

Σα 173

1. (B) $x^3 + 8 = 0$

$$x^3 = -8$$

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

$$\boxed{x = -2}$$

(E) $x^3 - 2 = 0$

$$x^3 = 2$$

$$x^3 = \sqrt[3]{2^3}$$

$$x^3 = \sqrt[3]{2^3}$$

$$\boxed{x = \sqrt[3]{2}}$$

(H) $x^4 - 81 = 0$

$$x^4 = 81$$

$$x^4 = 3^4$$

$$\boxed{x = 3}$$

$$\boxed{x = -3}$$

$$2. \quad \textcircled{B} \quad 64x^6 - 1 = 0$$

$$64x^6 = 1$$

$$(2x)^6 = 1^6$$

$$2x = 1$$

∨

$$2x = -1$$

$$\textcircled{x = \frac{1}{2}}$$

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

$$\textcircled{E} \quad 32x^5 - 243 = 0$$

$$32x^5 = 243$$

$$(2x)^5 = 3^5$$

$$2x = 3$$

$$x = \frac{3}{2}$$

$$3. \quad (8) \quad 3x^2 - 1 = 0$$

$$3x^2 = 1$$

$$x^2 = \frac{1}{3}$$

$$x^2 = \sqrt{\frac{1}{3}}^2$$

$$x = \sqrt{\frac{1}{3}} \quad \vee \quad x = -\sqrt{\frac{1}{3}}$$

$$x = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$x = -\frac{\sqrt{3}}{3}$$

$$4. \quad (52) \quad 3x^3 - 8 = 0$$

$$3x^3 = 8$$

$$x^3 = \frac{8}{3}$$

$$x^3 = \frac{2^3}{\sqrt[3]{3^3}}$$

$$x^3 = \left(\frac{2}{\sqrt[3]{3}}\right)^3$$

$$x = \frac{2}{\sqrt[3]{3}} = \frac{2 \sqrt[3]{3^2}}{\sqrt[3]{3} \sqrt[3]{3^2}}$$

$$x = \frac{2 \sqrt[3]{3^2}}{3}$$

$$5. \quad (B) \quad 81x^5 - 16x = 0$$

$$x(81x^4 - 16) = 0$$

$$x = 0$$

$$\vee \quad 81x^4 - 16 = 0$$

$$81x^4 = 16$$

$$(9x^2)^2 = (4)^2$$

$$9x^2 = 4$$

$$(3x)^2 = 2^2$$

\vee

$$9x^2 = -4$$

Admissível!

$$3x = 2 \quad \vee \quad 3x = -2$$

$$x = \frac{2}{3}$$

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

$$6. (D) \quad x^9 - 3x^5 + 2x^4 - 6 = 0$$

$$x^5(x^4 - 3) + 2(x^4 - 3) = 0$$

$$(x^4 - 3)(x^5 + 2) = 0$$

$$x^4 - 3 = 0$$

$$x^4 = 3$$

$$x^4 = (\sqrt[4]{3})^4$$

$$\underline{\underline{x = \sqrt[4]{3}}}$$

$$\text{or } \underline{\underline{x = -\sqrt[4]{3}}}$$

$$\text{or } x^5 + 2 = 0$$

$$x^5 = -2$$

$$x^5 = (-\sqrt[5]{2})^5$$

$$\underline{\underline{x = -\sqrt[5]{2}}}$$

$$5. \quad (E) \quad 54x^7 = 2x^4$$

$$54x^7 - 2x^4 = 0$$

$$x^4(54x^3 - 2) = 0$$

$$x^4 = 0$$

$$x = 0$$

$$\therefore 54x^3 - 2 = 0$$

$$27x^3 - 1 = 0$$

$$27x^3 = 1$$

$$(3x)^3 = 1^3$$

$$3x = 1$$

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

$$(52) \quad x^5 + x^2 = 0$$

$$x^3(x^2 + 1) = 0$$

$$x^3 = 0$$

$$x = 0$$

$$\therefore x^2 + 1 = 0$$

$$x^2 = -1$$

Answer

$$7. \textcircled{\delta} (x-1)^4 - 3(x-1) = 0.$$

$$(x-1) \left((x-1)^3 - 3 \right) = 0$$

$$x-1 = 0 \quad \vee \quad (x-1)^3 - 3 = 0.$$

$$\textcircled{x=1}$$

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

$$(x-1)^3 = \sqrt[3]{3^3}$$

$$x-1 = \sqrt[3]{3}$$

$$x = \sqrt[3]{3} + 1$$

$$8. \textcircled{\gamma} x^2 - 3x + 3 = \frac{2}{x}$$

$$\text{npn } x \neq 0$$

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

$$x^3 - 3x^2 + 3x - 2 = 0.$$

$$x^3 - 3x^2 + 3x - 1 - 1 = 0$$

$$(x-1)^3 = 1.$$

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

$$x-1 = 1$$

$$\textcircled{x=2}$$

$$9. \textcircled{B} \cdot 27x^3 - (x-1)^3 = 0$$

$$27x^3 = (x-1)^3$$

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

$$3x = x-1$$

$$2x = -1$$

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

$$10. \textcircled{B} |x^4 - 1| = 3$$

$$x^4 - 1 = 3$$

or

$$x^4 - 1 = -3$$

$$x^4 = 4$$

$$x^4 = -2$$

$$(x^2)^2 = 2^2$$

Answer.

$$x^2 = 2 \quad \text{or} \quad x^2 = -2$$

$$x^2 = \sqrt{2}^2$$

Answer

$$\underline{\underline{x = \sqrt{2}}} \quad \text{or} \quad \underline{\underline{x = -\sqrt{2}}}$$

$$10. \textcircled{8} . |x^5 - 2| = 30$$

$$x^5 - 2 = 30$$

$$x^5 = 32$$

$$x^5 = 2^5$$

$$\textcircled{x=2}$$

$$\text{or } x^5 - 2 = -30$$

$$x^5 = -30 + 2$$

$$x^5 = -28$$

$$x^5 = -\sqrt[5]{28}^5$$

$$x = -\sqrt[5]{28}$$

$$11. \textcircled{B} (x-2)^6 - 32 \text{ d}(x, 2) = 0 .$$

$$(x-2)^6 - 32 |x-2| = 0$$

$$|x-2|^6 - 32 |x-2| = 0$$

$$|x-2| (|x-2|^5 - 32) = 0 .$$

$$|x-2| = 0$$

$$x-2 = 0$$

$$\textcircled{x=2}$$

$$\text{or } |x-2|^5 - 32 = 0$$

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

$$|x-2| = 2$$

$$x-2 = 2$$

$$\textcircled{x=4}$$

$$\text{or } x-2 = -2$$

$$\textcircled{x=0}$$

$$\textcircled{d} \left(|x-3| - 1 \right)^4 - 81 = 0$$

$$\left(|x-3| - 1 \right)^4 = 3^4$$

$$|x-3| - 1 = 3$$

$$|x-3| = 4$$

$$x-3=4$$

$$\underline{\underline{x=7}}$$

$$\text{or } x-3=-4$$

$$\underline{\underline{x=-1}}$$

$$\text{or } |x-3| - 1 = -3$$

$$|x-3| = -2$$

Adhika .

12.

$$63x^3 - 3x^2 - 3x - 1 = 0.$$

$$64x^3 - x^3 - 3x^2 - 3x - 1 = 0$$

$$64x^3 = x^3 + 3x^2 + 3x + 1$$

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

$$4x = x + 1$$

$$4x - x = 1$$

$$3x = 1$$

$$x = \frac{1}{3}.$$

Αδωρον

$$1 + \frac{1}{1 - \frac{1}{x+1}} = \frac{1}{x}$$

για να οπφείρου η ~~(αποσταση)~~ εξίσωση νείρε

$$x \neq 0$$

$$x+1 \neq 0 \Rightarrow x \neq -1$$

$$1 - \frac{1}{x+1} \neq 0 \Rightarrow \frac{x+1-1}{x+1} \neq 0 \Rightarrow \frac{x}{x+1} \neq 0$$

$$(x+1 \neq 0 \Rightarrow x \neq -1)$$

$$1 + \frac{1}{\frac{x}{x+1}} = \frac{1}{x} \Rightarrow 1 + \frac{x+1}{x} = \frac{1}{x}$$

$$x + x + 1 = 1$$

$$2x = 0$$

~~$x = 0$~~
(ανολ)

Αδωρον

Άσκηση

$$A = \frac{x^3 + x^2}{x^2 + 5x} - \frac{x^3 - 5x^2}{x^3 - 25x}$$

α) Βρες τα x ώστε να οριστεί η A .

β) Ανλοποιώστε την

γ) $A = 0$.

Λύση

α) $A = \frac{x^3 + x^2}{x^2 + 5x} - \frac{x^3 - 5x^2}{x^3 - 25x} \Rightarrow A = \frac{x^3 + x^2}{x(x+5)} - \frac{x^3 - 5x^2}{x(x^2 - 25)}$

• Πρέπει $x(x+5) \neq 0 \Rightarrow x \neq 0$ και $x+5 \neq 0 \Rightarrow x \neq -5$

• Πρέπει $x(x^2 - 25) \neq 0 \Rightarrow x(x-5)(x+5) \neq 0 \Rightarrow x \neq 0$ και $x-5 \neq 0 \Rightarrow x \neq 5$ και $x+5 \neq 0 \Rightarrow x \neq -5$

Άρα: Η A ορίζεται για κάθε x που ανήκει στο \mathbb{R} και είναι διαφόρο των $0, 5, -5$

β) $A = \frac{x^3 + x^2}{x^2 + 5x} - \frac{x^3 - 5x^2}{x^3 - 25x} \Rightarrow A = \frac{x^3 + x^2}{x(x+5)} - \frac{x^3 - 5x^2}{x(x-5)(x+5)} \Rightarrow$

$\Rightarrow A = \frac{x^2(x+5)}{x(x+5)} - \frac{x^2(x-5)}{x(x-5)(x+5)} \Rightarrow A = \frac{x(x+5)}{(x+5)} - \frac{x}{(x+5)} \Rightarrow$

$\Rightarrow A = \frac{x(x+5) - x}{x+5} \Rightarrow A = \frac{x^2}{x+5}$

$$d) \quad x = \frac{x^2}{x+5} \Rightarrow 0 = \frac{x^2}{x+5} \Rightarrow \cancel{0} = x^2 \Rightarrow x = 0$$

Answer!

Αίσιοι

$$\frac{4}{x-2} = \frac{8}{x^2-2x} - \frac{x-2}{x} \Rightarrow$$

$$\Rightarrow \frac{4}{x-2} = \frac{8}{x(x-2)} - \frac{x-2}{x} \Rightarrow$$

$$\Rightarrow \otimes$$

$$\rightarrow x-2=0 \Rightarrow x=2$$

$$\rightarrow x(x-2)=0 \Rightarrow x=0 \quad \vee \quad \begin{matrix} x-2=0 \\ x=2 \end{matrix}$$

$$\rightarrow x=0$$

ΑΠΑ
 $x \neq 0$
 $x \neq 2$

$$\cancel{x(x-2)} \frac{4}{\cancel{x-2}} = \frac{8}{\cancel{x(x-2)}} - \cancel{x(x-2)} \frac{x-2}{\cancel{x}}$$

$$4x = 8 - (x-2)^2 \Rightarrow$$

$$\Rightarrow \cancel{4x} = 8 - x^2 + \cancel{4x} - 4 \Rightarrow 0: \quad x^2 = 4$$

~~$x=2$~~

$x=-2$

✓

Абсолют

$$\left(|2x-4| - 6 \right)^3 + 27 = 0 \Rightarrow$$

$$\Rightarrow \left(|2x-4| - 6 \right)^3 = -27 \Rightarrow$$

$$\Rightarrow \left(|2x-4| - 6 \right)^3 = (-3)^3 \Rightarrow$$

$$\Rightarrow |2x-4| - 6 = -3 \Rightarrow \text{~~2x-4 = 3~~}$$

$$\Rightarrow |2x-4| = 3 \Rightarrow$$

$$\Rightarrow 2x-4 = 3 \Rightarrow$$

$$\Rightarrow \frac{2x}{2} = \frac{4+3}{2} \Rightarrow$$

$$\Rightarrow x = 2$$

$$\text{и } 2x-4 = -3 \Rightarrow$$

$$\Rightarrow \frac{2x}{2} = \frac{-2}{2} \Rightarrow$$

$$\Rightarrow x = -1$$

Аскибу

$$5x(x^3 - 5) = 2x(2x^3 + 1) \Rightarrow$$

$$\Rightarrow 5x(x^3 - 5) - 2x(2x^3 + 1) = 0 \Rightarrow$$

$$\Rightarrow x(5(x^3 - 5) - 2(2x^3 + 1)) = 0$$

$$x(5x^3 - 25 - 4x^3 - 2) = 0$$

$$x(x^3 - 27) = 0$$

$$x = 0$$

и

$$x^3 - 27 = 0$$

$$x^3 = 27$$

$$x^3 = 3^3$$

$$x = 3$$

Επορω Μαθημα

Σελ 173

① α γ δ σ ζ θ .

② α γ δ σ ζ

③ α β γ

④ α β γ δ ε .

⑤ α γ δ .

⑥ α .

⑦ α β γ

⑧ α β .

⑨ α .

⑩ α γ

⑪ α γ .