

2025-2026 学年八年级数学上学期期末模拟卷

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一、选择题：(本大题共 6 题，每题 3 分，共 18 分.下列各题四个选项中，有且只有一个选项是正确的，选择正确项的代号并填涂在答题卡的相应位置上.)

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

二、填空题：(本大题共 12 题，每题 2 分，共 24 分.)

7. $>$

8. $\sqrt{a+b}/\sqrt{b+a}$

9. 1

10. 6cm

11. $3\left(x - \frac{1+\sqrt{7}}{3}\right)\left(x - \frac{1-\sqrt{7}}{3}\right)$

12. $x < 2 - \sqrt{5}$

13. $20^\circ/20$ 度

14. 16

15. $\frac{73}{99}$

16. $\frac{30}{x-20} - 1 = \frac{40}{x}$

17. -3

18. 2 或 $\frac{4}{5}$

三、解答题：(本大题共 11 题，共 58 分.解答应写出文字说明，证明过程或演算步骤.)

19. (1) 解: $\frac{1}{\sqrt{3}-2} - 4\sqrt{\frac{1}{2}} + (\sqrt{48} - \sqrt{24}) \div \sqrt{6}$

$$= \frac{(\sqrt{3}+2)}{(\sqrt{3}-2)(\sqrt{3}+2)} - 2\sqrt{2} + \sqrt{48} \div \sqrt{6} - \sqrt{24} \div \sqrt{6}$$

$$= -\sqrt{3} - 2 - 2\sqrt{2} + 2\sqrt{2} - 2$$

$$= -\sqrt{3} - 4;$$

$$(2) \text{ 解: } \left(\frac{a}{b} \sqrt{ab} \cdot \sqrt{a^3b} \right) \div \left(3\sqrt{\frac{a}{b}} \right) (a > 0, b > 0)$$

$$= \left(\frac{a}{b} \sqrt{a^4b^2} \right) \div \left(3\sqrt{\frac{a}{b}} \right)$$

$$= \left(\frac{a}{b} \sqrt{a^4b^2} \right) \times \left(\frac{1}{3} \sqrt{\frac{b}{a}} \right)$$

$$= \frac{a}{3b} \sqrt{a^3b^3}$$

$$= \frac{a}{3b} \cdot ab \sqrt{ab}$$

$$= \frac{1}{3} a^2 \sqrt{ab}.$$

$$20. (1) \text{ 解: } \frac{1}{2}x^2 - 3x - 5 = 0$$

$$x^2 - 6x - 10 = 0$$

$$(x-3)^2 - 19 = 0$$

$$(x-3)^2 = 19$$

$$x-3 = \pm\sqrt{19}$$

$$x_1 = 3 + \sqrt{19}, x_2 = 3 - \sqrt{19};$$

$$(2) \text{ 解: } 2x^2 + 2\sqrt{7}x + 1 = 0$$

$$a = 2, b = 2\sqrt{7}, c = 1,$$

$$\Delta = (2\sqrt{7})^2 - 4 \times 2 \times 1 = 20 > 0,$$

$$x = \frac{-2\sqrt{7} \pm \sqrt{20}}{2 \cdot 2}$$

$$x = \frac{-2\sqrt{7} \pm 2\sqrt{5}}{2 \cdot 2}$$

$$x = \frac{-\sqrt{7} \pm \sqrt{5}}{2}$$

$$x_1 = \frac{-\sqrt{7} + \sqrt{5}}{2}, x_2 = \frac{-\sqrt{7} - \sqrt{5}}{2}.$$

$$21. \text{ 解: } \because 2a + 7b + 3 \text{ 立方根是 } 3, 3a + b - 1 \text{ 的算术平方根是 } 4,$$

$$\therefore \begin{cases} 2a+7b+3=27 \\ 3a+b-1=16 \end{cases},$$

$$\text{解得: } \begin{cases} a=5 \\ b=2 \end{cases},$$

$$\therefore 9 < 14 < 16,$$

$$\therefore 3 < \sqrt{14} < 4,$$

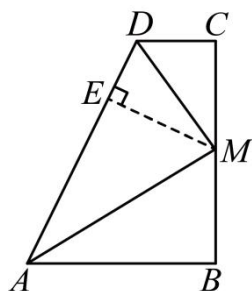
$$\therefore \sqrt{14} \text{ 的整数部分是 } 3,$$

$$\therefore c=3,$$

$$\therefore 3a-b+c=3 \times 5-2+3=15-2+3=16,$$

$$\therefore 3a-b+c \text{ 的平方根是 } \pm 4.$$

22. 证明: 如图, 作 $ME \perp AD$ 于 E ,



$$\because DM \text{ 平分 } \angle ADC, ME \perp AD, \angle C = 90^\circ,$$

$$\therefore ME = CM,$$

$$\because M \text{ 是 } BC \text{ 的中点},$$

$$\therefore CM = BM,$$

$$\therefore EM = BM,$$

$$\because ME \perp AD, \angle B = 90^\circ,$$

$$\therefore \text{点 } M \text{ 在 } \angle DAB \text{ 的角平分线上},$$

$$\therefore AM \text{ 平分 } \angle DAB.$$

23. 解: 设垂直于墙的一边长为 x 米, 则平行于墙的一边长为 $(120-2x+2)$ 米,

$$\text{根据题意得: } x(120-2x+2)=1860,$$

$$\text{整理得: } x^2-61x+930=0,$$

$$\text{解得: } x_1=30, x_2=31,$$

当 $x=30$ 时, $120-2x+2=120-2\times 30+2=62>61.8$, 不符合题意, 舍去;

当 $x=31$ 时, $120-2x+2=120-2\times 31+2=60<61.8$, 符合题意.

答: 长方形仓库的长和宽分别是 60 米、31 米.

24. (1) 解: $\because$ 一元二次方程 $x^2-(2m-1)x+m^2-2m-1=0$ 有实数根,

$$\therefore \Delta = b^2 - 4ac = [-(2m-1)]^2 - 4 \times (m^2 - 2m - 1) \times 1 \geq 0,$$

$$\text{解得 } m \geq -\frac{5}{4}.$$

(2) 解: x_1, x_2 是方程 $x^2-(2m-1)x+m^2-2m-1=0$ 的两个根,

$$\text{则 } x_1 + x_2 = 2m - 1, \quad x_1 x_2 = m^2 - 2m - 1,$$

$$\because x_1^2 + x_2^2 - x_1 x_2 = 7,$$

$$\therefore (x_1 + x_2)^2 - 3x_1 x_2 = 7,$$

$$\therefore (2m-1)^2 - 3(m^2 - 2m - 1) = 7,$$

整理, 得 $m^2 + 2m - 3 = 0$,

$$\text{解得 } m_1 = 1, m_2 = -3.$$

$$\text{又 } m \geq -\frac{5}{4},$$

故 $m = 1$.

25. (1) 解: 在 $Rt\triangle ABC$ 中, $\angle ABC = 90^\circ$, $AB = 15\text{m}$, $BC = 20\text{m}$,

$$\text{由勾股定理得: } AC = \sqrt{AB^2 + BC^2} = \sqrt{15^2 + 20^2} = 25(\text{m}),$$

答: AC 的长为 25m;

(2) 解: 在 $\triangle ADC$ 中, $CD = 7\text{m}$, $AD = 24\text{m}$, $AC = 25\text{m}$,

$$\because AD^2 + DC^2 = 24^2 + 7^2 = 625 = AC^2,$$

$\therefore \triangle ADC$ 是直角三角形, 且 $\angle ADC = 90^\circ$,

$$\therefore S_{\triangle ADC} = \frac{1}{2} \times 24 \times 7 = 84(\text{m}^2),$$

$\because \angle ABC = 90^\circ$, $AB = 15\text{m}$, $BC = 20\text{m}$,

$$\therefore S_{\triangle ABC} = \frac{1}{2} \times 20 \times 15 = 150(\text{m}^2),$$

$$\because 150 > 84, \quad 150 - 84 = 66,$$

∴种白菜的菜地大，大 66m^2 ，

答：种白菜的菜地大，大 66m^2 。

26. (1) 证明：∵ AD 平分 $\angle BAC$ ， $DE \perp AB$ ， $DF \perp AC$ ，

$$\therefore DE = DF, \quad \angle BED = \angle DFC = 90^\circ;$$

在 $\text{Rt}\triangle BDE$ 和 $\text{Rt}\triangle DFC$ 中，

$$\begin{cases} BD = CD \\ DE = DF \end{cases},$$

$$\therefore \text{Rt}\triangle BDE \cong \text{Rt}\triangle DFC (\text{HL}),$$

$$\therefore BE = CF;$$

(2) 解：由 (1) 可知 $DE = DF = 2$ ，

∵ AD 平分 $\angle BAC$ ， $\angle DAF = 15^\circ$ ，

$$\therefore \angle BAC = 2\angle DAF = 30^\circ, \quad \angle BAD = \angle DAF,$$

$$\therefore BD \parallel AC,$$

$$\therefore \angle DBE = \angle BAC = 30^\circ, \quad \angle DAF = \angle BDA,$$

$$\therefore \angle BAD = \angle BDA,$$

$$\therefore AB = BD,$$

∵ 在 $\text{Rt}\triangle BDE$ 中， $\angle DBE = 30^\circ$ ，

$$\therefore BD = 2DE = 2 \times 2 = 4,$$

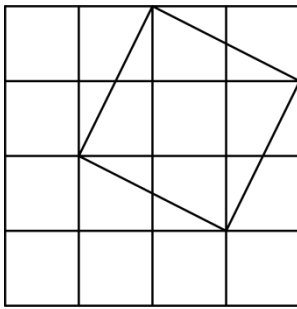
$$\therefore AB = BD = 4.$$

27. (1) 解：这个阴影正方形的面积 $= 4 \times 4 - 4 \times \frac{1}{2} \times 1 \times 3 = 10$ ，

若这个正方形的边长为 a ，则 $a = \sqrt{10}$ ；

故答案为：10； $\sqrt{10}$

(2) 解：如图，四边形即为所求；



图②

阴影部分的面积为 $1 \times 1 + \frac{1}{2} \times 1 \times 2 = 2$;

$\therefore$ 这个正方形的边长为 b , 面积是 5,

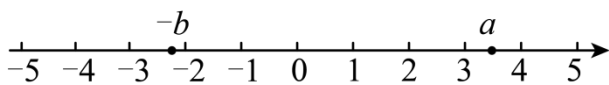
$$\therefore b = \sqrt{5};$$

故答案为: 2, $\sqrt{5}$

$$(3) \text{ 解: } 3 < \sqrt{10} < 4, 2 < \sqrt{5} < 3,$$

$$\therefore -4 < -b < -3, 2 < a < 3,$$

如图, 即为所求.



$$28. \text{ 解: } \because x = \frac{1}{3-2\sqrt{2}} = \frac{3+2\sqrt{2}}{(3-2\sqrt{2}) \times (3+2\sqrt{2})} = \frac{3+2\sqrt{2}}{9-8} = 3+2\sqrt{2},$$

$$\therefore x-3 = 2\sqrt{2},$$

$$\therefore (x-3)^2 = (2\sqrt{2})^2,$$

$$\therefore x^2 - 6x + 9 = 8;$$

$$(2) \because y = \sqrt{6} - 2,$$

$$\therefore y+2 = \sqrt{6},$$

$$\therefore (y+2)^2 = (\sqrt{6})^2,$$

$$\therefore y^2 + 4y + 4 = 6,$$

$$\therefore y^2 + 4y = 2,$$

$$\therefore y(y^2 + 4y) = 2y, \text{ 即 } y^3 + 4y^2 = 2y,$$

$$\therefore y^3 + 5y^2 + 2y - 3$$

$$= (y^3 + 4y^2) + (y^2 + 4y) - 2y - 3$$

$$= 2y + 2 - 2y - 3$$

$$= -1;$$

$$(3) \because \frac{1}{\sqrt{n} + \sqrt{n+1}} = \frac{\sqrt{n+1} - \sqrt{n}}{(\sqrt{n} + \sqrt{n+1})(\sqrt{n+1} - \sqrt{n})} = \frac{\sqrt{n+1} - \sqrt{n}}{n+1-n} = \sqrt{n+1} - \sqrt{n},$$

$$\therefore a = \frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots + \frac{1}{\sqrt{2024}+\sqrt{2025}}$$

$$= \sqrt{2} - 1 + \sqrt{3} - \sqrt{2} + \sqrt{4} - \sqrt{3} + \dots + \sqrt{2025} - \sqrt{2024}$$

$$= \sqrt{2025} - 1$$

$$= 45 - 1$$

$$= 44,$$

$$\therefore a + 1 = 45,$$

$$\text{两边平方得 } (a+1)^2 = 45^2 = 2025, \quad \text{即 } a^2 + 2a + 1 = 2025,$$

$$\therefore a^2 + 2a - 2024 = 0,$$

$$\therefore 2a^2 + 4a - 4046 = 2(a^2 + 2a - 2023) = 2(2024 - 2023) = 2,$$

$$a^4 + 3a^3 - 2025a^2 - 2030a - 2 = (a^2 + 2a - 2024)(a^2 + a - 3) - 6074 = 0 - 6074 = -6074,$$

$$\therefore \frac{a^4 + 3a^3 - 2025a^2 - 2030a - 2}{2a^2 + 4a - 4046}$$

$$= \frac{-6074}{2}$$

$$= -3037.$$

29. (1) 解: 当 ABC 为等边三角形时,

$$AB = AC = BC,$$

$$\therefore AB^2 + AC^2 - AB \cdot AC = BC^2 + BC^2 - BC \cdot BC = BC^2,$$

$\therefore$ 等边三角形一定是“类勾股三角形”

故答案为: 是

$$(2) \text{ 解: } \textcircled{1} \text{ 在 Rt} \triangle ABC \text{ 中, } \angle C = 90^\circ; \angle B = 30^\circ, AC = 1,$$

$$\therefore AB = 2AC = 2, \quad BC = \sqrt{AB^2 - AC^2} = \sqrt{3},$$

$$\therefore AB^2 + AC^2 - AB \cdot AC = 2^2 + 1^2 - 2 \times 1 = 3 = (\sqrt{3})^2 = BC^2,$$

$\therefore ABC$ 是“类勾股三角形”.

② $\because$ 在 $\text{Rt}\triangle ABC$ 中, $\angle C = 90^\circ$, $AB = c$, $AC = b$, $BC = a$, 且 $a > b$,

$$\therefore a^2 + b^2 = c^2,$$

$\therefore ABC$ 是“类勾股三角形”,

$\therefore$ 当 $a^2 + b^2 - ab = c^2$ 时, 则 $-ab = 0$ (舍去),

当 $a^2 + c^2 - ac = b^2$ 时, 则,

$$a^2 + c^2 - ac = c^2 - a^2,$$

$$\therefore ac = 2a^2,$$

$$\therefore c = 2a,$$

$$\therefore b = \sqrt{3}a,$$

$$\therefore a:b:c = 1:\sqrt{3}:2 \quad (\text{不符合题意, 舍去})$$

当 $b^2 + c^2 - bc = a^2$ 时, 则,

$$b^2 + c^2 - bc = c^2 - b^2,$$

$$\therefore bc = 2b^2,$$

$$\therefore c = 2b,$$

$$\therefore a = \sqrt{3}b,$$

$$\therefore a:b:c = \sqrt{3}:1:2.$$

综上: ABC 是“类勾股三角形”, $AB = c$, $AC = b$, $BC = a$, 且 $a > b$, $a:b:c = \sqrt{3}:1:2$.

(3) 解: ① $\because ABC$ 是等边三角形,

$$\therefore AB = AC = BC, \quad \angle ABC = \angle ACB = \angle BAC = 60^\circ,$$

$\because BG$ 是 $\triangle BEF$ 的高, $\triangle BGF$ 是“类勾股三角形”, $BG > FG$,

$\therefore$ 由 (2) 可得 $FG:BG:BF = 1:\sqrt{3}:2$, $\angle BFG = 60^\circ$,

$$\therefore \angle FAB + \angle FBA = \angle BFG = 60^\circ,$$

$$\therefore \angle FAB + \angle EAC = \angle BAC = 60^\circ,$$

$$\therefore \angle FBA = \angle EAC,$$

在 $\triangle ABD$ 和 $\triangle CAE$ 中,

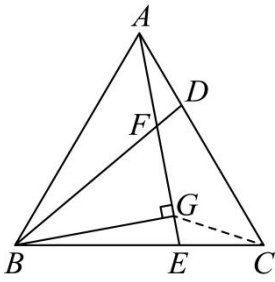
$$\begin{cases} \angle BAD = \angle ACE \\ BA = AC \\ \angle DBA = \angle EAC \end{cases},$$

$$\therefore \triangle ABD \cong \triangle CAE (\text{ASA}),$$

$$\therefore AD = CE.$$

$$\textcircled{2} \because \angle GCB = \angle ABD, \quad AB = AC,$$

$$\therefore \angle FAB = 60^\circ - \angle ABD = 60^\circ - \angle GCB = \angle ACG,$$



在 $\triangle ABF$ 和 $\triangle CAG$ 中,

$$\begin{cases} \angle FAB = \angle GCA \\ BA = AC \\ \angle ABF = \angle ACG \end{cases},$$

$$\therefore \triangle ABF \cong \triangle CAG,$$

$$\therefore AG = BF,$$

$$\because FG : BG : BF = 1 : \sqrt{3} : 2, \quad FG = 1,$$

$$\therefore BG = \sqrt{3}, \quad BF = 2,$$

$$\therefore AG = BF = 2,$$

$$\therefore AB = \sqrt{AG^2 + BG^2} = \sqrt{2^2 + (\sqrt{3})^2} = \sqrt{7}.$$

$$\therefore \text{等边 } ABC \text{ 的边长为 } \sqrt{7}.$$