

1)

$$\begin{aligned} \left(1 - \frac{1}{3} - \frac{2}{5}\right) * S_{ABC} &= 4m^2 \\ \frac{15 - 5 - 6}{15} * S_{ABC} &= 4m^2 \\ \frac{4}{15} * S_{ABC} &= 4m^2 \\ S_{ABC} &= 15m^2 \end{aligned}$$

2)

$$\begin{aligned} 10^5 * \left(\frac{25}{99} - 0.2 - \frac{5}{999}\right) &= \\ 10^5 * 0.0475202 &= \\ 4752.02 &\doteq 4750 \end{aligned}$$

3)

$$\begin{aligned} \frac{5x - 6}{6} - \left(\frac{x}{6} - \frac{12x}{9}\right) &= \\ \frac{5x - 6}{6} - \frac{x}{6} + \frac{4x}{3} &= \\ \frac{5x - 6 - x + 8x}{6} &= \\ \frac{12x - 6}{6} &= 2x - 1 \end{aligned}$$

4)

$$\begin{aligned} a \neq 0 \wedge a \neq -\frac{1}{2} \\ \frac{4a - \frac{1}{a}}{4a + 2} &= \\ \frac{\frac{4a^2 - 1}{a}}{2(2a + 1)} &= \\ \frac{4a^2 - 1}{2a(2a + 1)} &= \\ \frac{(2a - 1)(2a + 1)}{2a(2a + 1)} &= \frac{(2a - 1)}{2a} \end{aligned}$$

5)

$$\begin{aligned}\frac{x-1}{2} - 3x + 16 &< x \\ \frac{3x-3}{6} - 3x + 36 - x &< 0 \\ \frac{3x-3-3x-3-6x}{6} &< 0 \\ \frac{-6x-6}{6} &< 0 \\ -x-1 &< 0 \\ x+1 &> 0 \\ x &> -1\end{aligned}$$

6)

$$\begin{aligned}3x(x+1) &= 9x^2 \\ x_1 &= 0 \\ 3x(x+1) &= 9x^2 / : x \\ 3(x+1) &= 9x \\ x+1 &= 3x \\ x_2 &= \frac{1}{2}\end{aligned}$$

7)

$$\begin{aligned}p : x &= 2t \\ y &= 4 + 3t; t \in R \\ t &= \frac{x}{2} \\ y &= 4 + 3 * \frac{x}{2} \\ 2y &= 8 + 3x \\ 3x - 2y + 8 &= 0\end{aligned}$$

8)

$$B[-1 + 2; 3 - 3] \rightarrow B[1; 0]$$

$$S_{AC}\left[\frac{a_1 + c_1}{2}; \frac{a_2 + c_2}{2}\right]$$

$$S_{AC}\left[\frac{-2 - 1}{2}; \frac{-1 + 3}{2}\right]$$

$$S_{AC}\left[\frac{-3}{2}; 1\right]$$

9)

$$\Omega = \{0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 4, 4\}$$

$$Med(x) = 1 = \omega_{13}$$

$$\bar{x} = \frac{7 * 0 + 6 * 1 + 6 * 2 + 4 * 3 + 2 * 4}{25} = 1.52$$

10)

$$s_n = \frac{n}{2}(a_1 + a_n)$$

$$s_{40} = \frac{40}{2}(a_1 + a_{40})$$

$$1600 = 20 * (1 + a_{40})$$

$$80 = 1 + a_{40}$$

$$a_{40} = 79$$

11)

$$a_4 = \frac{11}{3}$$

$$a_6 = \frac{7}{3}$$

$$d = \frac{a_6 - a_4}{2}$$

$$d = \frac{\frac{7}{3} - \frac{11}{3}}{2}$$

$$d = -\frac{2}{3}$$

$$a_5 = a_4 + d$$

$$a_5 = \frac{11}{3} - \frac{2}{3}$$

$$a_5 = \frac{9}{3} = 3$$

12)

$$\begin{aligned}5^{x+4} &= \frac{25}{5^x} \\5^x * 5^4 &= \frac{5^2}{5^x} \\5^x * 5^x &= \frac{5^2}{5^4} \\5^{2x} &= 5^{-2} \\2x &= -2 \\x &= -1\end{aligned}$$

13)

Linka jela na  $25 + 25 + 50 + 50 + 100 = 250\%$ , pokud ji pustíme naplno, pojede na  $500\%$ . Vyroby tedy 2x tolik

$$x = 2 * x_0 = 720 * 2 = 1440$$

14)

$$\begin{aligned}\text{dívky} &\dots\dots\dots d \\ \text{chlapci} &\dots\dots\dots c = 2d \\ \text{celkem} &\dots\dots\dots p = c + d\end{aligned}$$

$$\begin{aligned}d + 1 &= c - 12 \\ d + 1 &= 2d - 12 \\ d &= 13 \\ c &= 2 * 13 = 26 \\ p &= 13 + 26 = 39\end{aligned}$$

15)

$$\begin{aligned}|PX|^2 + |PR|^2 &= |RX|^2 \\ |PX| &= \sqrt{|RX|^2 - |PR|^2} \\ x &= \sqrt{25^2 - 20^2} \\ x &= \sqrt{225} \\ x &= 15\text{cm}\end{aligned}$$

$$|PQ|^2 + |PR|^2 = |RQ|^2$$

$$|RQ| = \sqrt{|PQ|^2 + |PR|^2}$$

$$x = \sqrt{20^2 + (15 + 33)^2}$$

$$x = \sqrt{2704}$$

$$x = 52cm$$

16 a)

$$\cos \alpha = \frac{b}{c}$$

$$\cos 60^\circ = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2}$$

ANO

16 b)

$$\tan \alpha = \frac{a}{b}$$

$$\tan 60^\circ = \frac{1}{\sqrt{3}}$$

$$\sqrt{3} \neq \frac{1}{\sqrt{3}}$$

NE

16 c)

$$\sin \alpha = \frac{b}{c}$$

$$\sin 30^\circ = \frac{2}{4}$$

$$\frac{1}{2} = \frac{1}{2}$$

ANO

16 d)

$$\begin{aligned}\tan \alpha &= \frac{a}{n} \\ \tan 30^\circ &= \frac{\sqrt{2}}{\sqrt{6}} \\ \frac{\sqrt{3}}{3} &= \frac{1}{\sqrt{3}} \\ \frac{\sqrt{3}}{3} &= \frac{1}{\sqrt{3}} * \frac{\sqrt{3}}{\sqrt{3}} \\ \frac{\sqrt{3}}{3} &= \frac{\sqrt{3}}{3} \\ \text{ANO}\end{aligned}$$

17)

Platí to pro tupouhlé trojúhelníky, tedy první a poslední.

18)

$$\begin{aligned}\beta + \frac{1}{3}\pi &= 2\pi - 2\beta \\ 3\beta &= \frac{5}{3}\pi \\ \beta &= \frac{5}{9}\pi < \frac{5}{8}\pi\end{aligned}$$

19)

$$\begin{aligned}n &= \frac{5}{x-3} \\ n(x-3) &= 5 \\ x-3 &= \frac{5}{n} \\ x &= \frac{5}{n} + 3\end{aligned}$$

20)

$$V = 600l = 600000cm^2$$
$$V_v = \frac{3}{4} * V = 450000cm^2$$

$$V_v = S_p * v$$
$$v = \frac{V_v}{S_p}$$
$$v = \frac{450000}{14000}$$
$$v \doteq 32cm$$

21)

$$o = 2\pi r + 6r$$
$$S = o * v$$
$$S = (2 * \pi * 3 + 6 * 3) * 13cm^2$$
$$S = 36.85 * 13cm^2$$
$$S \doteq 479cm^2$$

22)

$$V(3, 8) = \frac{8!}{5!} = 8 * 7 * 6 = 336$$

23)

$$p(a) = \frac{m(a)}{m}$$
$$p(a) = \frac{10}{25}$$
$$p(a) = 0.4$$

24)

$$\begin{aligned}
 a_2 &= 2 = a_1 q \\
 a_2 * a_3 &= 6 \\
 a_3 &= \frac{6}{a_2} = 3 = a_2 q \\
 q &= \frac{a_3}{a_2} = \frac{3}{2} \\
 a_1 &= \frac{a_2}{q} = \frac{2}{\frac{3}{2}} = \frac{4}{3}
 \end{aligned}$$

Takže jediné co jsme neověřili je E, ověříme

$$\begin{aligned}
 \frac{a_3}{q} &= \frac{3}{\frac{3}{2}} \\
 &= \frac{3}{\frac{3}{2}} \\
 &= 2 \neq \frac{3}{4}
 \end{aligned}$$

**25)**

25.1 B

25.2 F

25.3 D

25.4 A

**26 a)**

$$(a^{-1} * a^2)^3 = (a^1)^3 = a^3$$

**26 b)**

$$\left(\frac{a^{-4}}{a^{-1}}\right)^{-2} = (a^{-3})^{-2} = a^6$$

**26 c)**

$$\sqrt{a^4 * a^{12}} = \sqrt{a^{16}} = a^8$$