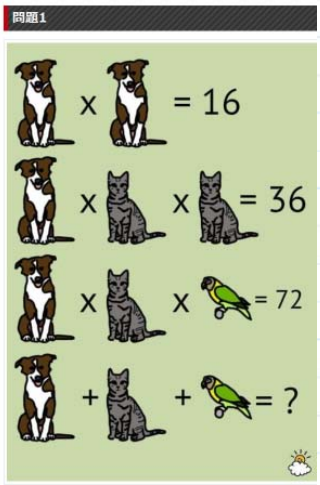
Lesson 1. Mathcadでクイズ問題を解こう



Q.1

$$D \cdot D = 16 \xrightarrow{solve, D} \begin{bmatrix} 4 \\ -4 \end{bmatrix}$$

$$D \cdot C \cdot C = 36 \xrightarrow[solve, C]{substitute, D = 4} \begin{bmatrix} 3 \\ -3 \end{bmatrix}$$

$$D \cdot C \cdot C = 36 \xrightarrow[solve, C]{substitute, D = -4} \begin{bmatrix} 3i \\ -3i \end{bmatrix}$$

$$D \cdot C \cdot P = 72 \xrightarrow[solve, P]{\substack{substitute, D = 4 \\ substitute, C = 3}} 6 \qquad \begin{aligned} D &:= 4 \\ C &:= 3 \\ P &:= 6 \end{aligned}$$

$$D + C + P = 13$$

$\mathbf{clear}(D, C, P)$

$$D \cdot C \cdot P = 72 \xrightarrow[solve, P]{\substack{substitute, D = 4 \\ substitute, C = -3}} -6 \qquad \begin{aligned} D &:= 4 \\ C &:= -3 \\ P &:= -6 \end{aligned}$$

$$D + C + P = -5$$

$\mathbf{clear}(D, C, P)$

$$D \cdot C \cdot P = 72 \xrightarrow[solve, P]{\substack{substitute, D = -4 \\ substitute, C = 3i}} 6i \qquad \begin{aligned} D &:= -4 \\ C &:= 3i \\ P &:= 6i \end{aligned}$$

$$D + C + P = -4 + 9i$$

$\mathbf{clear}(D, C, P)$

$$D \cdot C \cdot P = 72 \xrightarrow[solve, P]{\substack{substitute, D = -4 \\ substitute, C = -3i}} -6i \qquad \begin{aligned} D &:= -4 \\ C &:= -3i \\ P &:= -6i \end{aligned}$$

$$D + C + P = -4 - 9i$$

Q.2

$$S\cdot S\cdot S=125 \xrightarrow{solve,S} \begin{bmatrix} 5 \\ -\frac{5}{2}+\frac{5i\cdot\sqrt{3}}{2} \\ -\frac{5}{2}-\frac{5i\cdot\sqrt{3}}{2} \end{bmatrix}$$

$\mathbf{clear}(S,D,M)$

$$S\cdot D=55 \xrightarrow[solve,D]{substitute,S=5} 11$$

$$D\cdot M+S=38 \xrightarrow[substitute,D=11]{substitute,S=5,\ solve,M} 3$$

$S:=5 \qquad D:=11 \qquad M:=3 \qquad D+M=14$

$\mathbf{clear}(S,D,M)$

$$S\cdot D=55 \xrightarrow[solve,D]{substitute,S=-\frac{5}{2}+\frac{5i\cdot\sqrt{3}}{2}} -\frac{11}{2}-\frac{11i\cdot\sqrt{3}}{2}$$

$$D\cdot M+S=38 \xrightarrow[solve,M]{substitute,S=-\frac{5}{2}+\frac{5i\cdot\sqrt{3}}{2},\ substitute,D=-\frac{11}{2}-\frac{11i\cdot\sqrt{3}}{2}} -\frac{3}{2}+\frac{43i\cdot\sqrt{3}}{22}$$

$S:=-\frac{5}{2}+\frac{5i\cdot\sqrt{3}}{2} \qquad D:=-\frac{11}{2}-\frac{11i\cdot\sqrt{3}}{2} \qquad M:=-\frac{3}{2}+\frac{43i\cdot\sqrt{3}}{22}$

$D+M=-7-6.141i$

$\mathbf{clear}(S,D,M)$

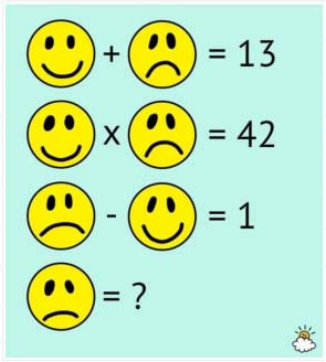
$$S\cdot D=55 \xrightarrow[solve,D]{substitute,S=-\frac{5}{2}-\frac{5i\cdot\sqrt{3}}{2}} -\frac{11}{2}+\frac{11i\cdot\sqrt{3}}{2}$$

$$D\cdot M+S=38 \xrightarrow[solve,M]{substitute,S=-\frac{5}{2}-\frac{5i\cdot\sqrt{3}}{2},\ substitute,D=-\frac{11}{2}+\frac{11i\cdot\sqrt{3}}{2}} -\frac{3}{2}-\frac{43i\cdot\sqrt{3}}{22}$$

$$S := -\frac{5}{2} - \frac{5i \cdot \sqrt{3}}{2} \qquad D := -\frac{11}{2} + \frac{11i \cdot \sqrt{3}}{2} \qquad M := -\frac{3}{2} - \frac{43i \cdot \sqrt{3}}{22}$$

$D + M = -7 + 6.141i$

問題3

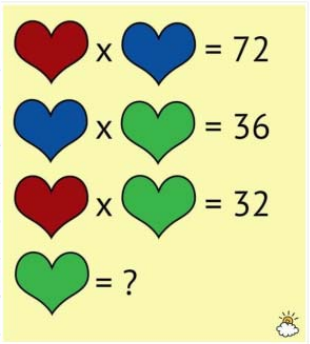


Q.3

推定値 $S := 0 \quad N := 0$

制約条件
$S + N = 13$
$S \cdot N = 42$
$N - S = 1$

ソルバー $\begin{bmatrix} S \\ N \end{bmatrix} := \text{find}(S, N)$ $\begin{bmatrix} S \\ N \end{bmatrix} = \begin{bmatrix} 6 \\ 7 \end{bmatrix}$



回答はこちら

問題1：13
問題2：14
問題3：7
問題4：4

Q.4

推定値 $R := 1 \quad B := 1 \quad G := 1$

制約条件
$R \cdot B = 72$
$B \cdot G = 36$
$R \cdot G = 32$

ソルバー $\begin{bmatrix} R \\ B \\ G \end{bmatrix} := \text{find}(R, B, G)$ $\begin{bmatrix} R \\ B \\ G \end{bmatrix} = \begin{bmatrix} 8 \\ 9 \\ 4 \end{bmatrix}$

$G = 4$

Q.4

推定値 $R := -1 \quad B := -1 \quad G := -1$

制約条件
$R \cdot B = 72$
$B \cdot G = 36$
$R \cdot G = 32$

ソルバー $\begin{bmatrix} R \\ B \\ G \end{bmatrix} := \text{find}(R, B, G)$ $\begin{bmatrix} R \\ B \\ G \end{bmatrix} = \begin{bmatrix} -8 \\ -9 \\ -4 \end{bmatrix}$

$G = -4$

$\mathbf{clear}(D, C, P)$

推定値 $D := 1 \quad C := 1 \quad P := 1$

制約条件
$D \cdot D = 16$
$D \cdot C \cdot C = 36$
$D \cdot C \cdot P = 72$

ソルバー $\begin{bmatrix} D \\ C \\ P \end{bmatrix} := \mathbf{find}(D, C, P)$ $\begin{bmatrix} D \\ C \\ P \end{bmatrix} = \begin{bmatrix} 4 \\ 3 \\ 6 \end{bmatrix}$ $D + C + P = 13$

推定値 $D := 1 \quad C := -1 \quad P := 1$

制約条件
$D \cdot D = 16$
$D \cdot C \cdot C = 36$
$D \cdot C \cdot P = 72$

ソルバー $\begin{bmatrix} D \\ C \\ P \end{bmatrix} := \mathbf{find}(D, C, \mathbf{P})$ $\begin{bmatrix} D \\ C \\ P \end{bmatrix} = \begin{bmatrix} 4 \\ -3 \\ -6 \end{bmatrix}$ $D + C + P = -5$

$\mathbf{clear}(D, C, P)$

推定値 $D := -1 \quad C := -1\mathrm{i} \quad P := 1$

制約条件
$D \cdot D = 16$
$D \cdot C \cdot C = 36$
$D \cdot C \cdot P = 72$

ソルバー $\begin{bmatrix} D \\ C \\ P \end{bmatrix} := \mathbf{find}(D, C, P)$ $\begin{bmatrix} D \\ C \\ P \end{bmatrix} = \begin{bmatrix} -4 \\ -3\mathrm{i} \\ -6\mathrm{i} \end{bmatrix}$ $D + C + P = -4 - 9\mathrm{i}$

推定値 $D := -1 \quad C := 1\mathrm{i} \quad P := 1$

制約条件
$D \cdot D = 16$
$D \cdot C \cdot C = 36$
$D \cdot C \cdot P = 72$

ソルバー $\begin{bmatrix} D \\ C \\ P \end{bmatrix} := \mathbf{find}(D, C, \mathbf{P})$ $\begin{bmatrix} D \\ C \\ P \end{bmatrix} = \begin{bmatrix} -4 \\ 3\mathrm{i} \\ 6\mathrm{i} \end{bmatrix}$ $D + C + P = -4 + 9\mathrm{i}$

$\mathbf{clear}(S, D, M)$

推定値 $S := 1 \quad D := 1 \quad M := 1$

制約条件
$S \cdot S \cdot S = 125$
$S \cdot D = 55$
$D \cdot M + S = 38$

ソルバー $\begin{bmatrix} S \\ D \\ M \end{bmatrix} := \mathbf{find}(S, D, \mathbf{M})$ $D + M = 14$

$\mathbf{clear}(S, D, M)$

推定値 $S := -1\mathrm{i} \quad D := -1 \quad M := -1$

制約条件
$S \cdot S \cdot S = 125$
$S \cdot D = 55$
$D \cdot M + S = 38$

ソルバー $\begin{bmatrix} S \\ D \\ M \end{bmatrix} := \mathbf{find}(S, D, \mathbf{M})$ $D + M = -7 + 6.141\mathrm{i}$

$\mathbf{clear}(S, D, M)$

推定値 $S := -1\mathrm{i} \quad D := -11\mathrm{i} \quad M := -7 - 1\mathrm{i}$

制約条件
$S \cdot S \cdot S = 125$
$S \cdot D = 55$
$D \cdot M + S = 38$

ソルバー $\begin{bmatrix} S \\ D \\ M \end{bmatrix} := \mathbf{find}(S, D, M)$ $D + M = -7 - 6.141\mathrm{i}$