

1 ア 7 1 46 ウ $-\frac{1}{14}$ エ $-3a^2b$ ①各2点 /8

2 ア 1 7 2 0 3 2 4 大きい
イ 1, 2, 4 ウ $(x=5)$
 $x=3$ ②各2点 /12

3 ア あ 4 い 1 う 6
イ A 1 B 0.2 C $\sqrt{2}$
 $(2, 3, 5, \dots)$ $(0.2, 0.4, \frac{1}{2})$ $(\sqrt{3}, \sqrt{5}, \pi)$ ③各2点 /12

4 ア $3\sqrt{5}$ イ $\sqrt{2}$ ウ $4\sqrt{3}$ エ $\sqrt{14}-\sqrt{6}$
オ $2\sqrt{6}$ カ 5 キ $\frac{3\sqrt{7}}{14}$ ④各2点 /14

5 ア $x = \pm 7$ イ $x = 2 \pm \sqrt{7}$ ウ $x = -9 \pm \sqrt{7}$ エ $x = 1, 3$
オ $x = \frac{4 \pm \sqrt{22}}{2}$ カ $x = \pm 5$ キ $x = 2, 8$ ⑤各2点 /21

6 解の公式の方法 $(x+p)^2=q$ の方法
 $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4 \times 1 \times (-3)}}{2 \times 1}$
 $x = \frac{6 \pm \sqrt{36+12}}{2}$
 $x = \frac{6 \pm \sqrt{48}}{2}$
 $x = \frac{6 \pm 4\sqrt{3}}{2}$
 $x = 3 \pm 2\sqrt{3}$
 $x^2 - 6x - 3 = 0$
 $x^2 - 6x = 3$
 $x^2 - 6x + 9 = 3 + 9$
 $(x-3)^2 = 12$ $\left[\begin{array}{l} \text{平方根} \\ x-3 = \pm \sqrt{12} \end{array} \right]$
 $x-3 = \pm 2\sqrt{3}$
 $x = 3 \pm 2\sqrt{3}$ ⑥各2点 /4

7 $x^2 - y^2$
 $= (x+y)(x-y) = 4 \times 1 = 12 \times (-2\sqrt{3})$
 $= (5-\sqrt{3} + 6+\sqrt{3})(6-\sqrt{3} - (6+\sqrt{3})) = -24\sqrt{3}$
 $= 12 \times (8-\sqrt{3} - 6-\sqrt{3})$ ⑦ 3点 /3

8 ア Aさん $(10-x)(8-x) = 48$
 Bさん $80 - \{10x + x(8-x)\} = 48$
 イ II 2 III 16 ウ $0 < x < 8$ ⑧各2点 /10

9 ア 141% イ 71% ウ 115% ⑨各2点 /6

10 ア 白 40 枚 黒 41 枚 イ 6
 ウ n番目の模様の黒タイルが545枚とする
 $n^2 + (n+1)^2 = 545$ n は自然数だから
 $n^2 + n^2 + 2n + 1 = 545 \Rightarrow 2n^2 + 2n - 544 = 0$ $n=16$ は問題に合っている
 $2n^2 + 2n - 544 = 0$ $n=17$ は問題に合っていない
 $n^2 + n - 272 = 0$
 $(n-16)(n+17) = 0$
 $n = 16, -17$
A. 16番目 ⑩ (7)(1) 各2点 10点 /10

12	1	$\sqrt{5}$ cm	2	$\pm\sqrt{7}$	3	$0.4 \left(\frac{2}{5}\right)$
	4	$-\sqrt{9}, \frac{5}{3}, -0.2$	5	1.41421356	6	12

④ 各2点

/6

13	1	$-6 < -\sqrt{35}$	2	$\frac{\sqrt{2}}{3}, \frac{2}{3}, \sqrt{\frac{2}{3}}, \frac{2}{\sqrt{3}}$	3	3 個
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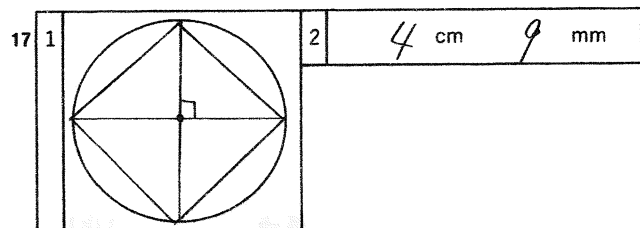
14	1	① 26.45	2	0.8367	3	③ 10.58
	2	$C = 6$	3	22	4	$a = 3, b = 6$
	5	$1 - \sqrt{5}$	6	$\sqrt{1+5} - 3 \times 4 \div 2 = 0$		+6

15	1	$\sqrt{21}$	2	$\frac{5}{3}$	3	$-\frac{2\sqrt{5}}{5}$
	4	$-\sqrt{7}$	5	0	6	$2\sqrt{2}$
	7	$\sqrt{3} + 3$	8	44	9	2

16	1	26.26	2	$\frac{3}{11}$	3	-8
	4	4.2 cm				

④ 各2点

/8



④ 各3点

/6

問10

n	1	2	3	4	n
黒	5	13	25	41	$n^2 + (n+1)^2$
白	4	12	20	40	黒-1
全	9	25	49	81	$(2n+1)^2$

(7) 表より 白 40 枚

黒 41 枚

(8) $3^2, 5^2, 7^2, \dots, (2n+1)^2$ 奇数の2乗

$$(7) \quad n^2 + (n+1)^2 = 545$$

$$n^2 + n^2 + 2n + 1 = 545$$

$$2n^2 + 2n - 544 = 0$$

$$n^2 + n - 272 = 0$$

$$(n-16)(n+17) = 0$$

$$n = 16, -17$$

n は自然数だから

n = 16 は問題に合う

n = -17 は問題に合わない

A. 16 番目

$$(8) \quad \text{黒 } 545, \dots$$

$$\text{白 } 544$$

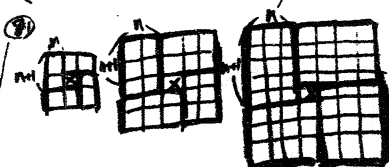
$$\begin{array}{r} 1) \text{ 白 } 544 \\ \hline \text{全 } 1089 \end{array}$$

$$(2n+1)^2 = 1089$$

$$2n+1 = 33$$

$$2n = 32, -34$$

$$n = 16, -17$$



左上の 70.7 425

+ n 以外から

70.7 は黒と白の数の和

$$\text{黒 } (n+1)n \times \frac{1}{2} \times 4 + 1 = 2n(n+1) + 1$$

$$\text{白 } (n+1)n \times \frac{1}{2} \times 4 = 2n(n+1)$$

中3 数学 前期期末 対策 ③

問1 (ア) $-5+12 = 7$
 (イ) $4-7 \times (2-8) = 4+42 = 46$
 (ウ) $-24a^2b^3 \div 8ab^2 = -3a^1b^1$

問2 (ア) $x^2 - ax + 4a - 14 = 0$ の1つの解が2
 $x=2$ を代入 $a=5$ を代入
 $4 \cdot 2^2 - 2a + 4a - 14 = 0 \Rightarrow 2a = 10 \Rightarrow a = 5$
 $x^2 - 5x + 6 = 0 \Rightarrow (x-2)(x-3) = 0 \Rightarrow x = 2, 3$
 確認する!

問4 (ア) $\sqrt{5} + 2\sqrt{5} = 3\sqrt{5}$
 (イ) $\sqrt{18} - \sqrt{8} = 3\sqrt{2} - 2\sqrt{2} = \sqrt{2}$
 (ウ) $\sqrt{3} + \frac{9 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \sqrt{3} + \frac{9\sqrt{3}}{3} = 4\sqrt{3}$

(エ) $\sqrt{2}(\sqrt{7} - \sqrt{3}) = \sqrt{14} - \sqrt{6}$
 (オ) $\sqrt{54} - \sqrt{30} \div \sqrt{5} = 3\sqrt{6} - \sqrt{6} = 2\sqrt{6}$

(カ) $(3-\sqrt{5})^2 - 6(3-\sqrt{5}) + 9 = 3 - \sqrt{5} = A$ とする
 $A^2 - 6A + 9 = (A-3)^2 = (3-\sqrt{5}-3)^2 = (-\sqrt{5})^2 = 5$
 (キ) $-\sqrt{\frac{4}{7}} + \sqrt{\frac{7}{4}} = -\frac{\sqrt{4} \times \sqrt{7}}{\sqrt{7} \times \sqrt{4}} + \frac{\sqrt{7}}{\sqrt{4}} = -\frac{2\sqrt{7}}{2} + \frac{\sqrt{7}}{2} = -\frac{4\sqrt{7} + 7\sqrt{7}}{4} = \frac{3\sqrt{7}}{4}$

問5 (ア) $x^2 = 49 \Rightarrow x = \pm 7$

(イ) $(x+9)^2 = 7 \Rightarrow x+9 = \pm\sqrt{7} \Rightarrow x = -9 \pm \sqrt{7}$

(エ) $(x+1)(x-5) + 8 = 0 \Rightarrow x^2 - 4x - 5 + 8 = 0 \Rightarrow x^2 - 4x + 3 = 0 \Rightarrow (x-1)(x-3) = 0 \Rightarrow x = 1, 3$

(カ) $(x+2)^2 - 4(x+2) - 21 = 0 \Rightarrow A^2 - 4A - 21 = 0 \Rightarrow (A-7)(A+3) = 0 \Rightarrow (x+2-7)(x+2+3) = 0 \Rightarrow (x-5)(x+5) = 0 \Rightarrow x = \pm 5$

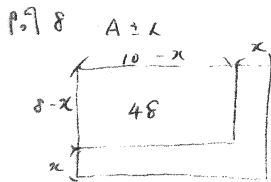
(イ) $x^2 - 4x = 3 \Rightarrow x^2 - 4x - 3 = 0$
 因数分解できない
 解の公式

$x = \frac{4 \pm \sqrt{16 - 4 \times (-3)}}{2} = \frac{4 \pm \sqrt{28}}{2} = 2 \pm \sqrt{7}$

$x^2 - 4x = 3 \Rightarrow x^2 - 4x + 4 = 3 + 4 \Rightarrow (x-2)^2 = 7 \Rightarrow x-2 = \pm\sqrt{7} \Rightarrow x = 2 \pm \sqrt{7}$

(ア) $2x^2 - 8x - 3 = 0$
 $x = \frac{8 \pm \sqrt{64 - 4 \times 2 \times (-3)}}{4} = \frac{8 \pm \sqrt{124}}{4} = \frac{8 \pm 2\sqrt{31}}{4} = \frac{4 \pm \sqrt{31}}{2}$

(イ) $\frac{1}{2}x(10-x) = 8 \Rightarrow x(10-x) = 16 \Rightarrow 10x - x^2 = 16 \Rightarrow 0 = x^2 - 10x + 16 \Rightarrow (x-2)(x-8) = 0 \Rightarrow x = 2, 8$



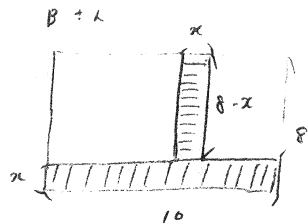
$$(10-x)(8-x) = 48$$

$$80 - 8x - 10x + x^2 = 48$$

$$x^2 - 18x + 32 = 0$$

$$(x-2)(x-16) = 0$$

$$x = 2, 16$$



$$8 \times 10 - \{10x - x(8-x)\} = 48$$

$$x = 2, 16$$

$$8-x > 0 \quad 10-x > 0 \quad \text{から } x > 0$$

$$\frac{8}{x} > 1 \quad 10 > x$$

$$0 < x < 8 \text{ かつ } A: 2m$$

問9

(1) 「紙の大きさは2倍になるけど、」

面積が2倍ということ!

つまり、辺の長さは $\sqrt{2}$ 倍 $\approx 141\%$

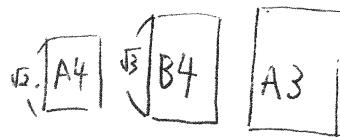
(2) A3 $\rightarrow$ A4 つまり面積を $\frac{1}{2}$ 倍にする

$$\text{辺の長さは } \frac{1}{\sqrt{2}} \text{ 倍} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{2}$$

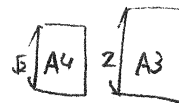
$$= \frac{1.414}{2} = 0.707$$

$$= 71\%$$

$$(7) A4: B4 = \sqrt{2} \cdot \sqrt{3}$$



$$A4: A3 = 1: \sqrt{2} \text{ 程度}$$



$$\sqrt{2} \text{ 倍}$$

$$A4 = 9.5 \times \sqrt{2}$$

$$A3 = 9.5 \times \sqrt{2} \times \sqrt{2} = 2$$

$$B4 \rightarrow A3 \text{ は } x \text{ 倍}$$

$$\sqrt{3} \times x = 2 \quad \text{程度}$$

$$x = \frac{2}{\sqrt{3}}$$

$$x = \frac{2 \times \sqrt{3}}{3}$$

$$x = \frac{2 \times 1.732}{3} = 1.154 \rightarrow 115\%$$

問12 (1) 面積 $5a^2$

↓平方根

1辺 $\sqrt{5}a$

(4) $-\sqrt{9}, \frac{5}{3}, -0.2$

(2) $7 \rightarrow \pm\sqrt{7}$

(3) $\sqrt{0.4} \cdot 0.4$

(16) $144 < 153 < 169$
 $(12) \times \sqrt{153} < 13$
 整数部分は 12

問13

(1) $-6 < -\sqrt{35}$
 $9 \times 4 = 36 < 35$
 $2 \times 4 = 8 < 35$

(2) $\frac{2}{3}, \sqrt{\frac{2}{3}}, \frac{\sqrt{2}}{3}, \frac{2}{\sqrt{3}}$
 $\frac{4}{9}, \frac{2}{3}, \frac{2}{9}, \frac{4}{3}$
 $\frac{4}{9}, \frac{6}{9}, \frac{2}{9}, \frac{12}{9}$
 ② ③ ① ④

(1) $\sqrt{19-3n}$ 16, 9, 4, 1, 0
 $19-3n=16 \quad 19-3n=9 \quad 19-3n=4 \quad 19-3n=1 \quad 19-3n=0$
 $3n=3 \quad 3n=10 \quad 3n=15 \quad 3n=18 \quad 3n=19$
 $n=1 \quad n=\frac{10}{3} \times \quad n=5 \quad n=6 \quad n=\frac{19}{3} \times$
 $n=1, 5, 6$ a 3 個

問14

(1) $\sqrt{7} = 2.645, \sqrt{70} = 8.367$

① $\sqrt{700} = \sqrt{7} \times \sqrt{100} = 2.645 \times 10 = 26.45$
 ② $\sqrt{0.7} = \sqrt{\frac{70}{100}} = \sqrt{70} \times \frac{1}{10} = 8.367 \times \frac{1}{10} = 0.8367$
 ③ $\sqrt{112} = \sqrt{7 \times 16} = \sqrt{7} \times \sqrt{16} = 2.645 \times 4 = 10.58$

(2) $(3x-a)(bx+5) = cx^2+7x-20$

$3bx^2 + 15x - abx - 5a$
 $3bx^2 + (15-ab)x - 5a$
 $3b = c, 15-ab = 7, -5a = -20$
 $a = 4$
 $15-4b = 7 \rightarrow 4b = 8 \rightarrow b = 2$
 $3 \times 2 = c \rightarrow c = 6$
 $a = 4, b = 2, c = 6$

(3) $x-y=4, xy=3$

$\frac{x^2+y^2}{11}$
 $= \frac{(x-y)^2}{11} + 2xy$
 $= \frac{4^2}{11} + 2 \times 3$
 $= \frac{16}{11} + 6$
 $= \frac{67}{11}$
 (4) $x^2+y^2 = (x-y)^2 + 2xy$

(4) $\sqrt{10a+b}$ 47 自然数 $1 \leq 10a+b \leq 47$

$\sqrt{10a+b} = \sqrt{81}, \sqrt{64}, \sqrt{49}, \sqrt{36}, \sqrt{25}, \sqrt{16}$ など

$\sqrt{10b+a+1}$ など

$\sqrt{81} \times \sqrt{10a+b+1} = \sqrt{19} \times$
 $\sqrt{64} \times \sqrt{10a+b+1} = \sqrt{47} \times$
 $\sqrt{49} \times \sqrt{10a+b+1} = \sqrt{95} \times$

$\sqrt{36} \times \sqrt{10a+b+1} = \sqrt{64} \times$
 $\sqrt{25} \times \sqrt{10a+b+1} = \sqrt{53} \times$
 $\sqrt{16} \times \sqrt{10a+b+1} = \sqrt{62} \times$

$a=3, b=6$

(5) $\sqrt{5}$ 整数部分は b 7b

$4 < 5 < 9$
 $\sqrt{5} < 3$
 $\frac{a-3}{a+2} = \frac{\sqrt{5}-2-3}{\sqrt{5}-2+2} = \frac{\sqrt{5}-5}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{5-5\sqrt{5}}{5} = 1-\sqrt{5}$
 $\begin{cases} b=2 \\ a=\sqrt{5}-2 \end{cases}$
 302 約分!

(6) $\sqrt{1}+5-3 \times 4 \div 2 = 0$
 $(1+2-3) \times \sqrt{4} \div 5 = 0$
 $4 \div 2 + 3 - 5 \times \sqrt{1} = 0$
 $(3+5) \times (\sqrt{4} \div 2 - 1) = 0$
 $(5+\sqrt{1}) \div 3 \times 2 - 4 = 0$
 $5 - (4 \div 2 \times \sqrt{1} + 3) = 0$
 $(2+3-5) \times \sqrt{1} \div 4 = 0$
 $\{2 \times 3 - (5+1)\} \div \sqrt{4} = 0$

問15

$$(1) \sqrt{3} \times \sqrt{7}$$

$$= \sqrt{21}$$

$$(2) \sqrt{\frac{5}{18}} \times \sqrt{10}$$

$$= \frac{\sqrt{5} \times \sqrt{10}}{\sqrt{18}}$$

$$= \frac{5}{3}$$

$$(3) \sqrt{5} \times (\sqrt{3})$$

$$= \frac{2\sqrt{3}}{\sqrt{5}} \times \sqrt{5}$$

$$= \frac{2\sqrt{3}}{5}$$

$$(4) \sqrt{6} + 5\sqrt{7} - \sqrt{6}$$

$$= -\sqrt{7}$$

$$(5) 15\sqrt{3} - \sqrt{27} - \sqrt{12}$$

$$= 5\sqrt{3} - 3\sqrt{3} - 2\sqrt{3}$$

$$= 0$$

$$(6) \frac{12}{\sqrt{5} \times 5} - \sqrt{8}$$

$$= \frac{9}{2} - \sqrt{8}$$

$$= 4\sqrt{5} - 7\sqrt{2}$$

$$= 2\sqrt{2}$$

$$(7) 1\sqrt{5} + \frac{15}{\sqrt{5}} : \sqrt{5}$$

$$= \frac{15}{5} + \frac{15}{5}$$

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

$$(8) (7 + \sqrt{5})(7 - \sqrt{5})$$

$$= 49 - 5$$

$$= 44$$

$$(9) (\sqrt{3} - 1)^2 + \sqrt{3}(\sqrt{3} - \sqrt{3})$$

$$= 3 - 2\sqrt{3} + 1 + \sqrt{3} - 2$$

$$= 4 - 2\sqrt{3} + 2\sqrt{3} - 2$$

$$= 2$$

問16 (1) $\sqrt{700} \times \sqrt{5} \times \sqrt{100}$

$$= 2.621 \times 10$$

$$= 26.26$$

(2) 底面積 8 cm^2 (26)

$$5 \times 10 \times \frac{1}{2} = 60$$

$$10.5 \times 10$$

$$5 \times 18$$

$$\text{面積} \approx 18 \text{ cm}^2 \rightarrow 18 \sqrt{18} \text{ cm}$$

$$= 3\sqrt{5} \text{ cm} = 3 \times 1.41 = 4.23 = 4.2 \text{ cm}$$

(3) $0.27 = x \times y$

$$100x = 27 \times y$$

$$\rightarrow x = \frac{0.27}{y}$$

$$99x = 27$$

$$x = \frac{27}{99}$$

$$x = \frac{3}{11}$$

(4) $x + y = 2\sqrt{3}$ $2y = 5$

$$(x - y)^2 = x^2 - 2xy + y^2$$

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

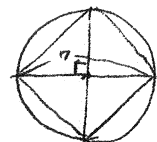
$$= \frac{(x + y)^2 - 2xy}{4} - 2xy$$

$$= \frac{(2\sqrt{3})^2 - 4 \times 5}{4}$$

$$= \frac{12 - 20}{4}$$

$$= -2$$

問17 (1)



直径と対角線と
作る正方形

(2) $7 \times 7 \times \frac{1}{2} = \frac{49}{2}$ ← ひし形(面積の半分の)

面積

$$1.41$$

$$\frac{49}{2} \text{ cm}^2 \rightarrow \sqrt{\frac{49}{2}} \text{ cm}$$

$$\frac{7}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{7\sqrt{2}}{2} \text{ cm}$$

$$= 3.5 \times 1.41$$

$$= 4.935$$

$$= 4.9 \text{ cm} = \underline{4 \text{ cm } 9 \text{ mm}}$$