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SMAN 1 Bone-Bone, Luwu Utara, Sul-Sel

Kegagalan dapat dibagi menjadi dua sebab. Yakni orang yang berpikir tapi tidak pernah bertindak dan orang yang bertindak tapi tidak pernah berpikir (W.A. Nance)

[RUMUS CEPAT MATEMATIKA]

Gradien Garis

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Materi ini dapat disebarluaskan secara bebas, untuk tujuan bukan komersial, dengan atau tanpa menyertakan sumber. Hak Cipta selamanya pada Allah Swt. Salam hangat selalu ...
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1. UMPTN 1996

Jika ${}^4\log(4^x \cdot 4) = 2 - x$, maka $x = \dots$

- A. -1
- B. $-\frac{1}{2}$
- C. $\frac{1}{2}$
- D. 1
- E. 2

Solusi

Remember

- 📁 $a^m \cdot a^n = a^{m+n}$
- 📁 ${}^a\log u = v \Leftrightarrow u = a^v$

📁 ${}^4\log(4^x \cdot 4) = 2 - x$
 ${}^4\log 4^{x+1} = 2 - x$
 $4^{x+1} = 4^{2-x} \rightarrow x + 1 = 2 - x$
 $x = \frac{1}{2}$

2. UMPTN 1996

Jika x_1 dan x_2 adalah akar-akar persamaan $\log(x^2 + 7x + 20) = 1$, maka $(x_1 + x_2)^2 - 4x_1 \cdot x_2$ adalah....

- A. 49
- B. 29
- C. 20
- D. 19
- E. 9

Solusi

Remember

✂ Akar-akar $ax^2 + bx + c = 0$, x_1 dan x_2

Maka :

$$\text{✂ } x_1 + x_2 = -\frac{b}{a}$$

$$\text{✂ } x_1 \cdot x_2 = \frac{c}{a}$$

$$\begin{aligned} \text{✂ } \log(x^2 + 7x + 20) = 1 &= \log 10 \\ x^2 + 7x + 20 = 10 &\rightarrow x^2 + 7x + 10 = 0 \\ (x_1 + x_2)^2 - 4x_1 \cdot x_2 &= (-7)^2 - 4 \cdot 10 = 9 \end{aligned}$$

3. UMPTN 1996

Jika ${}^a\log(1-{}^3\log\frac{1}{27}) = 2$, maka nilai a yang memenuhi adalah....

- A. $\frac{1}{8}$
- B. $\frac{1}{4}$
- C. 2
- D. 3
- E. 4

Solusi

Remember

$$\nabla \quad {}^a\log u = v \Leftrightarrow u = a^v$$

$$\nabla \quad {}^a\log(1-{}^3\log\frac{1}{27}) = 2 \rightarrow 1-{}^3\log\frac{1}{27} = a^2$$

$$1 - {}^3\log 3^{-3} = a^2$$

$$1 - (-3) = a^2$$

$$a^2 = 4 \rightarrow a = 2$$

4. UMPTN 1997

Jika $2 \log x + \log 6x - \log 2x - \log 27 = 0$, maka x sama dengan....

- A. 3
- B. -3
- C. 3 atau -3
- D. 9
- E. 9 atau -9

Solusi

Remember

- 📁 ${}^a \log x + {}^a \log y = {}^a \log x.y$
- 📁 ${}^a \log x - {}^a \log y = {}^a \log \frac{x}{y}$

$$\text{📁 } 2 \log x + \log 6x - \log 2x - \log 27 = 0$$

$$\log \frac{x^2 \cdot 6x}{2x \cdot 27} = \log 1 \rightarrow \frac{x^2}{9} = 1$$

$$x^2 = 9, \text{ berarti } x = 3$$

5. **UMPTN 1997**

Jika $b = a^4$, a dan b positif, maka ${}^a\log b - {}^b\log a$ adalah....

- A. 0
- B. 1
- C. 2
- D. $3\frac{3}{4}$
- E. $4\frac{1}{4}$

Solusi

Remember

📁 Jika $x = y^n$ maka $y = x^{\frac{1}{n}}$

$$\begin{aligned}\text{📁 } {}^a\log b - {}^b\log a &= {}^a\log a^4 - {}^b\log b^{\frac{1}{4}} \\ &= 4 - \frac{1}{4} = 3\frac{3}{4}\end{aligned}$$

6. UMPTN 1997

Jumlah dari penyelesaian persamaan :

$${}^2\log^2 x + 5^2\log x + 6 = 0 \text{ sama dengan....}$$

- A. $\frac{1}{4}$
- B. $\frac{3}{4}$
- C. $\frac{1}{8}$
- D. $\frac{3}{8}$
- E. $-\frac{5}{8}$

Solusi

Remember

📁 ${}^a\log f(x) = p$ maka :
 $f(x) = a^p$

$$\begin{aligned} \text{✎ } & {}^2\log^2 x + 5^2\log x + 6 = 0 \\ & ({}^2\log x + 2)({}^2\log x + 3) = 0 \\ & {}^2\log x = -2 \text{ atau } {}^2\log x = -3 \\ & x = 2^{-2} = \frac{1}{4} \text{ atau } x = 2^{-3} = \frac{1}{8} \end{aligned}$$

$$\text{✎ } \text{Maka : } x_1 + x_2 = \frac{1}{4} + \frac{1}{8} = \frac{3}{8}$$

7. UMPTN 1997

Jika ${}^9\log 8 = p$, maka ${}^4\log \frac{1}{3}$ sama dengan....

A. $-\frac{3}{2p}$

B. $-\frac{3}{4p}$

C. $-\frac{2}{3p}$

D. $-\frac{4}{3p}$

E. $-\frac{6}{4p}$



Triks

Remember

☞ Posisi basis terbalik :

$${}^9\log 8 = p \Rightarrow {}^4\log \frac{1}{3} = \frac{-1.3}{2p} = -\frac{3}{4p}$$

8. UMPTN 1998

Dari sistem persamaan ${}^5\log x + {}^5\log y = 5$ dan ${}^5\log x^3 - {}^5\log y^4 = 1$, nilai $x + y$ adalah....

- A. 50
- B. 75
- C. 100
- D. 150
- E. 200

Solusi

Remember

$$\text{✎ } {}^5\log x + {}^5\log y = 5 \rightarrow 3^5 \log x + 3^5 \log y = 15$$

$${}^5\log x^3 - {}^5\log y^4 = 1 \rightarrow 3^5 \log x - 4^5 \log y = 1$$

$$\text{-----}$$
$$7^5 \log y = 14$$

$${}^5\log y = 2 \rightarrow y = 5^2 = 25$$

$${}^5\log x = 3 \rightarrow x = 5^3 = 125$$

$$\text{Jadi : } x + y = 25 + 125 = 150$$

9. UMPTN 1998

Nilai x yang memenuhi ketaksamaan ${}^2\log(2x+7) > 2$ adalah.....

A. $x > -\frac{7}{2}$

B. $x > -\frac{3}{2}$

C. $-\frac{7}{2} < x < -\frac{3}{2}$

D. $-\frac{7}{2} < x < 0$

E. $-\frac{3}{2} < x < 0$

Solusi

Remember

📁 Jika ${}^a\log f(x) > p$, maka :

(i) $f(x) > a^p$

(ii) $f(x) > 0$

📁 ${}^2\log(2x+7) > 2 \rightarrow$ (i) $2x + 7 > 4$

$$x > -\frac{3}{2}$$

(ii) $2x + 7 > 0$

$$x > -\frac{7}{2}$$

Gabungan (i) dan (ii) di dapat : $x > -\frac{3}{2}$

10. UMPTN 1999

Nilai x yang memenuhi persamaan :

$${}^{(3x+5)}\log 27 = {}^3\log 3 \text{ adalah...}$$

- A. 42
- B. 41
- C. 39
- D. $7\frac{2}{3}$
- E. $7\frac{1}{3}$



Solusi

Remember

$$\text{✉ } {}^{3x+5}\log 27 = 1 \rightarrow 27 = 3x + 5$$

$$3x = 22$$

$$x = \frac{22}{3} = 7\frac{1}{3}$$

11. UMPTN 1999

Diketahui $\log 2 = 0,3010$ dan $\log 3 = 0,4771$ maka

$$\log(\sqrt[3]{2} \cdot \sqrt{3}) = \dots$$

- A. 0,1505
- B. 0,1590
- C. 0,2007
- D. 0,3389
- E. 0,3891

Solusi

Remember

$$\begin{aligned} \log(\sqrt[3]{2} \cdot \sqrt{3}) &= \log 2^{1/3} + \log 3^{1/2} \\ &= 1/3 \log 2 + 1/2 \log 3 \\ &= 1/3(0,3010) + 1/2(0,4771) \\ &= 0,3389 \end{aligned}$$

12. Prediksi SPMB

Jika x_1 dan x_2 memenuhi persamaan :

$$(2\log x - 1) \frac{1}{x \log 10} = \log 10, \text{ maka } x_1 \cdot x_2 = \dots$$

- A. $5 \oplus 10$
- B. $4 \oplus 10$
- C. $3 \oplus 10$
- D. $2 \oplus 10$
- E. $\oplus 10$

Solusi

Remember

$$\text{✉ } (2\log x - 1) \frac{1}{x \log 10} = \log 10$$

$$(2\log x - 1) \log x = 1$$

$$2\log^2 x - \log x - 1 = 0$$

$$\log x_1 \cdot x_2 = -\frac{b}{a} = \frac{1}{2} \rightarrow x_1 \cdot x_2 = 10^{\frac{1}{2}} = \sqrt{10}$$

13. Prediksi SPMB

Jumlah dari nilai x yang memenuhi persamaan

$${}^3\log x({}^3\log x + 4) + 3 = 0 \text{ adalah....}$$

- A. $\frac{4}{27}$
- B. $\frac{8}{27}$
- C. $\frac{10}{27}$
- D. $\frac{13}{27}$
- E. $\frac{16}{27}$

Solusi

Remember

$$\begin{aligned} \text{✎ } & {}^3\log x({}^3\log x + 4) + 3 = 0 \\ & {}^3\log^2 x + 4{}^3\log x + 3 = 0 \\ & ({}^3\log x + 1)({}^3\log x + 3) = 0 \\ & {}^3\log x = -1 \quad \text{atau} \quad {}^3\log x = -3 \\ & x = 3^{-1} = \frac{1}{3} \quad \text{atau} \quad x = 3^{-3} = \frac{1}{27} \end{aligned}$$

$$\text{✎ Jadi : } \frac{1}{3} + \frac{1}{27} = \frac{10}{27}$$

14. Prediksi SPMB

Jika ${}^2\log \frac{1}{a} = \frac{3}{2}$ dan ${}^{16}\log b = 5$, maka ${}^a\log \frac{1}{b^3} = ..$

- A. 40
- B. -40
- C. $\frac{40}{3}$
- D. $-\frac{40}{3}$
- E. 20

Solusi

Remember

$$\text{✎ } {}^2\log \frac{1}{a} = \frac{3}{2} \rightarrow a = 2^{-\frac{3}{2}}$$

$${}^{16}\log b = 5 \rightarrow b = 16^5$$

$$\text{✎ } {}^a\log \frac{1}{b^3} = -3^a \log b = -3^{2^{-\frac{3}{2}}} \log 16^5$$

$$= -15^{2^{-\frac{3}{2}}} \log 2^4 = -15 \cdot \frac{4}{-\frac{3}{2}} \log 2$$

$$= -15 \cdot \frac{8}{-3} = 40$$

15. Prediksi SPMB

Nilai x yang memenuhi $({}^b \log x)^2 + 10 < 7 \cdot {}^b \log x$ dengan $b > 1$ adalah....

- A. $2 < x < 5$
- B. $x < 2$ atau $x > 5$
- C. $b^2 < x < b^5$
- D. $x < b^2$ atau $x > b^5$
- E. $2b < x < 5b$

Solusi

Remember

- ✎ $({}^b \log x)^2 + 10 < 7 \cdot {}^b \log x$
 ${}^b \log^2 x - 7 \log x + 10 < 0$
 $({}^b \log x - 2)({}^b \log x - 5) < 0$
Pembuat Nol : $x = b^2$ atau $x = b^5$
Pert. "Kecil" jawaban pasti terpadu
- ✎ Jadi : $b^2 < x < b^5$

16. Jika $\log(y + 7) + 2\log x = 2$, maka

A. $y = \frac{100x^2}{7}$

B. $y = \frac{7}{100} - x^2$

C. $y = \frac{100}{7x^2}$

D. $y = \frac{100}{x^2} - 7$

E. $y = 100 - x^2$

Solusi

Remember

☞ $\log(y + 7) + 2\log x = 2$

$$\log(y + 7) + \log x^2 = \log 10^2$$

$$x^2(y + 7) = 10^2 \rightarrow y + 7 = \frac{100}{x^2}$$

$$y = \frac{100}{x^2} - 7$$