

[1]

(1)

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

$$\Leftrightarrow (2x+5)(x-2) = 0$$

(2)

$$2x^2 + 5x - 5 = 0$$

$$x = \frac{-5 \pm \sqrt{65}}{4}$$

2本の根は互いに異なる。

$$\frac{5}{x}$$

$$= \frac{20}{-5 \pm \sqrt{65}} \times \frac{\sqrt{65} + 5}{\sqrt{65} + 5} = \frac{5 \pm \sqrt{65}}{2}$$

$$\frac{5+\sqrt{65}}{2} < \frac{5}{x} < \frac{5+\sqrt{65}}{2}$$

∴ $m < \frac{5}{x} < m+1$ を満たす整数 m は 6

(3)

D

$$= (4C-3)^2 - 8(2C^2-C-11)$$

$$= -16C + 97 > 0$$

$C = 1, 3, 6$ の 3

[2]

(1) $\sin A = \frac{4}{5}$

$$\Delta ABC = \frac{1}{2} \cdot 6 \cdot 5 \cdot \frac{4}{5} = 12$$

$$\Delta AID = \frac{1}{2} \cdot 6 \cdot 5 \sin(\cos A) = 12$$

(2)

$$5r - 5r_1 - 5r_3$$

$$= a^2 - b^2 - c^2$$

$$= -2bc \cos A \leftarrow \text{余}$$

$0^\circ < A < 90^\circ$ のとき負... ②

$A = 90^\circ$ のとき 0... ①

$90^\circ < A < 180^\circ$ のとき正... ①

(3) ①②⑤ 使用

$$T = \frac{1}{2} bc \sin A = \frac{abc}{4R}$$

$$T = \frac{1}{2} ca \sin B = \frac{abc}{4R}$$

$$T = \frac{1}{2} ab \sin C = \frac{abc}{4R}$$

∴ $T = T = T$ 又... ③

(4)

$0^\circ < A < 90^\circ$ のとき $ID > BC$... ②

(ΔAID の外接円の半径) $>$

(ΔABC の外接円の半径)

⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

①... ②... ③... ④... ⑤... ⑥... ⑦... ⑧... ⑨... ⑩... ⑪... ⑫...

第2問

(1)

(平均速度)

$$= xz \quad r \dots ②$$

(2)

$$Z = -2(x-2.1) + 4.6$$

$$= -2x + 8.8$$

$$= -2x + \frac{44}{5} \leq 4.8$$

$$\Leftrightarrow -2x \leq -4$$

$$\Leftrightarrow x \geq 2$$

$$\therefore \underline{2.00} \leq x \leq 2.40$$

$$y = xz$$

$$= x(-2x + \frac{44}{5})$$

$$= -2x^2 + \frac{44}{5}x$$

$$= -2(x^2 - \frac{22}{5}x)$$

$$= -2(x - \frac{11}{5})^2 + \frac{242}{25}$$

$x = 2.20$ のとき yz が最大

∴ $x = 2.20$ のとき yz は

$$Z = -4.9 + 8.8 = \underline{4.90}$$

のときの yz は

$$100 \times \frac{25}{242} = \frac{1250}{121} \approx 10.33$$

... ③

[2]

(1) ①②③④

(2) ①②③④⑤⑥⑦⑧⑨⑩⑪⑫

(3) ①②③④⑤⑥⑦⑧⑨⑩⑪⑫

(4) ①②③④⑤⑥⑦⑧⑨⑩⑪⑫

第3問

(1)

$$(i) P_A\left(\frac{1}{2}\right) = \frac{3}{8}$$

$$P_B\left(\frac{1}{3}\right) = \frac{4}{9}$$

$$(ii) P_W(A) = \frac{P(A \cap W)}{P(W)}$$

$$= \frac{P(A \cap W)}{P(W)} = \frac{P(B \cap W)}{P(W)}$$

$$= \frac{\frac{3}{8} + \frac{4}{9}}{\frac{3}{8} + \frac{4}{9}} = 1 - \frac{21}{59}$$

$$= \frac{21}{59}$$

$$= \frac{21}{59}$$

$$= \frac{21}{59}$$

$$= \frac{21}{59}$$

(2)

$P_w(A) < P_w(B)$ の比は
① < ② の比に等しい。又...③

(3)

$$P(A|NW) = \frac{1}{3} \cdot 3C_1 \left(\frac{1}{2}\right)^3 = \frac{1}{8}$$

$$P(B|NW) = \frac{1}{3} \cdot 3C_1 \cdot \frac{1}{3} \cdot \left(\frac{2}{3}\right)^2 = \frac{4}{27}$$

$$P(C|NW) = \frac{1}{3} \cdot 3C_1 \cdot \frac{1}{4} \cdot \left(\frac{3}{4}\right)^2 = \frac{9}{64}$$

$P_w(A)$

$$= \frac{\frac{1}{8}}{\frac{1}{8} + \frac{4}{27} + \frac{9}{64}}$$

$$= \frac{216}{715} \#$$

(4)

$$P(A|NW) = \frac{1}{4} \cdot 4C_1 \left(\frac{1}{2}\right)^3 = \frac{1}{8}$$

$$P(B|NW) = \frac{1}{3} \left(\frac{2}{3}\right)^2 = \frac{4}{27}$$

$$P(C|NW) = \frac{1}{4} \left(\frac{3}{4}\right)^2 = \frac{9}{64}$$

$$P(D|NW) = \frac{1}{5} \left(\frac{4}{5}\right)^2 = \frac{16}{125}$$

B, C, D, A の順で高し

よ...⑤

第4問

(1) 偶数が2回 奇数が3回
で P_0 と P_1 に移動.

(2) $5x - 3y = 8$

$$x = 2x + 3k$$

$$y = 3x + 5k$$

$$\downarrow 0 \leq y < 5$$

$$0 \leq 2x + 3k < 5$$

$$k = -4 \text{ のとき } x = 4, y = 4$$

これは8回投げて偶数が4, 4
なす P_0 と P_2 だ.

(3) 偶数3回で1周なので

偶数1回, 奇数4回で

再びこれになる5回で P_0 と P_2 だ.

(4)

$P_0 \dots$ 偶2

$P_1 \dots$ 偶1奇3

$P_2 \dots$ 奇1

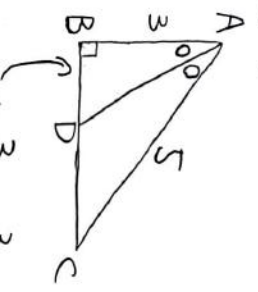
$P_3 \dots$ 偶2奇4

$P_4 \dots$ 偶1奇5

よ...③

よ...⑥

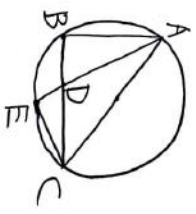
第5問



$$4 \times \frac{3}{8} = \frac{3}{2} \#$$

$$AD = \sqrt{9 + \frac{9}{4}}$$

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



方針

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

$$\therefore DE = \frac{\sqrt{5}}{2}$$

$$\therefore AE = AD + DE = \frac{9\sqrt{5}}{2} \#$$

$\triangle AHP \sim \triangle ABD$

$$\text{よ) } AP = \sqrt{5}r \#$$

$$PC = PQ = 5 - r \#$$

方針

$$PF \cdot PQ = AP \cdot PE$$

$$\Leftrightarrow r(5-r) = \sqrt{5}r \cdot (9\sqrt{5} - \sqrt{5}r)$$

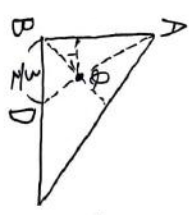
$$\Leftrightarrow 5 - r = 10 - 5r$$

$$\therefore r = \frac{5}{4} \#$$

$\triangle ABC$ の内接円 $\odot O$ の半径 r は

$$\frac{1}{2} \cdot 3 \cdot 4 = \frac{1}{2} (3+4+5)r$$

$$\therefore r = 1 \#$$

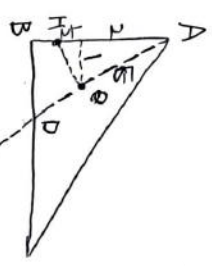


$$AQ = AD \times \frac{2}{3}$$

$$= \sqrt{5} \#$$

$$AH = \sqrt{AP^2 - r^2}$$

$$= 2r = \frac{5}{2} \#$$



よ...①

方針逆

$AH \cdot AB = AQ \cdot AD$ は成立

$AH \cdot AB = AQ \cdot AE$ は不成立