

1. Jawaban : D

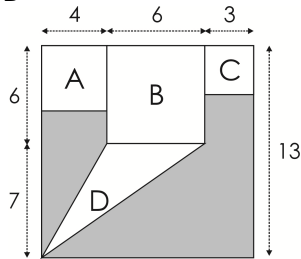
$$\begin{aligned}
6(3^{40})^{(2\log a)} + 3^{41}(2\log a) &= 3^{41} \\
\iff 2 \cdot 3^{41} \cdot 2 \log a + 3^{41} \cdot 2 \log a &= 3^{43} \\
\iff (2+1) [3^{41} \cdot 2 \log a] &= 3^{43} \\
\iff 3^{42} \cdot 2 \log a &= 3^{43} \\
\iff 2 \log a &= \frac{3^{43}}{3^{42}} \\
\iff 2 \log a &= 3 \\
\iff a &= 2^3 = 8
\end{aligned}$$

2. Jawaban : C

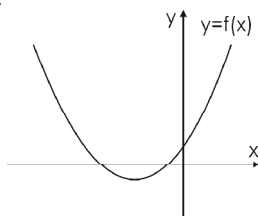
Karena 2 adalah satu-satunya akar, maka persamaan kuadrat dapat dikonstruksi dengan

$$\begin{aligned}
\iff (x-2)^2 &= 0 \\
\iff x^2 - 4x + 4 &= 0 \\
\iff \frac{1}{4}x^2 - x + 1 &= 0 \\
\iff \frac{1}{4}x^2 + ax + b &= 0
\end{aligned}$$

sehingga diperoleh nilai $a = -1$ dan $b = 1$.
Jadi nilai $a + b = 0$

3. Jawaban : D

$$\begin{aligned}
L_{arsir} &= L_{persegi} - (A + B + C + D) \\
&= 13^2 - \left(16 + 36 + 9 + \left(\frac{1}{2} \cdot 6 \cdot 7 \right) \right) \\
&= 169 - 82 = 87
\end{aligned}$$

4. Jawaban : A

Analisis $f(x) = ax^2 + bx + c$

- grafik terbuka ke atas
 $\iff a > 0$
- sumbu simetri di sebelah kiri sumbu y
 $\iff a$ dan b bertanda sama
 $\iff b > 0$
- titik potong grafik dengan sumbu y di atas sumbu x
 $\iff c > 0$

Jadi pilihan yang tepat adalah $ab > 0$ dan $a + b + c > 0$

5. Jawaban : B

$$\begin{aligned}
\text{Premis 1} &: p \implies q \\
\text{Premis 2} &: \sim q \vee \sim r \equiv q \implies \sim r \\
\text{Kesimpulan} &: p \implies \sim r \equiv p \vee \sim r
\end{aligned}$$

6. Jawaban : A

$$\begin{aligned}
&\cos^2(15^\circ) + \cos^2(35^\circ) + \cos^2(55^\circ) + \cos^2(75^\circ) \\
&= (\cos^2(15^\circ) + \cos^2(75^\circ)) + (\cos^2(35^\circ) + \cos^2(55^\circ)) \\
&= (\sin^2(75^\circ) + \cos^2(75^\circ)) + (\sin^2(55^\circ) + \cos^2(55^\circ)) \\
&= 1 + 1 = 2
\end{aligned}$$

7. Jawaban : B

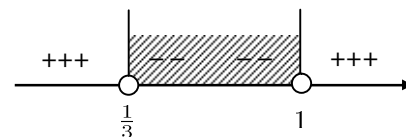
- perhatikan persamaan (i) dan (ii)
 $x + y = -1$
 $-x + 3y = -11$
jika diselesaikan akan menghasilkan $(2, -3)$

agar sistem tersebut mempunyai penyelesaian maka $(2, -3)$ juga harus memenuhi persamaan (iii), sehingga

$$\begin{aligned}
\iff a \cdot 2 + b \cdot (-3) &= 4 \\
\iff 2a - 3b &= 4 \\
\iff 3b - 2a &= -4
\end{aligned}$$

8. Jawaban : A

$$\begin{aligned}
&\frac{x^2 + 2x + 2}{(3x^2 - 4x + 1)(x^2 + 1)} \leq 0 \\
\iff \frac{1}{(3x - 1)(x - 1)} &\leq 0
\end{aligned}$$



Jadi nilai x yang memenuhi adalah $\frac{1}{3} < x < 1$

9. Jawaban : E

Dilihat dari grafik yang disajikan maka pilihan yang paling tepat adalah E

10. Jawaban : D

Dengan uji gradien, agar $f(x, y)$ maksimum di titik potong kedua fungsi kendala, yaitu di $(2, 3)$, maka haruslah berlaku

$$\begin{aligned}
\iff -3 &\leq -\frac{c}{4} \leq -\frac{1}{2} \\
\iff -12 &\leq -c \leq -2 \\
\iff 2 &< c < 12
\end{aligned}$$

11. Jawaban : B

- $f(x-1) = x+2 \implies f(x) = x+3$
- $g(x) = \frac{-x+2}{x+3} \implies g^{-1}(x) = \frac{-3x+2}{x+1}$

Jadi

$$\begin{aligned}(g^{-1} \circ f)(1) &= g^{-1}(f(1)) \\ &= g^{-1}(1+3) = g^{-1}(4) \\ &= \frac{(-3 \cdot 4) + 2}{4 + 1} \\ &= \frac{-10}{5} = -2\end{aligned}$$

12. Jawaban : B

- $S_{10} = 220$
 $\iff \frac{10}{2}(2a+9b) = -110$
 $\iff 2a+9b = 22 \dots (i)$
- $U_{11} + U_{12} = 2$
 $\iff (a+10b) + (a+11b) = 2$
 $\iff 2a+21b = 2 \dots (ii)$

dari (i) dan (ii) maka diperoleh $a = -20$ dan $b = 2$. Jadi

$$\begin{aligned}S_2 &= \frac{2}{2}(2 \cdot (-20) + 2) \\ &= -40 + 2 = -38\end{aligned}$$

13. Jawaban : D

$$BA : a - 16, a, a + 16$$

$$BG : a - 6, a, a + 9$$

sehingga berlaku

$$\iff U_2^2 = U_1 \cdot U_2$$

$$\iff a^2 = (a-6)(a+9)$$

$$\iff a^2 = a^2 + 3a - 54$$

$$\iff 3a = 54$$

Jadi jumlah tiga bilangan semula adalah

$$3a = 54$$

14. Jawaban : E

- $A = B - 300.000$
- $C = D + 200.000$
- $D = 500.000$
- $C + D = 2A$

sehingga

- $C = 500.000 + 200.000 = 700.000$
- $A = \frac{700.000 + 500.000}{2} = 600.000$
- $B = 600.000 + 300.000 = 900.000$

15. Jawaban : C

$$A \begin{pmatrix} 2 \\ 1 \\ 4 \\ 6 \end{pmatrix} = \begin{pmatrix} 1 \\ 0 \\ 0 \\ 2 \end{pmatrix} \left. \vphantom{\begin{pmatrix} 2 \\ 1 \\ 4 \\ 6 \end{pmatrix}} \right\} A \begin{pmatrix} 2 & 4 \\ 1 & 6 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$$

sehingga

$$\iff A = \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix} \cdot \begin{pmatrix} 2 & 4 \\ 1 & 6 \end{pmatrix}^{-1}$$

$$\iff A = \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix} \cdot \frac{1}{8} \begin{pmatrix} 6 & -4 \\ -1 & 2 \end{pmatrix}$$

$$\iff A = \frac{1}{8} \begin{pmatrix} 6 & -4 \\ -2 & 4 \end{pmatrix}$$

$$\iff A = \begin{pmatrix} \frac{3}{4} & -\frac{1}{2} \\ -\frac{1}{4} & \frac{1}{2} \end{pmatrix}$$

Jadi

$$\begin{aligned}A \begin{pmatrix} 4 & 2 \\ 2 & 3 \end{pmatrix} &= \begin{pmatrix} \frac{3}{4} & -\frac{1}{2} \\ -\frac{1}{4} & \frac{1}{2} \end{pmatrix} \cdot \begin{pmatrix} 4 & 2 \\ 2 & 3 \end{pmatrix} \\ &= \begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}\end{aligned}$$