№2

a

$1011.\overline{010}$

$1011 = 2^0 \cdot 1 + 2^1 \cdot 1 + 2^3 \cdot 1 = 11$

$.01001001$

$2^{-2} \quad 2^{-5} \quad 2^{-8}$

$$\Rightarrow \sum_{p=0}^{\infty} 2^{-2} \cdot 2^{-3p} =$$

$$= \frac{1}{4} \sum_{0}^{\infty} 2^{-3p} = \frac{1}{4} \cdot \sum \frac{1}{8^p} =$$

$$= \frac{1}{4} \cdot \frac{1}{1-\frac{1}{8}} = \frac{1}{4} \cdot \frac{8}{7} = \frac{2}{7}$$

$11 + \frac{2}{7} \leftarrow$ ответ

в

$11.10\overline{10}1$

$11_2 = 3$

$.101010101$

$2^{-1} \quad 2^{-3} \quad 2^{-5} \quad 2^{-7}$

$$\sum_{0}^{\infty} 2^{-(1+2p)} = \frac{1}{2} \sum_{0}^{\infty} 2^{-2p} = \frac{1}{2} \sum \left(\frac{1}{4}\right)^p =$$

$$= \frac{1}{2} \cdot \frac{1}{1-\frac{1}{4}} = \frac{1}{2} \cdot \frac{4}{3} = \frac{2}{3}$$

$3 + \frac{2}{3} \leftarrow$ ответ

N(3)

p. 16 ex 16

a

$x = 2.75$

$2/2 = 1$	$0.75 \cdot 2 = 0.5 + 1$
$1/2 = 0$	$0.5 \cdot 2 = 0 + 1$

$x_B = 10.11$

$$fl(x_B) - x_B = 0 < \frac{\epsilon_{mach}}{2}$$

b

$x = 2.7$

$2/2 = 1$	$0.7 \cdot 2 = 0.4 + 1$	$0.6 \cdot 2 = 0.2 + 1.$
$1/2 = 0$	$0.4 \cdot 2 = 0.8 + 0$	$0.2 \cdot 2 = 0.4 + 0$
	$0.8 \cdot 2 = 0.6 + 1$	$0.4 \cdot 2 = 0.8 + 0$

$fl(x) = 10.1\overline{0110} = 1.01\overline{0110} \cdot 2^1$

$$(52 - 2)/4 = \frac{50}{4} = 12 \text{ oct. } 2$$

the 52nd Bit = 1 and 53rd Bit = 1

$1.01 \ldots\ldots 01 + 1 \cdot 2^{-52} =$

$= 1,01\,0110 \ldots\ldots 10 =$

$0.7 \cdot 10^{-50}$

$f(2,7) - 2,7 = 0.01\,\underbrace{0110 \ldots 0110}_{12 \text{ times}}\,10$

N 7

p 51 w 8

1) $f(x) = x^n - \alpha x^{n-1}$

2) $g(x) = x^n$

3) $f_\varepsilon(x) = x^n - \alpha x^{n-1} + \varepsilon x^n$

root of 1) $x_1 = 0$, $x_2 = \alpha$

$f'(x) = n x^{n-1} - \alpha(n-1) x^{n-2}$

$\bar{x} = \alpha$

$f(\alpha) = 0 \quad f'(\alpha) = n\alpha^{n-1} - n\alpha^{n-1} + \alpha^{n-1}$

$= \alpha^{n-1}$

$$\Delta r = -\frac{\varepsilon \alpha^{n}}{\alpha^{n-1}} = -\alpha\varepsilon$$

$$r + \Delta r = \alpha - \alpha\varepsilon = \alpha(1-\varepsilon)$$

$$f(x) = x^{n} - \alpha x^{n-1} + \varepsilon x^{n}$$

$$= f(x) = x^{n}\left(1 - \frac{\alpha}{x} + \varepsilon\right)$$

$$1 - \frac{\alpha}{x} + \varepsilon = 0 \qquad x = \frac{\alpha}{1+\varepsilon}$$ ✓ корень

$$f'\left(\frac{\alpha}{1+\varepsilon}\right) = n\cdot(1+\varepsilon)x^{n-1} - \alpha(n-1)x^{n-2}$$

$$= n\cdot(1+\varepsilon)\frac{\alpha^{n-1}}{(1+\varepsilon)^{n-1}} - (n-1)\frac{\alpha^{n-1}}{(1+\varepsilon)^{n-2}} =$$

$$= \frac{n\alpha^{n-1} - n\alpha^{n-1} + \alpha^{n-1}}{(1+\varepsilon)^{n-2}} = \frac{\alpha^{n-1}}{(1+\varepsilon)^{n-2}}$$

$$\Delta r = \varepsilon\frac{\left(\frac{\alpha}{1+\varepsilon}\right)^{n}}{\frac{\alpha^{n-1}}{(1+\varepsilon)^{n-2}}} = -\varepsilon\frac{\alpha}{(1+\varepsilon)^{2}}$$

$$r + \Delta r = \frac{\alpha}{1+\epsilon} - \frac{\epsilon\alpha}{(1+\epsilon)^2} = \frac{\alpha}{(1+\epsilon)^2}$$

NS

p. 59 ex 12

$$\boxed{\begin{aligned} f(x) &= \frac{1}{x} \\ x_0 &= 1 \\ x_{50} &= ? \end{aligned}}$$

$$x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$$

$$f'(x) = -\frac{1}{x^2}$$

$$\frac{f(x)}{f'(x)} = -\frac{1}{x}\frac{x^2}{1} = -x_i$$

$$x_{i+1} = x_i + x_i = 2x_i$$

for $i = 0$

$$x_1 = 2x_0 = 2$$

$$x_2 = x_1 - \left(-\frac{1}{2x_0}\frac{4x_0^2}{1}\right) = x_1 + 2x_0 = $$

$$= 2x_1$$

$$x_3 = x_2 + \left(\frac{1}{2x_1} \cdot \frac{4x_1^2}{1}\right) = x_2 + 2x_1 =$$

$$= 8$$

$$x_{50} = 2 \cdot x_{49} = 2^{50}$$