$a = -4$ $\quad A = \frac{3}{128}$.

Домашня робота

1) $$f(x) = \begin{cases} \cos x, & x \in \left(0; \frac{\pi}{2}\right) \\ 0, & x \notin \left(0; \frac{\pi}{2}\right) \end{cases}$$

$$F_\xi(x) = \int_{-\infty}^{x} f(u)\,du$$

$$\int_0^x \cos u\,du = \sin u \Big|_0^x = \sin x$$

$$F_\xi(x) = \begin{cases} 1, & x > \frac{\pi}{2} \\ \sin x, & x \in \left(0, \frac{\pi}{2}\right] \\ 0, & x \leq 0. \end{cases}$$

2) $$F_\xi(x) = \begin{cases} 1, & x > 2, \\ \frac{x}{4} + \frac{1}{2}, & -2 < x \leq 2 \\ 0, & x \leq -2 \end{cases}$$

$$f(x) = \frac{1}{4} \qquad x \in (-2; 2]$$

$$M\xi = \int_{-2}^{2} x \cdot \frac{1}{4}\,dx = \frac{x^2}{8}\Big|_{-2}^{2} = 0.$$

$$M\xi^2 = \int_{-2}^{2} x^2 \cdot \frac{1}{4}\,dx = \frac{x^3}{12}\Big|_{-2}^{2} = \frac{8}{12} + \frac{8}{12} = \frac{4}{3}$$

$$D\xi = M\xi^2 - M(\xi)^2 = \frac{4}{3} - 0^2 = \frac{4}{3}$$

3) $f_\xi(x) = \frac{3}{16} x^{n+1} \quad \xi \in [a, 2] \quad M\xi = 0$

$$\begin{cases} \int_a^2 \frac{3}{16} x^{n+1} dx = 1 \\ \int_a^2 \frac{3}{16} x^{n+2} dx = 0 \end{cases} \quad \begin{cases} \frac{3}{16(n+2)} \left(2^{n+2} - a^{n+2}\right) = 1 \\ \frac{3}{16(n+2)} \left(2^{n+3} - a^{n+3}\right) = 0 \end{cases}$$

$$2^{n+3} = a^{n+3} \qquad |a| = |2|$$

• n - непарне $\Rightarrow$ $n+3$ - парне

$a = -2$

$2^{n+2} + 2^{n+2} = \frac{16(n+2)}{3}$; $2 \cdot 2^{n+3} = \frac{16(n+2)}{3}$

$2^n = \frac{2(n+2)}{3}$; $2^{n-1} = \frac{n+2}{3} \Rightarrow n = 1$

Відповідь: $a = -2$, $n = 1$