

$$1) 6) \quad x^3 + x^2 = 12 \Leftrightarrow x^3 + x^2 - 12 = 0 \quad p = 2$$

1	1	0	-12	$p=2$
↓	2	6	12	
1	3	6	0	

$\underbrace{\hspace{1.5cm}}_{n(x)} \quad \underbrace{\hspace{1.5cm}}_u$

$$\text{Apru } (x-2)(x^2+3x+6) = 0 \Leftrightarrow$$

$$x-2=0$$

$$\boxed{x=2}$$

$$\vee \quad x^2+3x+6=0$$

$$\Delta = 9 - 4 \cdot 1 \cdot 6 = 9 - 24 < 0$$

Keine Wurzeln in $\mathbb{R}$

$$e) \quad x^3 - 3x + 2 = 0, \quad p = 1$$

$$(x-1)(x^2+x-2) = 0 \Leftrightarrow$$

$$x-1=0 \vee x^2+x-2=0$$

$$\boxed{x=1}$$

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

$$1 + 8 = 9 > 0$$

1	0	-3	2	$p=1$
↓	1	1	-2	
1	1	-2	0	

$\underbrace{\hspace{1.5cm}}_{n(x)} \quad \underbrace{\hspace{1.5cm}}_u$

$$x_{1,2} = \frac{-1 \pm 3}{2} \begin{matrix} \xrightarrow{+} \textcircled{1} \\ \xrightarrow{-} \textcircled{-2} \end{matrix}$$

2) b) $x^4 - 2x^3 - 7x^2 + 8x + 12 = 0$, $p = -1: 1 + 2 - 7 - 8 + 12 = 0 \checkmark$

1	-2	-7	8	12	$p = -1$
↓	-1	3	4	-12	
1	-3	-4	12	0	
<u> </u>					u
$\Pi(x)$					

Apra $(x+1)(x^3 - 3x^2 - 4x + 12) = 0 \Rightarrow$

$x+1=0$
 $x = -1$

$x^3 - 3x^2 - 4x + 12 = 0$
 $p = -2: -8 - 12 + 8 + 12 = 0 \checkmark$

Apra $(x+2)(x^2 - 5x + 6) = 0 \Rightarrow$

$x+2=0$ $\vee$ $x^2 - 5x + 6 = 0$

$x = -2$

$\Delta = 25 - 4 \cdot 1 \cdot 6 = 25 - 24$

$= 1 > 0$ $x_{1,2} = \frac{5 \pm 1}{2} =$ 3 2

1	-3	-4	12	$p = -2$
↓	-2	10	-12	
1	-5	6	0	
<u> </u>				u
$\Pi(x)$				

$$3) a) \frac{1}{12} \cdot X^4 + \frac{1}{3} \cdot X^3 + \frac{1}{12} \cdot X^2 - X - 1 = 0 \quad (\cdot 12)$$

$$\cancel{\frac{1}{12}} \cdot X^4 + \cancel{\frac{1}{3}} \cdot X^3 + \cancel{\frac{1}{12}} \cdot X^2 - 12X - 12 = 0 \quad (=)$$

$$X^4 + 4X^3 + X^2 - 12X - 12 = 0, \quad p = -2: 16 - 32 + 4 + 24 - 12 = 44 - 44 = 0 \checkmark$$

1	4	1	-12	-12	$p = -2$
↓	-2	-4	6	12	
1	2	-3	-6	0	
					4
$n(x)$					

$$(x+2)(x^3 + 2x^2 - 3x - 6) = 0 \quad (=)$$

$$x+2=0 \quad \vee \quad x^3 + 2x^2 - 3x - 6 = 0$$

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

$$x^2(x+2) - 3(x+2) = 0 \quad (=)$$

$$(x+2)(x^2 - 3) = 0 \quad (=)$$

$$x+2=0 \quad \vee \quad x^2 - 3 = 0 \quad (=) \quad x^2 = 3 \quad (=)$$

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

$$\boxed{x = \pm \sqrt{3}}$$

17) α $\underline{x^3 - 4x^2 + x - 4 > 0}$ $\overset{\text{Νύκτω}}{\text{Τμήν}} \overset{\text{Επίσημ}}{x^2(x-4) + 1(x-4) = 0 \Leftrightarrow}$

$(x-4)(x^2+1) = 0 \Leftrightarrow x-4=0 \vee x^2+1=0$
 $\boxed{x=4}$ | $\text{4 δύνανται δίου } \underline{x^2+1 > 0}$

Πίνακας προσημίας

x	
$x-4$	- 0 +
x^2+1	+ +
$P(x)$	- 0 +

Αρα $P(x) > 0$ για $x \in (4, +\infty)$

$$17) a) \quad \underline{x^3 - 2x^2 - 4x + 8 \geq 0}$$

$P(x)$

1. $\dot{u}$ rw Trin. Gleichung $x^3 - 2x^2 - 4x + 8 = 0 \quad (| : (x-2))$

$$x^2(x-2) - 4(x-2) = 0 \quad (| : (x-2)) \quad (x-2)(x^2-4) = 0$$

$$x-2=0 \quad \vee \quad x^2-4=0 \quad (| : (x-2))$$

$$\boxed{x=2}$$

$$x^2=4 \quad (| : (x-2)) \quad \boxed{x=\pm 2}$$

x	$-\infty$	-2	2	$+\infty$	
$x-2$	$-$	$-$	0	$+$	
x^2-4	$+$	0	$-$	0	$+$
$P(x)$	$-$	0	$+$	0	$+$

$\forall x \quad P(x) \geq 0 \quad \text{für}$

$$x \in [-2, +\infty)$$