) \text{ 联结 } EC, \because BE \text{ 为 } \odot O \text{ 直径}, \therefore BO = OE,$$

$$\text{又} \because BH = CH, \therefore OH \text{ 是 } \triangle BEC \text{ 的中位线}, \therefore OH = \frac{1}{2}EC, OH \parallel CE,$$

$$\therefore \frac{OD}{DE} = \frac{AO}{EC}, \because \text{点 } D \text{ 是线段 } OE \text{ 的黄金分割点}, \therefore \frac{OD}{DE} = \frac{\sqrt{5}-1}{2} \text{ 或 } \frac{DE}{OD} = \frac{\sqrt{5}-1}{2},$$

$$\textcircled{1} \text{ 当 } \frac{OD}{DE} = \frac{\sqrt{5}-1}{2} \text{ 时}, \because OA = OB, \therefore \frac{OB}{OH} = \frac{2AO}{EC} = \frac{2OD}{DE} = \sqrt{5}-1,$$

$$\because \angle BOH = \angle BAC, \therefore \text{在 } Rt\triangle OHB \text{ 中}, \angle OHB = 90^\circ,$$

$$\therefore \cos \angle BAC = \cos \angle BOH = \frac{OH}{OB} = \frac{1}{\sqrt{5}-1} = \frac{\sqrt{5}+1}{4};$$

$$\textcircled{2} \text{ 当 } \frac{OD}{DE} = \frac{\sqrt{5}-1}{2} \text{ 时}, \text{ 同理可得 } \frac{OH}{OB} = \frac{EC}{2AO} = \frac{DE}{2OD} = \frac{\sqrt{5}-1}{4},$$

$$\therefore \cos \angle BAC = \cos \angle BOH = \frac{OH}{OB} = \frac{\sqrt{5}-1}{4},$$

$$\text{综上所述, } \cos \angle BAC = \frac{\sqrt{5} \pm 1}{4}.$$