ΑΠΑΝΤΗΣΕΙΣ ΙΟΥΛΙΟΥ 2003

ΘΕΜΑ 1ο

Α. Θεωρία, **Β.** γ, **Γ.** β, **Δ.** Θεωρία.

ΘΕΜΑ 2ο

α. Πρέπει $x^2 - 1 \geq 0$.

x	$-\infty$		-1		1		$+\infty$
$x^2 - 1$	+		0	-	0	+	

Άρα $A_f = (-\infty , -1] \cup [1 , +\infty)$.

β. $f'(x) = \left(\sqrt{x^2 - 1}\right)' = \dfrac{(x^2 - 1)'}{2\sqrt{x^2 - 1}} = \dfrac{2x}{2\sqrt{x^2 - 1}} = \dfrac{x}{\sqrt{x^2 - 1}}$

$$f'(3) = \frac{3}{\sqrt{3^2 - 1}} = \frac{3}{\sqrt{8}} = \frac{3}{2\sqrt{2}} = \frac{3\sqrt{2}}{2(\sqrt{2})^2} = \frac{3\sqrt{2}}{2\cdot 2} = \frac{3\sqrt{2}}{4}$$

γ. $\lim\limits_{x\to 2} h(x) = \lim\limits_{x\to 2} \dfrac{f(x) - \sqrt{3}}{x - 2} = \lim\limits_{x\to 2} \dfrac{\sqrt{x^2 - 1} - \sqrt{3}}{x - 2}$

$$= \lim_{x\to 2} \frac{\left(\sqrt{x^2 - 1} - \sqrt{3}\right)\left(\sqrt{x^2 - 1} + \sqrt{3}\right)}{(x - 2)\left(\sqrt{x^2 - 1} + \sqrt{3}\right)}$$

$$= \lim_{x\to 2} \frac{x^2 - 4}{(x - 2)\left(\sqrt{x^2 - 1} + \sqrt{3}\right)} = \lim_{x\to 2} \frac{(x - 2)(x + 2)}{(x - 2)\left(\sqrt{x^2 - 1} + \sqrt{3}\right)}$$

$$= \lim_{x\to 2} \frac{x + 2}{\sqrt{x^2 - 1} + \sqrt{3}} = \frac{4}{2\sqrt{3}} = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

ΘΕΜΑ 3ο

α. $A = \{2 , 4 , 6 , 8 , \dots , 30\}$ και $B = \{ 5 , 10 , 15 , 20 , 25 , 30\}$

$$P(A) = \frac{N(A)}{N(\Omega)} = \frac{15}{30} = 0{,}5 \quad \text{και} \quad P(B) = \frac{N(B)}{N(\Omega)} = \frac{6}{30} = 0{,}2$$

β. $A \cap B = \{10 , 20 , 30\}$ και $P(A \cap B) = \dfrac{N(A \cap B)}{N(\Omega)} = \dfrac{3}{30} = 0{,}1.$

$P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0{,}5 + 0{,}2 - 0{,}1 = 0{,}6.$

γ. $P(A \cup B') = P(A) + P(B') - P(A \cap B')$

$= P(A) + 1 - P(B) - P(A - B)$

$= P(A) + 1 - P(B) - [P(A) - P(A \cap B)]$

$= P(A) + 1 - P(B) - P(A) + P(A \cap B)$

$= 1 - P(B) + P(A \cap B)$

$= 1 - 0{,}2 + 0{,}1 = 0{,}9.$

δ. $P[(A' \cap B) \cup (A \cap B')] = P[(A - B) \cup (B - A)]$

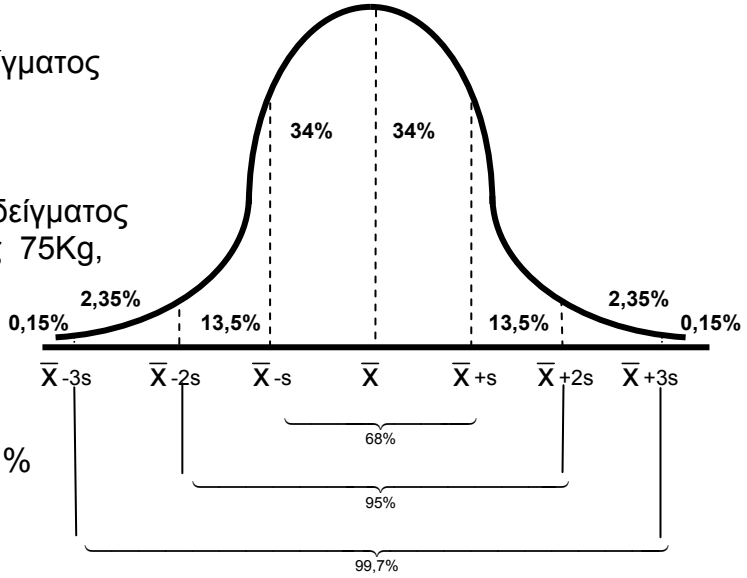
$= P(A) + P(B) - 2P(A \cap B)$

$= 0{,}5 + 0{,}2 - 2 \cdot 0{,}1 = 0{,}5.$

ΘΕΜΑ 4ο

α. Το 50% των μαθητών του δείγματος έχουν βάρος το πολύ 65 Kg,
άρα $\bar{x} = \delta = 65$.

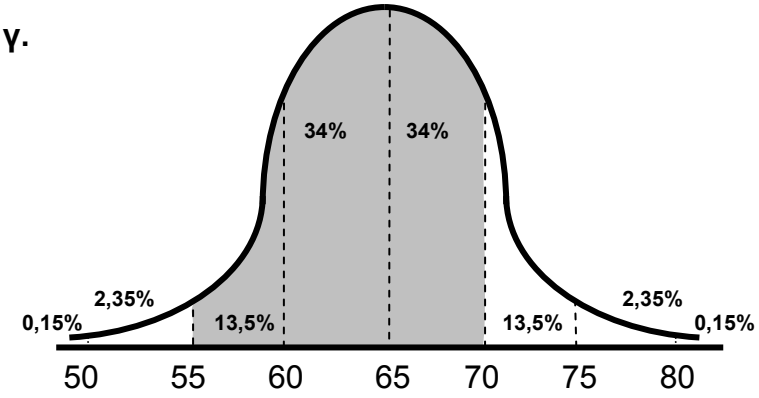
Το 47,5% των μαθητών του δείγματος έχουν βάρος από 65Kg έως 75Kg,
άρα $\bar{x} + 2s = 75 \Leftrightarrow$
$65 + 2s = 75 \Leftrightarrow$
$2s = 10 \Leftrightarrow$
$s = 5$



β. $CV = \frac{s}{\bar{x}} = \frac{5}{65} \cong 7{,}69\% < 10\%$

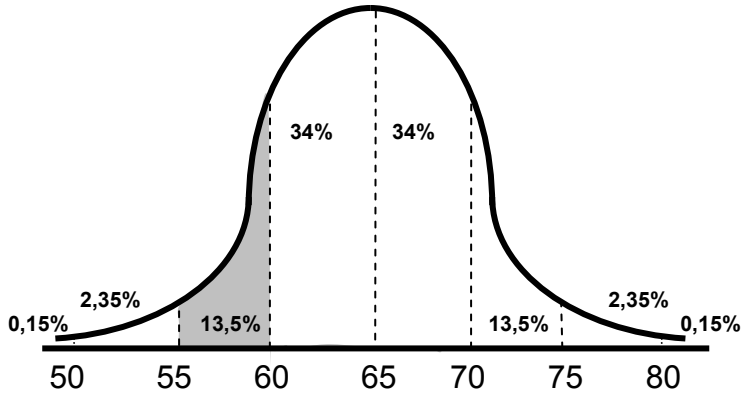
Άρα **είναι ομοιογενές**.

γ.



13,5% + 34% + 34% = **81,5%**

δ.



[55 , 60) → 13,5%

$f_i = \frac{v_i}{v} \Leftrightarrow 0{,}135 = \frac{27}{v} \Leftrightarrow v = \frac{27}{0{,}135} \Leftrightarrow$ **v = 200**.