UNIVERZITET CRNE GORE

POMORSKI FAKULTET KOTOR

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1. $\frac{48x^2-27}{16x^2+24x+9} = \frac{3(16x^2-9)}{(4x+3)^2} = \frac{3\cancel{(4x+3)}(4x-3)}{(4x+3)^{\cancel{2}}} = \boldsymbol{\frac{3(4x-3)}{4x+3}}$

2. $\mathbf{I}\ \ 100 - 25\% = 75$

   $\mathbf{II}\ \ 75 - 12\% = 75 - 75\frac{12}{100} = 75 - 9 = 66$

   $66 : 304 = 100 : x$

   $\boldsymbol{x} = \frac{304 \cdot 100}{66} = \mathbf{460.61}$

3. $(\frac{\boldsymbol{i^{100}}}{\sqrt{2}} + \frac{\boldsymbol{i^{99}}}{\sqrt{2}})^{-2} = (\frac{1}{\sqrt{2}} - \frac{i}{\sqrt{2}})^{-2} = \frac{1}{(\frac{1}{\sqrt{2}} - \frac{i}{\sqrt{2}})^2} = \frac{1}{\frac{1}{2} - 2\frac{1}{\sqrt{2}}\frac{i}{\sqrt{2}} + \frac{i^2}{2}} = \frac{1}{\cancel{\frac{1}{2}} - i - \cancel{\frac{1}{2}}} = \frac{1}{-i} \cdot \frac{i}{i} = \frac{i}{-i^2} = \frac{i}{-(-1)} = \boldsymbol{i}$

4. **c)**

5. $\mathrm{D} = \mathrm{b}^2 - 4 \cdot \mathrm{a} \cdot \mathrm{c} = (m-5)^2 - 4 \cdot (m-2) \cdot 1 = m^2 - 10m + 25 - 4m + 8 = m^2 - 14m + 33$

   $\mathrm{D} = 0 \Rightarrow \ \mathrm{m}^2 - 14\mathrm{m} + 33 = 0$

   $\mathrm{m}_{1,2} = \frac{14 \pm \sqrt{14^2 - 4 \cdot 1 \cdot 33}}{2} = \frac{14 \pm \sqrt{196 - 132}}{2} = \frac{14 \pm \sqrt{64}}{2} = \frac{14 \pm 8}{2}$

   $\mathbf{m_1} = \frac{14-8}{2} = \mathbf{3} \qquad \mathbf{m_2} = \frac{14+8}{2} = \mathbf{11}$

6. $\mathrm{y} = \mathrm{k} \cdot \mathrm{x} + \mathrm{n} \qquad y - y_1 = k \cdot (x - x_1) \qquad k = \frac{1}{3}$

   $(3, -4)$

   $\mathrm{y} + 4 = \frac{1}{3} \cdot (x - 3)$

   $\mathrm{y} + 4 = \frac{1}{3} \cdot \mathrm{x} - 1$

   $y = \frac{1}{3} \cdot x - 5$

   a) ~~$(-5, 1)\ \ y = -\frac{5}{3} - 5$~~

   b) $(-6, -7)\ \ \mathbf{y} = -\frac{6}{3} - \mathbf{5} = -\mathbf{7}$ ✓

   c) ~~$y = \frac{2}{3} - 5$~~

   d) ~~$y = \frac{1}{3} - 5$~~

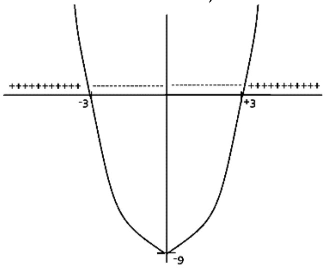
7. $\boldsymbol{a} = \mathbf{5.6}, \boldsymbol{b} = \mathbf{0.6}$

   $(a+2)^2 - 2(a+2)(b-3) + (b-3)^2 = \left(a + 2 - (b-3)\right)^2 = (a + 2 - b + 3)^2 =$

   $= (a - b + 5)^2 = (5.6 - 0.6 + 5)^2 = 10^2 = \mathbf{100}$

8. $-\frac{5}{2 \cdot x^2 - 18} > 0 \quad \Rightarrow \quad \frac{-5}{2(x^2-9)} > 0 \quad \Rightarrow \quad x^2 - 9 < 0$

   $x^2 - 9 = 0 \qquad x_{1,2} = \pm 3 \qquad \mathbf{x} \in (-\mathbf{3}, \mathbf{3})$



9. $3 + \log_2 x = \frac{4}{\log_2 x}$ **smjena**: $\log_2 x = t$

$3 + t = \frac{4}{t} \; / \cdot t$

$3t + t^2 = 4$

$t^2 + 3t - 4 = 0$

$\log_2 x = -4$

$\log_2 x = 1$

$t_{1,2} = \frac{-3 \pm \sqrt{9+16}}{2} = \frac{-3 \pm 5}{2}$

$t_1 = \frac{-8}{2} = -4$

$t_2 = 1$

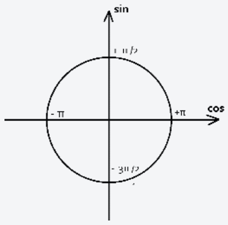
$\mathbf{x_1 = 2^{-4} = \frac{1}{16}}$

$\mathbf{x_2 = 2^1 = 2}$

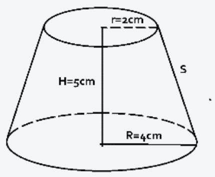
10. $\cos\alpha = \pm\sqrt{1 - sin^2\alpha} = -\sqrt{1 - 0.8^2} = -\sqrt{1 - 0.64} = -\sqrt{0.36} = -0.6$

$\cos\left(\alpha - \frac{\pi}{3}\right) = \cos\alpha \cdot \cos\frac{\pi}{3} + \sin\alpha \cdot \sin\frac{\pi}{3} =$

$= -0.6 \cdot \frac{1}{2} + 0.8 \cdot \frac{\sqrt{3}}{2} = \frac{0.8 \cdot \sqrt{3} - 0.6}{2}$



11. $P = B1 + B2 + M = 16\pi + 4\pi + 32.31\pi = 52.31\pi \text{ cm}^2$



$\mathbf{B1} = R^2 \cdot \pi = \mathbf{16\pi\ cm^2}$

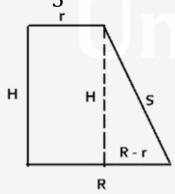
$\mathbf{B2} = r^2 \cdot \pi = \mathbf{4\pi\ cm^2}$

$\mathbf{M} = (R + r) \cdot S \cdot \pi = (4 + 2) \cdot \sqrt{29} \cdot \pi = \mathbf{32.31\ \pi\ cm^2}$

$V = \frac{H}{3} \cdot (B1 + B2 + \sqrt{B1 \cdot B2})$

$V = \frac{5}{3} \cdot (16\pi + 4\pi + \sqrt{16\pi \cdot 4\pi})$

$\mathbf{V} = \frac{5}{3} \cdot (20\pi + 8\pi) = \frac{5 \cdot 28\pi}{3} = \mathbf{\frac{140}{3}\pi}$



$H^2 + (R - r)^2 = S^2$ $\quad 5^2 + 2^2 = S^2$ $\quad 25 + 4 = S^2$ $\quad => \quad \mathbf{S = \sqrt{29}\ cm}$

12. $f(x) = \frac{1}{x-4} \quad g(x) = \frac{1}{x}$

$h(x) = f(x) + g(x) = \frac{1}{x-4} + \frac{1}{x} = \frac{x+x-4}{(x-4)\cdot x} = \frac{2x-4}{(x-4)\cdot x} = \frac{2\cdot(x-2)}{(x-4)\cdot x}$

DOMEN: $(x-4)\cdot x \neq 0$ $\quad x - 4 \neq 0$ $\quad x \neq 4 \;\wedge\; x \neq 0$

NULE: $h(x) = 0 \;=>\; 2(x-2) = 0 \;=>\; x - 2 = 0 \;=>\; x = 2$ $\quad \mathbf{N(2,0)}$