

LÖSUNGEN

$$1a) \quad \frac{5}{x} = \frac{6}{9} \quad | \cdot x$$

$$5 = \frac{6}{9} \cdot x \quad | \cdot \frac{9}{6}$$

$$5 \cdot \frac{9}{6} = x$$

$$7,5 \text{ cm} = x$$

$$\frac{4}{y} = \frac{6}{9} \quad | \cdot y$$

$$4 = \frac{6}{9} \cdot y \quad | \cdot \frac{9}{6}$$

$$4 \cdot \frac{9}{6} = y$$

$$6 \text{ cm} = y$$

$$b) \quad \frac{y}{12} = \frac{3}{3+6}$$

$$\frac{y}{12} = \frac{3}{9} \quad | \cdot 12$$

$$y = \frac{3}{9} \cdot 12$$

$$y = 4 \text{ cm}$$

$$\frac{3}{6} = \frac{2}{x} \quad | \cdot x$$

$$\frac{3}{6} \cdot x = 2 \quad | \cdot \frac{6}{3}$$

$$x = 2 \cdot \frac{6}{3}$$

$$x = 4 \text{ cm}$$

Alternative:

$$\frac{3}{3+6} = \frac{2}{2+x}$$

$$\frac{3}{9} = \frac{2}{2+x} \quad | \cdot (2+x)$$

$$\frac{3}{9} \cdot (2+x) = 2 \quad | \cdot \frac{9}{3}$$

$$2+x = 2 \cdot \frac{9}{3} \quad | -2$$

$$x = 2 \cdot \frac{9}{3} - 2$$

$$x = 4 \text{ cm}$$

$$c) \frac{4}{x} = \frac{3,3}{5} \quad | \cdot x$$

$$4 = \frac{3,3}{5} \cdot x \quad | \cdot \frac{5}{3,3}$$

$$4 \cdot \frac{5}{3,3} = x$$

$$6 \text{ cm} = x$$

$$\frac{y}{7} = \frac{3,3}{5} \quad | \cdot 7$$

$$y = \frac{3,3}{5} \cdot 7$$

$$y = 4,6 \text{ cm}$$

$$d) \frac{8}{9,6} = \frac{5}{x} \quad | \cdot x$$

$$\frac{8}{9,6} \cdot x = 5 \quad | \cdot \frac{9,6}{8}$$

$$x = \frac{5 \cdot 9,6}{8}$$

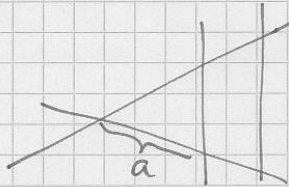
$$x = 6 \text{ cm}$$

$$\frac{8}{9,6} = \frac{y}{7,2} \quad | \cdot 7,2$$

$$\frac{8}{9,6} \cdot 7,2 = y$$

$$6 \text{ cm} = y$$

e)



$$a = 8 - 2 = 6 \text{ cm}$$

$$\frac{6}{8} = \frac{x}{12} \quad | \cdot 12$$

$$\frac{6}{8} \cdot 12 = x$$

$$9 \text{ cm} = x$$

$$\frac{6}{2} = \frac{3}{y} \quad | \cdot y$$

$$\frac{6}{2} \cdot y = 3 \quad | \cdot \frac{2}{6}$$

$$y = 3 \cdot \frac{2}{6}$$

$$y = 1 \text{ cm}$$

Alternative:

$$\frac{6}{8} = \frac{3}{3+y} \quad | \cdot (3+y)$$

$$\frac{6}{8} \cdot (3+y) = 3 \quad | \cdot \frac{8}{6}$$

$$3+y = 3 \cdot \frac{8}{6} \quad | -3$$

$$y = 3 \cdot \frac{8}{6} - 3$$

$$y = 1 \text{ cm}$$

$$f) \quad \frac{8}{12} = \frac{5}{5+x} \quad | \cdot (5+x)$$

$$\frac{8}{12} \cdot (5+x) = 5 \quad | \cdot \frac{12}{8}$$

$$5+x = 5 \cdot \frac{12}{8} \quad | -5$$

$$x = 5 \cdot \frac{12}{8} - 5$$

$$x = 2,5 \text{ cm}$$

$$\frac{5}{2,5} = \frac{y}{3} \quad | \cdot 3$$

$$\frac{5}{2,5} \cdot 3 = y$$

$$6 \text{ cm} = y$$

Alternative:

$$\frac{8}{12} = \frac{y}{y+3} \quad | \cdot (y+3)$$

$$\frac{8}{12} \cdot (y+3) = y$$

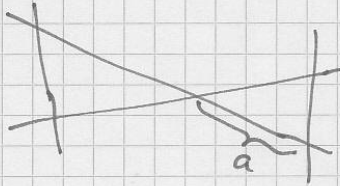
$$\frac{8}{12}y + \frac{8}{12} \cdot 3 = y \quad | -\frac{8}{12}y$$

$$\frac{8}{12} \cdot 3 = \frac{4}{12}y \quad | \cdot \frac{12}{4}$$

$$\frac{8}{12} \cdot 3 \cdot \frac{12}{4} = y$$

$$6 \text{ cm} = y$$

g)



$$a = 9 - 3 = 6 \text{ cm}$$

$$\frac{3}{6} = \frac{5}{y} \quad | \cdot y$$

$$\frac{3}{6} \cdot y = 5 \quad | \cdot \frac{6}{3}$$

$$y = 5 \cdot \frac{6}{3}$$

$$y = 10 \text{ cm}$$

$$\frac{3}{6} = \frac{2}{x} \quad | \cdot x$$

$$\frac{3}{6} \cdot x = 2 \quad | \cdot \frac{6}{3}$$

$$x = 2 \cdot \frac{6}{3}$$

$$x = 4 \text{ cm}$$

$$2 \text{ a) } \frac{3}{x} = \frac{7}{28} \quad | \cdot x$$

$$3 = \frac{7}{28} \cdot x \quad | \cdot \frac{28}{7}$$

$$3 \cdot \frac{28}{7} = x$$

$$12 = x$$

$$\text{b) } \frac{x}{5} = \frac{6}{8} \quad | \cdot 5$$

$$x = \frac{6}{8} \cdot 5$$

$$x = 3,75$$

$$\text{c) } \frac{5}{x+5} = \frac{6}{9} \quad | \cdot (x+5)$$

$$5 = \frac{6}{9} \cdot (x+5) \quad | \cdot \frac{9}{6}$$

$$5 \cdot \frac{9}{6} = x+5 \quad | -5$$

$$5 \cdot \frac{9}{6} - 5 = x$$

$$2,5 = x$$

$$\text{d) } \frac{9}{x} = \frac{10}{24} \quad | \cdot x$$

$$9 = \frac{10}{24} \cdot x \quad | \cdot \frac{24}{10}$$

$$9 \cdot \frac{24}{10} = x$$

$$21,6 = x$$

$$e) \frac{6}{4} = \frac{x}{8} \quad | \cdot 8$$

$$\frac{6}{4} \cdot 8 = x$$

$$12 = x$$

$$f) \frac{x}{x+4} = \frac{3}{8} \quad | \cdot (x+4)$$

$$x = \frac{3}{8}(x+4)$$

$$x = \frac{3}{8}x + \frac{3}{8} \cdot 4 \quad | -\frac{3}{8}x$$

$$\frac{5}{8}x = \frac{3}{8} \cdot 4 \quad | \cdot \frac{8}{5}$$

$$x = \frac{3}{8} \cdot 4 \cdot \frac{8}{5} = 2,4$$

3) a)

$$x^2 = 5 \cdot 4$$

$$x^2 = 20$$

$$x \approx 4,47 \text{ cm}$$

$$x = 5 + 4$$

$$x = 9 \text{ cm}$$

$$x^2 + 4^2 = y^2$$

$$20 + 16 = y^2$$

$$36 = y^2$$

$$6 \text{ cm} = y$$

$$x^2 + 5^2 = z^2$$

$$20 + 25 = z^2$$

$$45 = z^2$$

$$6,71 \text{ cm} \approx z$$

b)

$$4^2 + 5^2 = y^2$$

$$16 + 25 = y^2$$

$$41 = y^2$$

$$6,40 \text{ cm} \approx y$$

$$5 \cdot x = y^2$$

$$5 \cdot x = 41 \quad | :5$$

$$x = 8,2 \text{ cm}$$

$$x = x - 5$$

$$x = 8,2 - 5$$

$$x = 3,2 \text{ cm}$$

$$y^2 + z^2 = x^2$$

$$41 + z^2 = 8,2^2$$

$$41 + z^2 = 67,24$$

$$z^2 = 26,24$$

$$z = 5,12 \text{ cm}$$

$$c) 3^2 + 4^2 = x^2$$

$$9 + 16 = x^2$$

$$25 = x^2$$

$$5 \text{ cm} = x$$

$$z \cdot x = 4^2$$

$$z \cdot 5 = 16$$

$$z = 3,2 \text{ cm}$$

$$y = x - z$$

$$y = 5 - 3,2$$

$$y = 1,8 \text{ cm}$$

$$z \cdot y = x^2$$

$$3,2 \cdot 1,8 = x^2$$

$$5,76 = x^2$$

$$2,4 \text{ cm} = x$$

$$d) y \cdot 10 = 5^2$$

$$y \cdot 10 = 25$$

$$y = 2,5 \text{ cm}$$

$$x = 10 - y$$

$$x = 10 - 2,5$$

$$x = 7,5 \text{ cm}$$

$$x \cdot y = x^2$$

$$2,5 \cdot 7,5 = x^2$$

$$18,75 = x^2$$

$$4,33 \text{ cm} = x$$

$$z^2 + 5^2 = 10^2$$

$$z^2 + 25 = 100$$

$$z^2 = 75$$

$$z = 8,66 \text{ cm}$$

$$e) \quad 4 \cdot x = 7^2$$

$$4 \cdot x = 49$$

$$x = 12,25$$

$$y = x - 4$$

$$y = 12,25 - 4$$

$$y = 8,25 \text{ cm}$$

$$y \cdot 4 = x^2$$

$$8,25 \cdot 4 = x^2$$

$$33 = x^2$$

$$5,74 \text{ cm} \approx x$$

$$x^2 + y^2 = z^2$$

$$33 + 8,25^2 = z^2$$

$$33 + 68,0625 = z^2$$

$$101,0625 = z^2$$

$$10,05 \text{ cm} = z$$

$$4) \quad x^2 = 1^2 + 1^2 = 1 + 1 = 2 \Rightarrow x = \sqrt{2} \text{ cm}$$

$$y^2 = x^2 + 1^2 = 2 + 1 = 3 \Rightarrow y = \sqrt{3} \text{ cm}$$

$$z^2 = y^2 + 1^2 = 3 + 1 = 4 \Rightarrow z = \sqrt{4} = 2 \text{ cm}$$

$$x^2 = z^2 + 1^2 = 4 + 1 = 5 \Rightarrow x = \sqrt{5} \text{ cm}$$

$$u^2 = x^2 + 1^2 = 5 + 1 = 6 \Rightarrow u = \sqrt{6} \text{ cm}$$

$$v^2 = u^2 + 1^2 = 6 + 1 = 7 \Rightarrow v = \sqrt{7} \text{ cm}$$

$$5) \quad \frac{3}{x} = \frac{4}{4+3}$$

$$\frac{3}{x} = \frac{4}{7} \quad | \cdot x$$

$$3 = \frac{4}{7} \cdot x \quad | \cdot \frac{7}{4}$$

$$3 \cdot \frac{7}{4} = x$$

$$5,25 \text{ cm} = x$$

$$\frac{4}{3} = \frac{5}{y} \quad | \cdot y$$

$$\frac{4}{3} \cdot y = 5 \quad | \cdot \frac{3}{4}$$

$$y = 5 \cdot \frac{3}{4}$$

$$y = 3,75 \text{ cm}$$

$$\frac{5}{5+y} = \frac{z}{7}$$

$$\frac{5}{y} = \frac{4,5}{x}$$

$$\frac{5}{5+3,75} = \frac{z}{7}$$

$$\frac{5}{3,75} = \frac{4,5}{x} \quad | \cdot x$$

$$\frac{5}{8,75} = \frac{z}{7} \quad | \cdot 7$$

$$\frac{5}{3,75} \cdot x = 4,5 \quad | \cdot \frac{3,75}{5}$$

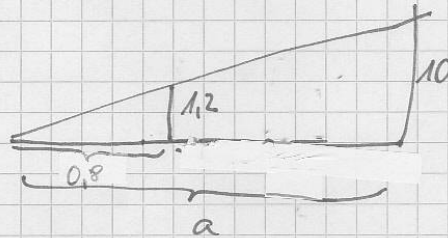
$$\frac{5}{8,75} \cdot 7 = z$$

$$x = 4,5 \cdot \frac{3,75}{5}$$

$$4 \text{ cm} \approx z$$

$$x = 3,375 \text{ cm}$$

6)



$$\frac{1,2}{10} = \frac{0,8}{a} \quad | \cdot a$$

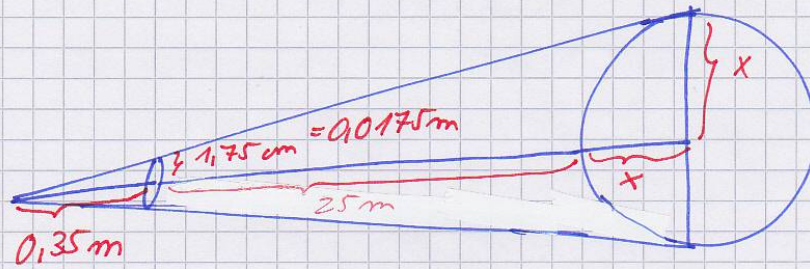
$$\frac{1,2}{10} \cdot a = 0,8 \quad | \cdot \frac{10}{1,2}$$

$$a = \frac{0,8 \cdot 10}{1,2}$$

$$a = 6,6\bar{6}$$

A.: Der Schatten ist $\approx 6,67$ m lang.

7)



$$\frac{0,35}{0,35 + 25 + x} = \frac{0,0175}{x}$$

$$\frac{0,35}{25,35 + x} = \frac{0,0175}{x} \quad | \cdot x$$

$$\frac{0,35 \cdot x}{25,35 + x} = 0,0175 \quad | \cdot (25,35 + x)$$

$$0,35 x = 0,0175 (25,35 + x) \quad | : 0,0175$$

$$20 x = 25,35 + x \quad | - x$$

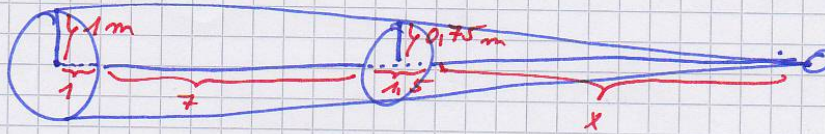
$$19 x = 25,35 \quad | : 19$$

$$x \approx 1,33 \text{ m}$$

$$\text{Durchmesser} = 2 \cdot x = 2,66 \text{ m}$$

A.: Der Durchmesser des Tanks beträgt 2,66 m.

8)



$$\frac{0,75}{1} = \frac{x}{x + 1,5 + 7 + 1}$$

$$\frac{0,75}{1} = \frac{x}{x + 9,5} \quad | \cdot (x + 9,5)$$

$$\frac{0,75}{1} \cdot (x + 9,5) = x$$

$$\frac{3}{4} \cdot (x + 9,5) = x$$

$$\frac{3}{4}x + \frac{3}{4} \cdot 9,5 = x \quad | - \frac{3}{4}x$$

$$\frac{3}{4} \cdot 9,5 = \frac{1}{4}x \quad | \cdot 4$$

$$4 \cdot \frac{3}{4} \cdot 9,5 = x$$

$$\underline{28,5 \text{ m} = x}$$

A.: Man muss 28,5 m weiter rechts stehen.

9)

$$\frac{3}{\text{Breite}} = \frac{4}{4+8}$$

A.: Der See ist 9 km breit.

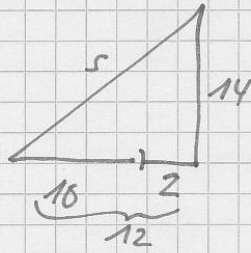
$$\frac{3}{\text{Breite}} = \frac{4}{12} \quad | \cdot \text{Breite}$$

$$3 = \frac{4}{12} \cdot \text{Breite} \quad | \cdot \frac{12}{4}$$

$$3 \cdot \frac{12}{4} = \text{Breite}$$

$$9 = \text{Breite}$$

10)



$$s^2 = 14^2 + 12^2$$

$$s^2 = 340$$

$$s = 18,44$$

A.: Das Seil ist 18,44 m lang.

$$11) \begin{array}{l} 100 \text{ m} \text{ --- } 6 \text{ m} \\ 7200 \text{ m} \text{ --- } 432 \text{ m} \end{array} \cdot 72$$

$$\Rightarrow h = 0,432 \text{ km}$$

$$h^2 + e^2 = s^2$$

$$0,432^2 + 7,2^2 = s^2$$

$$52,026.. = s^2$$

$$7,21 \text{ km} \approx s$$

A.: Die Höhe ist 0,432 km, der Weg ist 7,21 km lang.

12) a)

$$\frac{3}{3+4} = \frac{7}{16,3} \Leftrightarrow \frac{3}{7} = \frac{7}{16,3} = 0,428... \checkmark$$

$$\frac{3}{3+4} = \frac{5}{5+6} \Leftrightarrow \frac{3}{7} = \frac{5}{11} \Leftrightarrow 0,428... = 0,454... \checkmark$$

Der Fehler liegt bei den Werten 5 und 6.

Wir ersetzen die 5:

$$\frac{x}{6} = \frac{3}{4} \mid \cdot 6$$

$$x = \frac{3}{4} \cdot 6 = \underline{4,5}$$

$$b) \quad 2,5 \cdot 7,2 = (\sqrt{18})^2$$

$$2,5 \cdot 7,2 = 18$$

$$18 = 18 \quad \checkmark$$

$$7,2^2 + (\sqrt{18})^2 = (\sqrt{69,84})^2$$

$$7,2^2 + 18 = 69,84$$

$$51,84 + 18 = 69,84 \quad \checkmark$$

$$2,5^2 + (\sqrt{18})^2 = (\sqrt{24})^2$$

$$2,5^2 + 18 = 24$$

$$6,25 + 18 = 24 \quad \checkmark$$

Der Fehler liegt bei $\sqrt{24}$. Wir ersetzen
den Wert:

$$2,5^2 + (\sqrt{18})^2 = x^2$$

$$24,25 = x^2$$

$$\underline{\underline{\sqrt{24,25} = x}}$$