

Exercises 19

1. (B) $P(x) = (1-3x)(x^2-4)$

$\rightarrow P(x) = 0 \Rightarrow (1-3x)(x^2-4) = 0$

$1-3x = 0 \quad \vee \quad x^2-4 = 0$

$1 = 3x$

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

$x = 2 \quad x = -2$

x	-2	$\frac{1}{3}$	2
$1-3x$	+	+	-
x^2-4	+	-	+
$P(x)$	+	-	-

(S) $P(x) = (1-4x)(x^2+5)$

$\rightarrow 1-4x = 0$

$1 = 4x$

$x = \frac{1}{4}$

x	$\frac{1}{4}$
$1-4x$	+
x^2+5	+
$P(x)$	+

$\textcircled{02} \quad P(x) = (1-2x) \left(x^2 - \overset{+}{x} + 1 \right)$
 $\textcircled{\frac{1}{2}} \quad \Delta < 0$

x		$\frac{1}{2}$
$1-2x$	+	$\oplus$ —
x^2-x+1	+	+
$P(x)$	+	—

$\textcircled{4} \quad P(x) = (x-1) (2-x)^3$
 $\downarrow \quad \downarrow$
 $\textcircled{1} \quad \textcircled{2}$

x		1	2
$x-1$	—	$\oplus$ +	+
$(2-x)^3$	+	+	$\oplus$ —
$P(x)$	—	+	—

2. (B) $P(x) = (3x^2 - x - 2)(-x^2 + 6x - 9)$

$\downarrow$
 $\Delta = 1 + 24$
 $\Delta = 25$
 $x = \frac{1 \pm 5}{6}$

$\downarrow \Delta = 0$
 $x = 3$

$\begin{matrix} \textcircled{1} \\ \textcircled{-\frac{2}{3}} \end{matrix}$

x	$-\frac{2}{3}$	1	3
$3x^2 - x - 2$	$+$	$-$	$+$
$-x^2 + 6x - 9$	$-$	$-$	$-$
$P(x)$	$-$	$+$	$-$

3. (8) $f(x) = x - x^3$

$f(x) = x(1 - x^2)$

$\textcircled{0} \quad \textcircled{1} \quad \textcircled{-1}$

x	-1	0	1
x	$-$	0	$+$
$1 - x^2$	$-$	$+$	$-$
$f(x)$	$+$	$+$	$-$

4. (B) $f(x) = -3x^3 + x^2 + 2x$

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

↓
(0)

$$\Delta = 1 + 24 = 25$$

$$x = \frac{-1 \pm 5}{-6}$$

(-2/3)

→ (1)

x	-2/3	0	1
x	-	0	+
-3x^2 + x + 2	-	+	-
f(x)	+	-	+

5. (D) $f(x) = x^5 + x^2$

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

↓
(0)

↓
(-1)

x	-1	0
x^2	+	0
x^3 + 1	-	+
f(x)	-	+

6. $f(x) = x^3 - 7x + 6$

$$\begin{array}{ccccccc}
 & 1 & 0 & -7 & 6 & \textcircled{1} & \\
 & \downarrow & & & & & \\
 & 1 & 1 & -6 & 0 & &
 \end{array}$$

$$f(x) = (x-1)(x^2+x-6)$$

$\textcircled{1} \quad \textcircled{-3} \quad \textcircled{2}$

x	-3	1	2
$x-1$	-	- $\circ$ +	+
x^2+x-6	+	$\circ$ -	- $\circ$ +
$f(x)$	-	+	-

10. (Y) $x^3 + x^2 > 5x - 3$

$$x^3 + x^2 - 5x + 3 > 0$$

$$\begin{array}{cccc|c} 1 & 1 & -5 & 3 & (1) \\ \downarrow & & & & \\ 1 & 2 & -3 & 0 & \end{array}$$

$$(x-1)(x^2+2x-3) > 0$$

(1) $\Delta = 4 + 12 = 16$

$$x = \frac{-2 \pm 4}{2}$$

(1)

(-3)

x	-3	1
x-1	-	+
x^2+2x-3	+	-
—	-	+

$$x \in (-3, 1)$$

κανονα

$a > 0$

x	p
$ax + \beta$	$- \phi +$

Δεξια τω ριζα ομοσηα του α ,

$0 < a < 1$

x	p ₁	p ₂
$ax^2 + \beta x + \gamma$	$+ \phi -$	$- \phi +$

$\Delta > 0$

$a > 0$

x	p
$ax^2 + \beta x + \gamma$	$+ \phi +$

$\Delta = 0$

$a > 0$

x	
$ax^2 + \beta x + \gamma$	$+$

$\Delta < 0$

x	1
$x^3 - 1$	$- \phi +$