

stress test

1. $\frac{6x-3y}{2} - \frac{x+4y}{3} - \frac{4x-5y}{6}$ 的值为?
[배점 2, 하중]

- ① $2x+2y$ ② $2x-2y$ ③ $x+y$
④ $x+2y$ ⑤ $2x+y$

해설

$$\begin{aligned} & \left(\frac{6x-3y}{2} - \frac{x+4y}{3} - \frac{4x-5y}{6} \right) \\ &= \frac{3(6x-3y) - 2(x+4y) - (4x-5y)}{6} \\ &= \frac{12x-12y-2x-8y-4x+5y}{6} \\ &= 2x-2y \end{aligned}$$

2. $(5x-2y)(-3y)$ 的值为?
[배점 2, 하중]

- ① $-15xy-6y^2$ ② $-15xy-5y^2$
③ $-15xy+6y^2$ ④ $15xy+5y^2$
⑤ $15xy+6y^2$

해설

$$\begin{aligned} & (5x-2y)(-3y) \\ &= 5x \times (-3y) + (-2y) \times (-3y) \\ &= -15xy+6y^2 \end{aligned}$$

3. $A = \frac{2x-y}{2}$, $B = \frac{x+3y+2}{3}$ 时, $A - \{2A - 3B - 3(A - 2B)\}$ 的值为?
[배점 2, 하중]

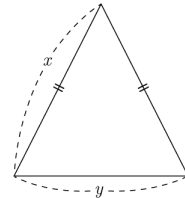
▶ 답:

▶ 정답: $x-4y-2$

해설

$$\begin{aligned} & (A - \{2A - 3B - 3(A - 2B)\}) \\ &= A - (2A - 3B - 3A + 6B) \\ &= A - (-A + 3B) = 2A - 3B \\ & A, B \text{ 的值代入} \\ & (A - \{2A - 3B - 3(A - 2B)\}) = 2x - y - (x + 3y + 2) = x - 4y - 2 \end{aligned}$$

4. 如图, $\triangle ABC$ 中, $AB=AC$, $\angle A=16^\circ$, $\angle B$ 的平分线交 AC 于 D , $\angle CDB$ 的度数为?
[배점 2, 하중]



[배점 2, 하중]

▶ 답:

▶ 정답: $y = -2x + 16$

해설

$$\begin{aligned} & \text{在} \triangle ABC \text{ 中, } AB=AC, \angle A=16^\circ, \angle B \text{ 的平分线交 } AC \text{ 于 } D, \\ & \angle CDB \text{ 的度数为?} \\ & \text{解: } \angle A=16^\circ, \angle B=\angle C=72^\circ, \angle ABD=\angle CBD=36^\circ, \\ & \angle CDB=180^\circ - \angle C - \angle CBD = 180^\circ - 72^\circ - 36^\circ = 72^\circ \end{aligned}$$

5. $\begin{aligned} & \text{이 } \alpha \text{에 } \beta \text{가 } \gamma \text{보다 } 2x + 5y \text{ 배 더 많은 } \gamma \text{의 } \frac{1}{4} \text{이 } \alpha^2 \text{인} \\ & \text{이 } \alpha \text{가 } \beta \text{보다 } 6x + 2y \text{ 배 더 많은 } \gamma \text{의 } \frac{1}{4} \text{이 } \alpha \text{인 } \beta \text{가,} \\ & \text{이 } \alpha \text{에 } \beta \text{가 } \gamma \text{보다 } \alpha^3 \text{ 배 더 많은 } \gamma \text{의 } \frac{1}{4} \text{이 } \beta \text{인 } \alpha \text{가?} \end{aligned}$ [배점 3, 하상]

- ① $-8x + 4y$ ② $-4x + 6y$ ③ $-2x + 6y$
④ $2x - 8y$ ⑤ $8x + 2y$

해설

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$$A + (2x + 5y) = 6x + 2y$$

$$A = (6x + 2y) - (2x + 5y) = 4x - 3y$$

$$\begin{aligned} & \ddot{e} \circ \ddot{e} \frac{1}{4} \dot{1} \ddot{e} \circ \ddot{e} \mathbb{Y}' \hat{e}^2 \hat{e}^3 \dot{1} \dot{1} \ddot{e} \odot' (4x - 3y) - (2x + \\ & 5y) = 2x - 8y \dot{1} \dot{e} \mathfrak{x}. \end{aligned}$$

- 6.** $\dot{\iota} \ddot{e} \propto \ddot{e} \alpha \dot{\iota} - \dot{\iota} \dot{\iota}$ $4x - 3y\ddot{e}\Upsilon^{\frac{1}{4}} \ddot{e} \dot{\iota} \dot{\iota}^{\frac{1}{4}} \dot{\iota}$ $\hat{e}^2 \dot{\iota}$
 $\dot{\iota} \ddot{e}^3 \rangle \dot{\iota} \dot{\iota} - \hat{e}^{14} \dot{\iota} \ddot{e} \ddot{e}$ $2x - 7y\hat{e}^\circ \ddot{e} \dot{\iota} \ddot{e} \propto . \dot{\iota}' \ddot{e}$,
 $\ddot{e}^\circ \ddot{e}\Upsilon'\hat{e}^2 \hat{e}^3 \dot{\iota} \dot{\iota} \ddot{e} \mu \dot{\iota}$? [배점 3, 하상]

- ① $-8x - 13y$ ② $2x - 10y$
③ $6x - 10y$ ④ $10x - 13y$
⑤ $10x + 4y$

해설

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$$A - (4x - 3y) = 2x - 7y$$

$$A = (2x - 7y) + (4x - 3y) = 6x - 10y$$

$$\begin{aligned} & \ddot{e}^{\circ} \ddot{e}^{\frac{1}{4}i} - \ddot{e}^{\circ} \ddot{e}^{\frac{1}{2}i} \ddot{e}^{\frac{3}{4}i} - \ddot{e}^{\frac{3}{4}i} \ddot{e}^{\frac{1}{4}i} - \ddot{e}^{\frac{3}{4}i} \ddot{e}^{\frac{1}{2}i} (6x - 10y) + (4x - \\ & 3y) = 10x - 13y \end{aligned}$$

7. $\frac{3}{2}x(2x - 4y) - 5x(x - y)$ $\frac{3}{2}x(2x - 4y) - 5x(x - y)$

[배점 3, 하상]

- ① $-2x^2 - xy$ ② $-2x^2 - 11xy$
 ③ $8x^2 + 11xy$ ④ $8x^2 - xy$
 ⑤ $x^2 + xy$

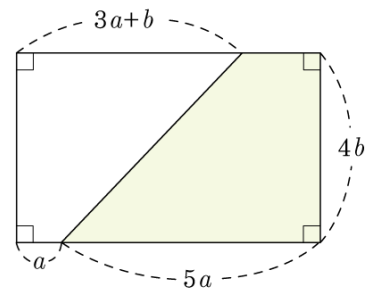
해설

$$\frac{3}{2}x(2x - 4y) - 5x(x - y)$$

$$= 3x^2 - 6xy - 5x^2 + 5xy$$

$$= -2x^2 - xy$$

- 8.** ē ñì ê · ,ē|¼āi ī§ī −ē° í ì ò ò ò ò í ē¶ ē¶ ì ē ò ´
SēY¼ a, b̂ì ê´ í ò ò ¼ēj ē í ē ,ê² ò ?



[배점 3, 하상]

- ① $S = 16ab - b^2$ ② $S = 16ab - 2b^2$
 ③ $S = 16ab - 3b^2$ ④ $S = 16ab - 4b^2$
 ⑤ $S = 16ab - 5b^2$

해설

$$a + 5a - (3a + b) = 3a - b$$

$$\therefore S = \frac{1}{2} \{ (3a - b) + 5a \} \times 4b = \frac{1}{2} (8a - b) \times 4b \\ = (8a - b) \times 2b = 16ab - 2b^2$$

9. $3(2x - y) = 6 + 4x - y$ 이고, $2(x - 2y) + 6y - 3$ 이
 x 이 y 이 될 때 x 의 값을 구하시오. [배점 3, 하상]

- ① $4x + 9$ ② $4x - 9$ ③ $3x + 9$
 ④ $3x - 9$ ⑤ $2x - 9$

해설

$$3(2x - y) = 6 + 4x - y$$

$$6x - 3y = 6 + 4x - y$$

$$2x = 2y + 6$$

$$x = y + 3$$

$$y = x - 3$$

$$2(x - 2y) + 6y - 3 = 2x + 2y - 3 \\ = 2x + 2(x - 3) - 3 \\ = 4x - 9$$

10. $2^{12} \times 5^{13}$ 이 10^n 이 될 때 n 의 값을 구하시오.

[배점 3, 중하]

▶ 답 :

▶ 정답 : 13 이 될 때

해설

$$2^{12} \times 5^{13} = 2^{12} \times 5^{12} \times 5 = (2 \times 5)^{12} \times 5 \\ = 10^{12} \times 5$$

11. $\left(\frac{y^2}{x}\right)^3 \times (x^2y^3)^2 = xy^{12}$

[배점 3, 중하]

① $\left(\frac{y^2}{x}\right)^3 \times (x^2y^3)^2 = xy^{12}$

② $12x^5 \div (-3xy^2) \times (-y^3)^2 = 4x^4y^4$

③ $\frac{x^4}{y} \times (y^3)^2 \div \left(\frac{x^2}{y}\right)^2 = y^6$

④ $\left(\frac{b}{a}\right)^3 \times (ab^3)^2 \times a^2 = ab^9$

⑤ $\left(\frac{3}{2}\right)^3 \times \left(\frac{2^2}{3}\right)^2 = 6$

해설

① $\left(\frac{y^2}{x}\right)^3 \times (x^2y^3)^2 = \frac{y^6}{x^3} \times x^4y^6 = xy^{12}$

② $12x^5 \div (-3xy^2) \times (-y^3)^2 \\ = 12x^5 \times \left(\frac{1}{-3xy^2}\right) \times y^6 = -4x^4y^4$

③ $\frac{x^4}{y} \times (y^3)^2 \div \left(\frac{x^2}{y}\right)^2 = \frac{x^4}{y} \times y^6 \times \frac{y^2}{x^4} = y^7$

④ $\left(\frac{b}{a}\right)^3 \times (ab^3)^2 \times a^2 = \frac{b^3}{a^3} \times a^2b^6 \times a^2 = ab^9$

⑤ $\left(\frac{3}{2}\right)^3 \times \left(\frac{2^2}{3}\right)^2 = \left(\frac{3^3}{2^3}\right) \times \left(\frac{2^4}{3^2}\right) = 3 \times 2 = 6$

12. $(4xy - x^3y - 3xy^2) \div \frac{1}{2}xy = 8 - x^2 - 6y$.

[배점 3, 중하]

▶ 답:

▶ 정답 : 0

해설

$$\begin{aligned} & (4xy - x^3y - 3xy^2) \div \frac{1}{2}xy \\ &= (4xy - x^3y - 3xy^2) \div \frac{xy}{2} \\ &= (4xy - x^3y - 3xy^2) \times \frac{2}{xy} \\ &= 8 - 2x^2 - 6y \end{aligned}$$

$$x^2 + y^2 + z^2 = 14, \quad x + y + z = 2$$

- 13.** $5x - 2y = -4x + y - 3$ 이 $\frac{1}{4}$ 에 , $5x - 2y + 5$ 는 $\frac{1}{4} x$ 이
 $\frac{1}{4}$ 이 $\frac{1}{4}$ 에 $\frac{1}{4}$ 이 $\frac{1}{4}$ 에 $\frac{1}{4}$. [배점 3, 중하]

[배점 3, 중하]

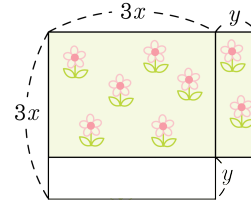
▶ 답:

▷ 정답 : $-x + 3$

해설

$$\begin{aligned} 5x - 2y &= -4x + y - 3 \quad | \quad +4x - y + 3 \\ 3y &= 9x + 3, \quad y = 3x + 1 \\ 5x - 2y + 5 &= 5x - 2(3x + 1) + 5 \\ &= 5x - 6x - 2 + 5 \\ &= -x + 3 \end{aligned}$$

- 14.** $\frac{1}{\sqrt{e}} \leq e^x \leq \frac{1}{1-x}$ for $x \in [0, 1]$.
 Let $f(x) = \frac{1}{\sqrt{e}}$, $g(x) = \frac{1}{1-x}$.
 Then $f(0) = g(0) = \frac{1}{\sqrt{e}}$, $f(1) = g(1) = 1$.
 We have $f'(x) = -\frac{x}{2\sqrt{e}}$, $g'(x) = \frac{1}{(1-x)^2}$.
 Since $f'(x) < 0$ and $g'(x) > 0$ for $x \in (0, 1)$,
 we have $f(x) \geq f(1) = 1$ and $g(x) \leq g(0) = \frac{1}{\sqrt{e}}$.
 Therefore, $\frac{1}{\sqrt{e}} \leq e^x \leq \frac{1}{1-x}$.



[배점 3, 중하]

- ① $9x^2 + 6xy + y^2(m^2)$
- ② $9x^2 - 6xy + y^2(m^2)$
- ③ $6x^2 - y^2(m^2)$
- ④ $9x^2 - y^2(m^2)$
- ⑤ $9x^2 + y^2(m^2)$

해설

$$\begin{aligned} \tilde{e}^3 \dot{1} \ddot{e} \quad \dot{e} \frac{1}{2} \ddot{e} \ddot{0} \dot{1} \quad \dot{e} \ddot{0} \ddot{e} \dot{1} \dot{1} \quad \dot{e} \ddot{e} \ddot{e} \dot{1} \dot{1} \quad 3x + y(\text{cm}), \\ \dot{1} \ddot{e} \ddot{e} \dot{1} \dot{1} \quad \dot{e} \ddot{e} \ddot{e} \dot{1} \dot{1} \quad 3x - y(\text{cm}) \quad \dot{1} \dot{1} \ddot{e} \ddot{e} \quad \ddot{e} \ddot{e} \frac{1}{4} \dot{1} \\ \tilde{e}^3 \dot{1} \ddot{e} \quad \dot{e} \frac{1}{2} \ddot{e} \ddot{0} \dot{1} \quad \ddot{e} \dot{1} \dot{1} \ddot{e} \quad (3x + y)(3x - y) = \\ 9x^2 - y^2(\text{cm}^2) \quad \dot{1} \dot{1} \ddot{e} \ddot{e} \quad. \end{aligned}$$

- [illegible]

[배점 3, 중하]

▶ 답:

▶ 정답 : $a = 5$

해설

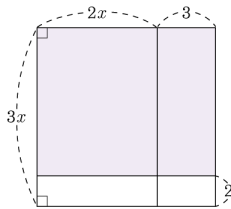
$$(x-7)(5x+a) = 5x^2 + (a-35)x - 7a$$

$$x \text{ 이 } x^3 \text{ 이 } x^0 - 30 \text{ 이 } x^{-1} \text{ 이 } x^1$$

$$a - 35 = -30$$

$$\therefore a = 5$$

16. $x^2 + 5x - 6$ 이 $(x+3)(x-2)$ 이 되도록 a 의 값을 구하시오.



[배점 3, 중하]

- ① $6x^2 + 5x - 6$ ② $4x^2 + 12x + 9$
 ③ $9x^2 - 12x + 4$ ④ $6x^2 - 5x + 6$
 ⑤ $4x^2 - 5x + 6$

해설

$$(2x+3)(3x-2) = 6x^2 + 5x - 6$$

17. $5^2 + 5^2 + 5^2 + 5^2 + 5^2 + 5^2 + 5^2$ 이 5^a 이 되도록 a 의 값을 구하시오.

- ① $(5^2)^7$ ② $(5^7)^2$ ③ 5×7^2
 ④ $(5 \times 7)^2$ ⑤ 7×5^2

해설

$$5^2 = x \text{ 이 } x \text{ 이 } x \text{ 이 } x \text{ 이 } x \text{ 이 } x \text{ 이 } x$$

$$7x \text{ 이 } x \text{ 이 } x \text{ 이 } x \text{ 이 } x \text{ 이 } x \text{ 이 } x$$

18. $3^3 = A$, $2^4 = B$ 이 되도록 A, B 의 값을 구하시오.

- ① AB^2 ② A^3B ③ AB^3
 ④ A^2B ⑤ A^3B^2

해설

$$48^3 = (2^4 \times 3)^3 = (2^4)^3 \times 3^3 = 2^{12} \times 3^3 = 2^3 \times 3^3 = 2^3 \times 3^3$$

19. $3x^2 + 5x - 4$ 이 $(x+3)(x-2)$ 이 되도록 a 의 값을 구하시오.

- ① $-4x^2 + 2x - 3$ ② $-4x^2 - 8x - 5$
 ③ $4x^2 + 8x - 3$ ④ $10x^2 + 8x - 5$
 ⑤ $10x^2 + 8x - 3$

해설

$$7x^2 + 3x + 1 + (3x^2 + 5x - 4)$$

$$= 7x^2 + 3x + 1 + 3x^2 + 5x - 4$$

$$= 10x^2 + 8x - 3$$

20. $\frac{6x^2 - 9x}{2} - \frac{x^2 - 8x + 5}{3} = ax^2 + bx + c$ 이고 $a + c$ 의
 값은? [배점 4, 중중]

- ① 1 ② $\frac{3}{2}$ ③ 4 ④ $\frac{9}{2}$ ⑤ 5

해설

$$\begin{aligned} \frac{6x^2 - 9x}{2} - \frac{x^2 - 8x + 5}{3} &= \frac{3(6x^2 - 9x)}{6} - \frac{2(x^2 - 8x + 5)}{6} \\ &= \frac{18x^2 - 27x}{6} - \frac{2x^2 - 16x + 10}{6} \\ &= \frac{18x^2 - 2x^2 - 27x + 16x - 10}{6} \\ &= \frac{16x^2 - 11x - 10}{6} \end{aligned}$$

이때, $a = \frac{16}{6}, c = -\frac{10}{6}$

$\therefore a + c = \frac{16}{6} + \left(-\frac{10}{6}\right) = \frac{6}{6} = 1$

21. $(x - 4)(x - 2)(x + 1)(x + 3) - 25 = Ax^4 + Bx^3 + Cx^2 + Dx + E$ 이고, $A + B + C + D + E$ 의
 값은? [배점 4, 중중]

- ① -2 ② -1 ③ 0 ④ 1 ⑤ 2

해설

$$\begin{aligned} &(x - 4)(x - 2)(x + 1)(x + 3) - 25 \\ &= \{(x - 4)(x + 3)\}\{(x - 2)(x + 1)\} - 25 \\ &= (x^2 - x - 12)(x^2 - x - 2) - 25 \\ &= (x^2 - x - 12)(x^2 - x - 2) - 25 \\ &= x^4 - x^3 - 14x^2 + 14x - 1 \\ &= x^4 - x^3 - 13x^2 + 14x - 1 \\ &\therefore A + B + C + D + E = 1 - 2 - 13 + 14 - 1 = -1 \end{aligned}$$

22. a, b 가 실수이고 $2^a + 2^b \leq 1 + 2^{a+b}$ (여기서, $a = 0$ 또는 $b = 0$ 이거나 $a \pm b \neq 0$) 이고
 $a + b + c = 4$ 이고, $2^a + 2^b + 2^c$ 의
 값은? [배점 5, 중상]

▶ 답:

▶ 정답: 18

해설

$$\begin{aligned} &2^a + 2^b + 2^c \leq 1 + 2^{a+b} + 2^c \quad (a = 0 \text{ 또는 } b = 0 \text{ 이거나 } a \pm b \neq 0) \\ &2^a + 2^b + 2^c \leq 1 + (1 + 2^{a+b+c}) \quad (a = 0 \text{ 또는 } b = 0 \text{ 이거나 } a \pm b \neq 0) \\ &2^a + 2^b + 2^c \leq 1 + (1 + 2^4) \\ &2^a + 2^b + 2^c \leq 18 \quad (a = 0, b = 0 \text{ 또는 } b = 0, c = 0 \text{ 또는 } c = 0, a = 0 \text{ 이거나 } a \pm b \neq 0) \end{aligned}$$

23. $A = x(2x + 1)$, $B = (8x^3 + 2x^2 - 6x) \div (-2x)$, $C = (2x^4y^2)^3 \div (2x^5y^3)^2$ 이 'ë ð. $A - [2B - \{A + (B + C)\}]$ ë¥¼ ê°ë ¨í í ì ì ë ê° í-ì ê³ ì ì ì í-ì í©ì êµ-í ë©' ? [배점 5, 중상]

- ① 10 ② 11 ③ 12 ④ 13 ⑤ 14

해설

$$\begin{aligned} A &= 2x^2 + x, B = -4x^2 - x + 3, C = 2x^2 \\ A - [2B - \{A + (B + C)\}] \\ &= 2A - B + C \\ &= 2(2x^2 + x) - (-4x^2 - x + 3) + 2x^2 \\ &= 4x^2 + 2x + 4x^2 + x - 3 + 2x^2 \\ &= 10x^2 + 3x - 3 \\ \therefore 10 + 3 + (-3) &= 10 \end{aligned}$$

24. $(2x - 1)(2x + A) = (-2x + 2)^2 + Bx$ 이 ¼ ë , $A - B$ ì ê°ì ? [배점 5, 중상]

- ① -4 ② -2 ③ 0 ④ 2 ⑤ 4

해설

$$\begin{aligned} (2x - 1)(2x + A) &= (-2x + 2)^2 + Bx \\ 4x^2 - 2x + 2Ax - A &= 4x^2 - 8x + 4 + Bx \\ x ì ê³ ì ê° ì ë ì ê° ì ¼ë¨ë ¨í -2 + 2A &= -8 + B \\ , ì ì í-ì ' ì ë ì ê° ì ¼ë¨ë ¨í -A &= 4 ì 'ë ð. \\ ë°ë ¼ì A = -4, B = -2 ì 'ë¨ë ¨í A - B &= -2 \\ ì 'ë ð. \end{aligned}$$

25. ë ðì ì ì ì P ì ê°ì êµ-í ì ¬ë ¼. (ë ¨, $a \neq b \neq c$)

$$P = \frac{a}{(a-b)(a-c)} + \frac{b}{(b-c)(b-a)} + \frac{c}{(c-a)(c-b)}$$

[배점 5, 중상]

▶ 답 :

▷ 정답 : 0

해설

$$\begin{aligned} P &= \frac{-a}{(a-b)(c-a)} + \frac{-b}{(b-c)(a-b)} + \\ &\frac{-c}{(c-a)(b-c)} \\ &= \frac{-a(b-c) - b(c-a) - c(a-b)}{(a-b)(b-c)(c-a)} \\ &= \frac{-ab + ac - bc + ab - ac + bc}{(a-b)(b-c)(c-a)} = 0 \end{aligned}$$