

stress test

해설

$$\begin{aligned} (18 \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2) \div (-2a^2b \times 3ab)^2 &= \\ 2 \{ (2^{\circ} \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2) \} \div (-2a^2b \times 3ab)^2 &= \\ 10 = 2(x+y) & \\ \div 2^3 \div 2 \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2 \div (-2a^2b \times 3ab)^2 &= 5 \\ x \div 2^4 \div (-2)^3 \div (-2ab^2)^2 \div 9a^2b^2 \div (-2a^2b \times 3ab)^2 &= -x+5 \\ x = 3 \div 2 \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2 \div (-2a^2b \times 3ab)^2, y = -x+5 &= -3+5=2(\text{cm}) \end{aligned}$$

5. $-2a^2b \times (3ab)^2 \div (-2ab^2)^2 \div 9a^2b^2$ 이 $2^{\circ} \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2$?
[배점 3, 하상]

- ① $-a^3b^2$ ② $-\frac{a}{b^2}$ ③ $-\frac{1}{2b^3}$
④ $\frac{a}{b^4}$ ⑤ $\frac{b^2}{a^3}$

해설

$$\begin{aligned} -2a^2b \times (3ab)^2 \div (-2ab^2)^2 \div 9a^2b^2 &= -2a^2b \times \\ 9a^2b^2 \times \frac{1}{4a^2b^4} \times \frac{1}{9a^2b^2} &= -\frac{1}{2b^3} \text{ 이 } 2^{\circ} \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2. \end{aligned}$$

6. $a^3b^2 \times a^5b^6 = a^{\square}b^{\square}$ 이 2^4 ÷ , $\square$ 이 2^8 ÷ 이 2^4 ÷
 $2^{\circ} \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2$?
[배점 3, 하상]

- ① 15, 12 ② 8, 8 ③ 9, 7
④ 5, 11 ⑤ 11, 7

해설

$$\begin{aligned} a^3b^2 \times a^5b^6 &= a^3 \times b^2 \times a^5 \times b^6 \\ &= a^3 \times a^5 \times b^2 \times b^6 \\ &= a^{3+5} \times b^{2+6} \\ &= a^8b^8 \end{aligned}$$

7. $2^{\circ} \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2$ ($2^{\circ} \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2$, $x \neq 0$) [배점 3, 하상]

- ① $x^5 \div x^5 = 0$
② $x^2 \times x^3 \times x^4 = x^8$
③ $(x^3y^2)^4 = x^{12}y^6$
④ $\left(\frac{y^2}{x^4}\right)^3 = \frac{y^6}{x^{12}}$
⑤ $(x^4)^2 \times (x^3)^2 = x^{15}$

해설

- ① 1
② x^9
③ $x^{12}y^8$
⑤ x^{14}

8. $-\frac{3}{4}x(x-2) \div 2^4 \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2$,
 $2^{\circ} \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2$ $b \div 2^4 \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2$, $a+b$ 이 $2^{\circ} \div (-2)^2 \div (-2ab^2)^2 \div 9a^2b^2$?
[배점 3, 하상]

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

해설

$$\begin{aligned} & \left(-\frac{3}{4}x\right) \times x + \left(-\frac{3}{4}x\right) \times (-2) \\ &= -\frac{3}{4}x^2 + \frac{3}{2}x \\ \therefore a + b &= \left(-\frac{3}{4}\right) + \frac{3}{2} = \frac{3}{4} \end{aligned}$$

9. $2x^2 + 1 - \frac{x^2 + 6x}{3}$ 의 값을 구하시오.

[배점 3, 하상]

- ① $-\frac{5}{3}x^2 - 3x + 1$ ② $-\frac{5}{3}x^2 + \frac{4}{3}x + 1$
 ③ $\frac{5}{3}x^2 - 2x + 1$ ④ $\frac{5}{3}x^2 + \frac{8}{3}x + 1$
 ⑤ $\frac{4}{3}x^2 + 4x + 1$

해설

$$\begin{aligned} & 2x^2 + 1 - \frac{x^2 + 6x}{3} \\ &= \frac{6x^2 - x^2 - 6x + 3}{3} \\ &= \frac{5}{3}x^2 - 2x + 1 \end{aligned}$$

10. $a = -\frac{3}{4}, b = \frac{1}{2}, c = \frac{1}{4}$ 일 때, $a + b + c$ 의 값을 구하시오.

$$\left(\frac{2y^2z^4}{x^a}\right)^3 = \frac{by^cz^{12}}{x^{12}}$$

[배점 3, 중하]

▶ 답:

▶ 정답: 18

해설

$$\begin{aligned} & \left(\frac{2y^2z^4}{x^a}\right)^3 = \frac{8y^6z^{12}}{x^{3a}} = \frac{by^cz^{12}}{x^{12}} \\ & a = 4, b = 8, c = 6 \\ & a + b + c = 18 \end{aligned}$$

11. $2^{12} \times 5^{13}$ 을 10으로 나눈 나머지를 구하시오.

[배점 3, 중하]

▶ 답:

▶ 정답: 13

해설

$$\begin{aligned} 2^{12} \times 5^{13} &= 2^{12} \times 5^{12} \times 5 = (2 \times 5)^{12} \times 5 \\ &= 10^{12} \times 5 \end{aligned}$$

12. $\frac{3}{4}xy\left(-\frac{5}{3}x + \frac{1}{6}y - \frac{1}{3}\right)$ 의 값을 구하시오.

$$8a^3b^2c^2 = \frac{1}{4}a^2b^2c^2 \cdot |8a| \cdot b^2c^2$$

[배점 3, 중하]

- ① $\frac{15}{8}$ ② $\frac{11}{8}$ ③ 11 ④ 15 ⑤ $\frac{1}{8}$

해설

$$\begin{aligned} \frac{3}{4}xy \times \left(-\frac{5}{3}x\right) + \frac{3}{4}xy \times \frac{1}{6}y + \frac{3}{4}xy \times \left(-\frac{1}{3}\right) &= \\ -\frac{5}{4}x^2y + \frac{1}{8}xy^2 - \frac{1}{4}xy & \\ \text{ë °ë ¼ì } a = \left(-\frac{5}{4}\right) + \frac{1}{8} + \left(-\frac{1}{4}\right) = -\frac{11}{8} \text{ ì ´ë- ëì } & \\ |8a| = 11 \text{ ì ´ë ñ.} & \end{aligned}$$

해설

$$\begin{aligned} (ax-2)(7x+b) &= 7ax^2 + (ab-14)x - 2b \\ 7ax^2 + (ab-14)x - 2b &= cx^2 + 10x - 16 \\ -2b &= -16, \therefore b = 8 \\ ab-14 &= 10, 8a-14 = 10, 8a = 24, \therefore a = 3 \\ 7a &= c, \therefore c = 21 \\ \therefore a &= 3, b = 8, c = 21 \\ \therefore a+b+c &= 32 \end{aligned}$$

13. ë ñì ê³ì°ì ñ ñì ê²ì ë³ë ê³ ë¥'ë©' ?
[배점 3, 중하]

- ① $-(a-5b) = a+5b$
 ② $-x(-3x+y) = 3x^2-xy$
 ③ $2x(3x-6) = 6x^2-6x$
 ④ $3x(2x-3y)-2y(x+y) = 6x^2-11xy-2y^2$
 ⑤ $-x(x-y+2)+3y(2x+y+4) =$
 $-x^2+7xy-2x+3y^2+12y$

해설

- ① $-(a-5b) = -a+5b$
 ③ $2x(3x-6) = 6x^2-12x$

14. $(ax-2)(7x+b)$ ë¥¼ì ê°í ì ì ´ $cx^2+10x-16$ ì ¼
 ë , ì ì a, b, c ì ë í ì ñ $-a+b+c$ ê°ì êµ¬ì ì ñë ¼.
 [배점 3, 중하]

▶ 답 :
 ▷ 정답 : 32

15. $(2x+ay)^2 = bx^2+cxy+9y^2$ ì ¼ ë , $a-b+c$ ì ê°ì
 êµ¬ì ì ñë ¼. (ë ¨ , $a > 0$) [배점 3, 중하]

▶ 답 :
 ▷ 정답 : 11

해설

$$\begin{aligned} (2x+ay)^2 &= 4x^2+4axy+a^2y^2 \\ 4x^2+4axy+a^2y^2 &= bx^2+cxy+9y^2 \\ \therefore b &= 4 \\ a^2 &= 9 \\ \therefore a &= 3 (\because a > 0) \\ 4a &= c \\ \therefore c &= 12 \\ a-b+c &= 3-4+12 = 11 \end{aligned}$$

16. $4x+3y = 2$ ì ¼ ë , $5(x-3y)-2(4x-3y)$ ë¥¼ x
 ì ê°í ì ì ¼ëì ë í ì ´ë ¼. [배점 3, 중하]

▶ 답 :
 ▷ 정답 : $9x-6$

해설

$$4x + 3y = 2$$

$$\therefore 3y = -4x + 2$$

$$\begin{aligned} (1x-2) &= 5(x-2+4x) - 2(4x-2+4x) \\ &= 5(5x-2) - 2(8x-2) \\ &= 9x-6 \end{aligned}$$

17. $(-3x^A y^2)^2 \times Bx \div (3y^3)^2 = -\frac{9x^3}{y^C}$ 이 이 A, B, C 이
 ê° ì ê° ê° êµ¬í ì -ë ¼. [배점 4, 중중]

▶ 답 :

▶ 답 :

▶ 답 :

▷ 정답 : $A = 1$

▷ 정답 : $B = -9$

▷ 정답 : $C = 2$

해설

$$(-3x^A y^2)^2 \times Bx \div (3y^3)^2 = -\frac{9x^3}{y^C}$$

$$\frac{Bx^{2A+1}}{y^2} = -\frac{9x^3}{y^C}$$

$$2A+1=3, A=1$$

$$\therefore A=1, B=-9, C=2$$

18. $(4a^2b - 8ab + 2b) \div (-2b) + (a^2x - ax) \div \frac{1}{3}x$

[배점 4, 중중]

① $a - 1$

② $a^2 + a - 1$

③ $a^2 - 1$

④ $a^2 - a$

⑤ $2a^2 + a - 1$

해설

$$\begin{aligned} (4a^2b - 8ab + 2b) \div (-2b) + (a^2x - ax) \times \frac{3}{x} \\ = \frac{4a^2b - 8ab + 2b}{-2b} + \frac{3(a^2x - ax)}{x} \\ = -2a^2 + 4a - 1 + 3a^2 - 3a \\ = a^2 + a - 1 \end{aligned}$$

19. $3(2x - y) = 6 + 4x - y$ 이 ¼ , $2(x - 2y) + 6y - 3$ 이
 x 이 ê´í ì ì ¼ëĵ ë í ë , ê²ì ? [배점 4, 중중]

① $2x - 7$

② $2x - 5$

③ $4x - 7$

④ $4x - 9$

⑤ $4x - 11$

해설

$$6x - 3y = 6 + 4x - y \Rightarrow 2x - 2y = 0 \Rightarrow x = y$$

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

$$= 2x + 2(x - 3) - 3$$

$$= 2x + 2x - 6 - 3$$

$$= 4x - 9$$

20. $\left(\frac{1}{2}x+5\right)^2 + a = \frac{1}{4}x^2 + bx + 21$ 이고, a, b 의
가 $a+b$ 의 값은? [배점 4, 중중]

① 10 ② 5 ③ 1 ④ 0 ⑤ -2

해설

$$\begin{aligned} \left(\frac{1}{2}x\right)^2 + 2 \times \left(\frac{1}{2}x\right) \times 5 + 5^2 + a \\ = \frac{1}{4}x^2 + 5x + 25 + a \\ 25 + a = 21 \\ a = -4, b = 5 \\ \therefore a + b = 1 \end{aligned}$$

21. $(x+1)(x+2)(x-3)(x-4)$ 의 x^2 의 계수는?
[배점 4, 중중]

① -12 ② -7 ③ 3
④ 6 ⑤ 8

해설

$$\begin{aligned} (x+1)(x+2)(x-3)(x-4) \\ = \{(x+1)(x-3)\}\{(x+2)(x-4)\} \\ = (x^2 - 2x - 3)(x^2 - 2x - 8) \\ x^2\text{의 계수는 } -8x^2 + 4x^2 - 3x^2\text{의 계수.} \\ \therefore -7\text{이다.} \end{aligned}$$

22. $\frac{3^x}{9^{-x+y}} = 27$, $\frac{25^{x+y}}{5^{3y}} = 625$ 이고, $64^x \times 625^y$ 의
자리수는? [배점 5, 중상]

① 10 자리 ② 12 자리 ③ 17 자리
④ 20 자리 ⑤ 26 자리

해설

$$\begin{aligned} 3^x &= 27 \times 9^{-x+y} = 3^3 \times 3^{-2x+2y} = 3^{-2x+2y+3} \\ \therefore x &= -2x + 2y + 3 \\ 25^{x+y} &= 625 \times 5^{3y} = 5^4 \cdot 5^{3y} = 5^{3y+4} \\ \therefore 2x + 2y &= 3y + 4 \\ x &= 5, y = 6 \\ 64^x \times 625^y &= (2^6)^5 \times (5^4)^6 = 2^{30} \times 5^{24} \\ &= (10)^{24} \times 2^6 = 64 \times 10^{24} \\ \therefore 26\text{ 자리이다.} \end{aligned}$$

23. x, y 에 대하여 $*$, $\triangle$ 에 대하여 $x * y = (8xy^2 + 4xy^2) \div 2xy$, $x \triangle y = (12x^2y - 8x^2y) \div 4xy$ 이고
 $\frac{(x * y) - (x \triangle y)}{(x * y) + (x \triangle y)}$ 의 값은? [배점 5, 중상]

① $\frac{6y+x}{6y+x}$ ② $\frac{6y-x}{6y-x}$ ③ $\frac{6y-x}{6y+x}$
④ $\frac{6y+x}{6y-x}$ ⑤ $\frac{3y-x}{3y+x}$

해설

$$\begin{aligned} x * y &= (8xy^2 + 4xy^2) \div 2xy = 4y + 2y \\ x \triangle y &= (12x^2y - 8x^2y) \div 4xy = 3x - 2x = x \\ \therefore \frac{(x * y) - (x \triangle y)}{(x * y) + (x \triangle y)} &= \frac{6y - x}{6y + x} \end{aligned}$$

24. $-4a - \{3a + 5b - 2(a - 2b - \boxed{})\} = -a - 11b$

이 때, $\boxed{}$ 의 값은?

[배점 5, 중상]

- ① $-3b - 2a$ ② $-b - 4a$ ③ $b - 2a$
 ④ $2a + 3b$ ⑤ $3a + 3b$

해설

$$\begin{aligned} & -4a - \{3a + 5b - 2(a - 2b - \boxed{})\} \\ &= -4a - (3a + 5b - 2a + 4b + 2\boxed{}) \\ &= -4a - 3a - 5b + 2a - 4b - 2\boxed{} \\ &= -5a - 9b - 2\boxed{} = -a - 11b \\ \therefore \boxed{} &= b - 2a \end{aligned}$$

25. $a^2 = 12, b^2 = 18$ 이 때, $\left(\frac{1}{2}a + \frac{2}{3}b\right)\left(\frac{1}{2}a - \frac{2}{3}b\right)$ 의

값은?

[배점 5, 중상]

- ① -9 ② -8 ③ -6 ④ -5 ⑤ -3

해설

$$\begin{aligned} & \left(\frac{1}{2}a + \frac{2}{3}b\right)\left(\frac{1}{2}a - \frac{2}{3}b\right) \\ &= \left(\frac{1}{2}a\right)^2 - \left(\frac{2}{3}b\right)^2 \\ &= \frac{1}{4}a^2 - \frac{4}{9}b^2 \\ &= \frac{1}{4} \times 12 - \frac{4}{9} \times 18 \\ &= 3 - 8 = -5 \end{aligned}$$