

ΜΑΘΗΜΑΤΙΚΑ Ι ΓΕΝΙΚΗΣ ΠΑΙΔΕΙΑΣ ΕΠΑΛ Α΄ ΟΜΑΔΑΣ

ΑΠΑΝΤΗΣΕΙΣ

ΘΕΜΑ Α

A1) Σχολ. Βιβλίο – σελ. 234

A2) α) Σ β) Σ γ) Λ δ) Λ ε) Σ

A3) α)
$$\int_a^{\beta} \eta \mu x dx = [-\sigma \nu x]_a^{\beta} = -\sigma \nu \beta + \sigma \nu \alpha$$

β) $(cf)' \cdot (x) = c \cdot f'(x)$

γ) $(x^{\alpha})' = \alpha x^{\alpha-1}$

Θέμα Β

B1.

$$\lim_{x \rightarrow 1^-} f(x) = \lim_{x \rightarrow 1^-} (\alpha^2 x + \ln x) = \alpha^2 \cdot 1 + \ln 1 = \alpha^2$$

B2.

$$\lim_{x \rightarrow 1^-} f(x) = \lim_{x \rightarrow 1^+} \frac{x^2 - x}{\sqrt{x+3} - 2} = \lim_{x \rightarrow 1^+} \frac{(x^2 - x)(\sqrt{x+3} + 2)}{(\sqrt{x+3} - 2)(\sqrt{x+3} + 2)} = \lim_{x \rightarrow 1^+} \frac{x(x-1)(\sqrt{x+3} + 2)}{x-1} = 4$$

B3.

$$\lim_{x \rightarrow 1^-} f(x) = \lim_{x \rightarrow 1^+} f(x) = f(1) \Leftrightarrow \alpha^2 = 4 \Leftrightarrow \alpha = \pm 2$$

Θέμα Γ

Γ1.

$$v_1 + v_2 + v_3 + v_4 = v$$

$$25 + 17 + 6 + 2 = v$$

$$50 = v$$

$$f_1 \% = \frac{v_1}{v} 100\% = \frac{25}{50} 100\% = 50\%$$

$$f_2 \% = \frac{v_2}{v} 100\% = \frac{17}{50} 100\% = 34\%$$

$$f_3 \% = \frac{v_3}{v} 100\% = \frac{6}{50} 100\% = 12\%$$

$$f_4 \% = \frac{v_4}{v} 100\% = \frac{2}{50} 100\% = 4\%$$

Μισθός εκατοντάδες €	Συχνότητα (αριθμός υπαλλήλων v_i)	Σχετική Συχνότητα $f_i\%$	$x_i v_i$
6	25	50	150
10	17	34	170
15	6	12	90
20	2	4	40
Σύνολα	$v = 50$	100	450

Γ2.

$$\bar{x} = \frac{x_1 v_1 + x_2 v_2 + x_3 v_3 + x_4 v_4}{v} = \frac{450}{50} = 9$$

Γ3.

Το 84% των υπαλλήλων έχουν μισθό το πολύ 1000€

Γ4.

$$S^2 = \frac{v_1 (x_1 - \bar{x})^2 + v_2 (x_2 - \bar{x})^2 + v_3 (x_3 - \bar{x})^2 + v_4 (x_4 - \bar{x})^2}{v} =$$

$$S^2 = \frac{25(6-9)^2 + 17(10-9)^2 + 6(15-9)^2 + 2(20-9)^2}{v} =$$

$$S^2 = \frac{25(-3)^2 + 17(1)^2 + 6(6)^2 + 2(11)^2}{50} =$$

$$S^2 = \frac{25 \cdot 9 + 17 \cdot 1 + 6 \cdot 36 + 2 \cdot 121}{50} =$$

$$S^2 = \frac{225 + 17 + 216 + 242}{50} = \frac{700}{50} = 14$$

Θέμα Δ

Δ1.

$$f(x) = (x-2)^2 (x+\alpha)$$

$$f'(x) = 2(x-2)(x+\alpha) + (x-2)^2 = (x-2)(2x+2\alpha+x-2) = (x-2)(3x+2\alpha-2)$$

Δ2.

$$f'(4) = 0 \Leftrightarrow (4-2)(3 \cdot 4 + 2\alpha - 2) = 0 \Leftrightarrow 2(10 + 2\alpha) = 0 \Leftrightarrow 10 + 2\alpha = 0 \Leftrightarrow \alpha = -5$$

Δ3.

$$f'(x) = (x-2)(3x-12)$$

$$f'(x) = 0 \Leftrightarrow x-2 = 0 \quad \eta \quad 3x-12 = 0$$

$$\Leftrightarrow x = 2 \quad \eta \quad x = 4$$

	$-\infty$	2	4	$+\infty$	
$f'(x)$	+	0	-	0	+
$f(x)$	↗		↘		↗

T.M. T.E.
 $f(2) = 0$ $f(4) = -4$

Δ4.

$$f(x) = g(x) \Leftrightarrow 3x^2 - 12x = 6x - 24 \Leftrightarrow 3x^2 - 18x + 24 = 0 \Leftrightarrow x^2 - 6x + 8 = 0$$

$$\Delta = 4$$

$$x_{1,2} = \frac{6 \pm 2}{2} \Leftrightarrow x_1 = 4 \quad \eta \quad x_2 = 2$$

$$E(\Omega) = \int_2^4 |f(x) - g(x)| dx = \int_2^4 |3x^2 - 12x - 6x + 24| dx =$$

$$\int_2^4 |3x^2 - 18x + 24| dx$$

	$-\infty$	2	4	$+\infty$	
$3x^2 - 18x + 24$	+	0	-	0	+

$$E(\Omega) = \int_2^4 (-3x^2 + 18x - 24) dx = \left[-x^3 + 9x^2 - 24x \right]_2^4 =$$

$$-4^3 + 9 \cdot 4^2 - 24 \cdot 4 - (-2^3 + 9 \cdot 2^2 - 24 \cdot 2) =$$

$$= -64 + 144 - 96 + 8 - 36 + 48 = 200 - 196 = 4 \text{ τ.μ.}$$