

$$1. \textcircled{a} \quad 4 - 2 \cdot 3^2 - (-2)^2 - (-2^2)^{-1} - \frac{1}{2} =$$

$$= 4 - 2 \cdot 9 - 2^2 + (2^2)^{-1} - \frac{1}{2} =$$

$$= \cancel{4} - 18 - \cancel{4} + 2^{-2} - \frac{1}{2} =$$

$$= -18 + \frac{1}{2^2} - \frac{1}{2} = -18 + \frac{1}{4} - \frac{1}{2}$$

$$= -\frac{72}{4} + \frac{1}{4} - \frac{2}{4}$$

$$= -\frac{73}{4}.$$

$$a^{-v} = \frac{1}{a^v}$$

$$\textcircled{B} \quad 2 + 2 \cdot 3 - (-2)^{-1} : \frac{1}{3} - \left(\frac{2}{3} - 1 \right) \cdot \frac{1}{2} =$$

$$= 2 + 6 + 2^{-1} \cdot \frac{3}{1} - \left(\frac{2}{3} - \frac{3}{3} \right) \cdot \frac{1}{2} =$$

$$= 8 + \frac{1}{2} \cdot \frac{3}{1} - \left(-\frac{1}{3} \right) \cdot \frac{1}{2} =$$

$$= 8 + \frac{3}{2} + \frac{1}{3} \cdot \frac{1}{2} =$$

$$= \frac{16}{2} + \frac{3}{2} + \frac{1}{6}$$

$$= \frac{19}{2} + \frac{1}{6}$$

$$= \frac{57}{6} + \frac{1}{6}$$

$$= \frac{58}{6}$$

$$2. \textcircled{a} (x-1)^2 - (2x-3)(x+1) - (2+x)^2 =$$

$$= x^2 - 2x + 1 - (2x^2 + 2x - 3x - 3) - (4 + 4x + x^2)$$

$$= \cancel{x^2} - 2x + 1 - 2x^2 - 2x + 3x + 3 - 4 - 4x - \cancel{x^2}$$

$$= -2x^2 - 5x$$

$$\textcircled{b} (3x-2)^2 - x(x+2)(x-3)$$

$$= 9x^2 - 12x + 4 - x(x^2 - 3x + 2x - 6)$$

$$= 9x^2 - 12x + 4 - x^3 + 3x^2 - 2x^2 + 6x$$

$$= -x^3 + 10x^2 - 6x + 4$$

$$\textcircled{1} \cdot (x-1)^3 - (x+1)^3 =$$

$$= x^3 - 3x^2 + 3x - 1 - (x^3 + 3x^2 + 3x + 1)$$

$$= \cancel{x^3} - 3x^2 + \cancel{3x} - 1 - \cancel{x^3} - 3x^2 - \cancel{3x} - 1$$

$$= -6x^2 - 2$$

3.

$$\frac{[(x^2)^3 : x^{-1}]^{-2} \cdot x^4}{[(x^2)^{-2} \cdot (x^4)^3]^{-1}} =$$

$$= \frac{(x^6 : x^{-1})^{-2} \cdot x^4}{(x^{-4} \cdot x^{12})^{-1}}$$

$$= \frac{(x^7)^{-2} \cdot x^4}{(x^8)^{-1}}$$

$$= \frac{x^{-14} \cdot x^4}{x^{-8}} =$$

$$= \frac{x^{-10}}{x^{-8}}$$

$$= x^{-2} = \frac{1}{x^2}$$

13.

ΕΥΟΤΗΤΑ
3

Οι α, β αντιστοιχούν

$$\Rightarrow \alpha + \beta = 0.$$

Οι αριθμοί x, y αντιστοιχούν

$$x \cdot y = 1.$$

$$\textcircled{a} \quad A = 2(\alpha - x) - x(y - 2) + 2\beta$$

$$A = 2\alpha - \cancel{2x} - \cancel{xy} + \cancel{2x} + 2\beta$$

$$A = 2\alpha + 2\beta - 1$$

$$A = 2(\alpha + \beta) - 1$$

$$A = 2 \cdot 0 - 1$$

$$A = -1.$$

$$\textcircled{B} \quad B = 1 - 2(\alpha - 1) - x(3y - B) + B(-x - 2)$$

$$B = 1 - 2\alpha + 2 - 3xy + \cancel{x B} - \cancel{B x} - 2B$$

$$B = \cancel{3} - 2\alpha - \cancel{3 \cdot 1} - 2B$$

$$B = -2\alpha - 2B,$$

$$B = -2(\alpha + B)$$

$$B = -2 \cdot 0$$

$$B = 0.$$

$$4. \textcircled{b} B = 3\alpha^2 - 2B\gamma^4 - \beta^4$$

$$\alpha = 2 \quad B = -3 \quad \gamma = -1,$$

$$B = 3 \cdot 2^2 - 2 \cdot (-3)(-1)^4 - (-3)^4$$

$$B = 3 \cdot 4 + 6 \cdot 1 - 3^4$$

$$B = 12 + 6 - 81$$

$$B = 18 - 81$$

$$B = -63$$

$$\textcircled{d} \Delta = B^2 - 4\alpha\gamma$$

$$\Delta = (-3)^2 - 4 \cdot 2 \cdot (-1)$$

$$\Delta = 9 + 8 = 17,$$

$$5. \textcircled{B} (2x)^3 \cdot \left(\frac{x}{2}\right)^2 =$$

$$= 8x^3 \cdot \frac{x^2}{4} =$$

$$= 2 \cdot x^5$$

$$a^{-v} = \frac{1}{a^v}$$

$$\left(\frac{a}{b}\right)^{-v} = \left(\frac{b}{a}\right)^v$$

$$\textcircled{20} \left(\frac{3}{5}\right)^{-2} \cdot \frac{3^5}{5^2}$$

$$\frac{3^{-2}}{5^{-2}} \cdot \frac{3^5}{5^2} =$$

$$= \frac{3^3}{5^0} = \frac{27}{1} = 27$$

$$\begin{aligned}
 6. \quad (a) \quad & (-2)^{16} \cdot 2^{-13} + (-3)^7 \cdot 3^{-5} = \\
 & = 2^{16} \cdot 2^{-13} - 3^7 \cdot 3^{-5} = \\
 & = 2^3 - 3^2 = 8 - 9 = -1
 \end{aligned}$$

$$\begin{aligned}
 (b) \quad & \frac{5^7 \cdot (-5)^4}{(-5)^9} = \frac{5^7 \cdot 5^4}{-5^9} = -\frac{5^{11}}{5^9} \\
 & = -5^2 = -25
 \end{aligned}$$

$$(c) \quad ((-2)^3)^4 \cdot (2^{-5})^3 =$$

$$= 2^{12} \cdot 2^{-15} = 2^{-3} = \frac{1}{2^3} = \frac{1}{8}$$

$$(d) \quad \frac{((-5)^{-3})^2}{(5^{-4})^2} = \frac{5^{-6}}{5^{-8}} = 5^2$$

19.

$$\textcircled{D} \quad \frac{12^{10}}{16^5 \cdot 81^3} =$$

$$= \frac{(3 \cdot 4)^{10}}{(4^2)^5 \cdot (3^4)^3} =$$

$$= \frac{\cancel{3^{10}} \cdot \cancel{4^{10}}}{\cancel{4^{10}} \cdot 3^{12}} = \frac{3^{10}}{3^{12}} = 3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

ΕΥΟΤΥΤΑ 5

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α) Νόο $\left(a + \frac{1}{a}\right)^2 - \left(a - \frac{1}{a}\right)^2 = 4$

$$a^2 + 2 \cdot a \cdot \frac{1}{a} + \frac{1}{a^2} - \left(a^2 - 2a \cdot \frac{1}{a} + \frac{1}{a^2}\right) = 4$$

$$\cancel{a^2} + 2 + \cancel{\frac{1}{a^2}} - \cancel{a^2} + 2 - \cancel{\frac{1}{a^2}} = 4$$

$$4 = 4.$$

β) $A = \left(\frac{999}{1000} + \frac{1000}{999}\right)^2 - \left(\frac{999}{1000} - \frac{1000}{999}\right)^2$

αν θεωρώ $a = \frac{999}{1000}$ τότε λόγω
του α ερωτήματός.

$$A = 4.$$

Εποραο Μαθιρι

3

④ ολν

⑤ ολν

⑧ ολν

⑨ ολν

⑪ ολν

⑫ ολν

4

② ολν.

③ γ.

④ αλ

⑪ ολν

⑬

⑮.