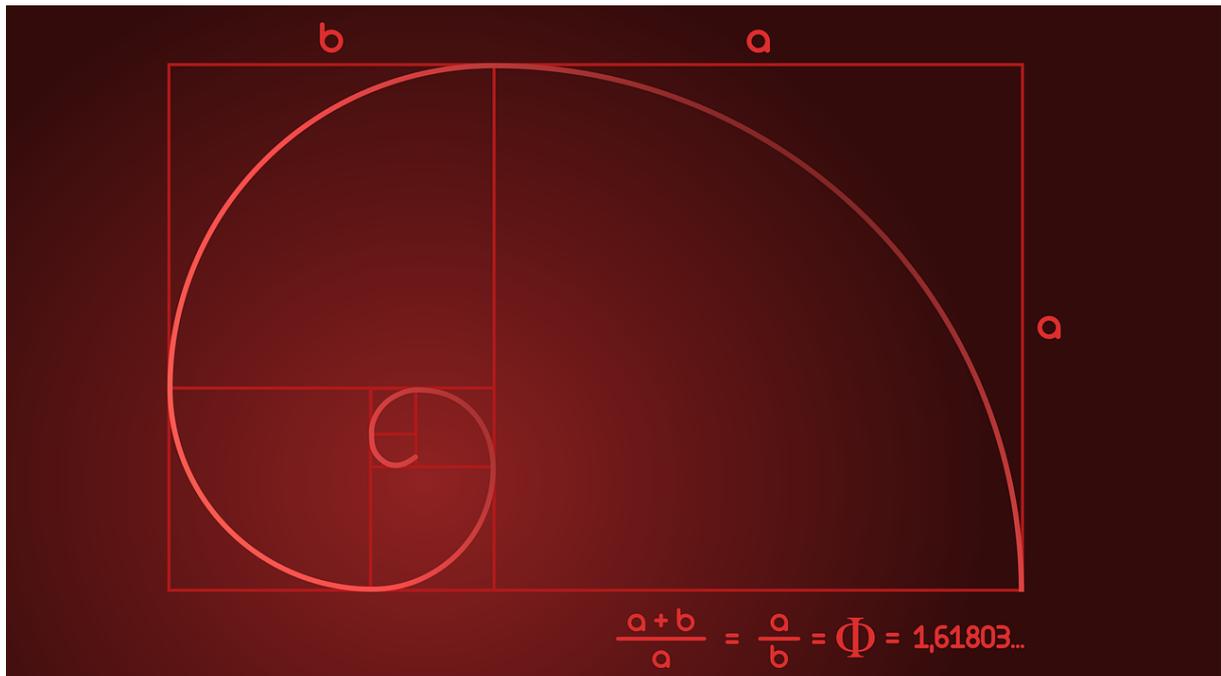


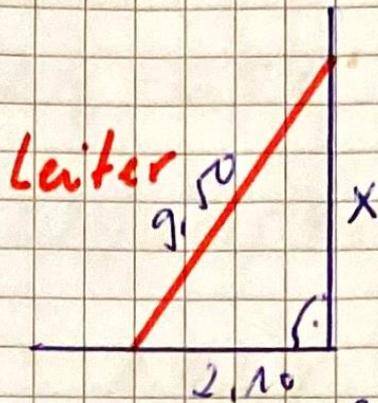
Übungsaufgaben (Lösungen) zur Vorbereitung auf die ZP10



Stand der Dinge: Seite 5 fehlt noch.

Viel Spaß und Freude beim Vergleichen.

①



Pythagoras: $x^2 + 2,1^2 = 9,5^2$
 $x^2 + 4,41 = 90,25 \quad | -4,41$
 $x^2 = 85,84 \quad | \sqrt{\quad}$
 $x = 9,26 \text{ m}$

②

Strahlensatz:

$$\frac{x}{4,8} = \frac{12+5}{12}$$

$$\frac{x}{4,8} = 1,416\ldots \quad | \cdot 4,8$$

$$\frac{y+4}{y} = \frac{6,8}{4,8} \quad | \cdot y \quad \underline{\underline{x = 6,8 \text{ m}}}$$

$$y+4 = 1,416\ldots \cdot y \quad | -y$$

$$4 = 0,416\ldots \cdot y \quad | : 0,416\ldots$$

$$\underline{\underline{9,6 \text{ m} = y}}$$

$$b) \quad 0,92y - 0,54 = 1,5 - 0,1y \quad | +0,1y$$

$$1,02y - 0,54 = 1,5 \quad | +0,54$$

$$1,02y = 2,04 \quad | :1,02$$

$$\underline{\underline{y = 2}}$$

$$c) \quad 11 = (24 - 5a) - (19 - 2a)$$

$$11 = 24 - 5a - 19 + 2a$$

$$11 = 5 - 3a$$

$$6 = -3a$$

$$\underline{\underline{-2 = a}}$$

$$| -5$$

$$| :(-3)$$

$$\textcircled{4} \quad 2 \cdot (3 \cdot x - 11) = 9x - 34$$

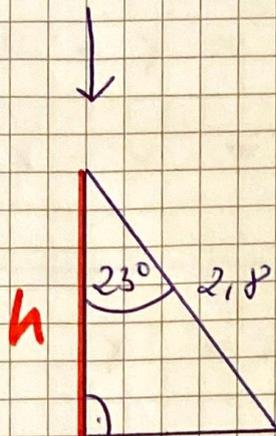
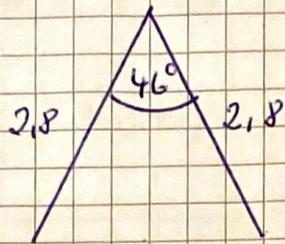
$$6x - 22 = 9x - 34 \quad | -6x$$

$$-22 = 3x - 34 \quad | +34$$

$$12 = 3x \quad | :3$$

$$\underline{\underline{4 = x}}$$

5



evt. noch
nicht im
Unterricht.

$$\cos 23^\circ = \frac{h}{2.8} \quad | \cdot 2.8$$

$$2.8 \cdot \cos 23^\circ = h$$

$$\underline{\underline{2.58 \text{ m} = h}}$$

6 (I) $2y = -x + 8$

(II) $2y = x + 2$

$$-x + 8 = x + 2 \quad | +x$$

$$8 = 2x + 2 \quad | -2$$

$$6 = 2x \quad | :2$$

$$\underline{\underline{3 = x}}$$

$$x = 3 \text{ m} \quad \text{II} \Rightarrow 2y = 3 + 2$$

$$2y = 5 \quad | :2$$

$$\underline{\underline{y = 2.5}}$$

$$b) \quad (I) \quad 4x + 2y = 22 \quad | :2$$

$$(II) \quad 3x - y = 4$$

$$(I) \quad 2x + y = 11 \quad | -2x$$

$$(II) \quad 3x - y = 4 \quad | -3x$$

$$(I) \quad y = 11 - 2x$$

$$(II) \quad -y = 4 - 3x \quad | \cdot (-1)$$

$$(I) \quad y = 11 - 2x$$

$$(II) \quad y = -4 + 3x$$

$$11 - 2x = -4 + 3x \quad | +2x$$

$$11 = -4 + 5x \quad | +4$$

$$15 = 5x \quad | :5$$

$$\underline{\underline{3 = x}}$$

$x=3$ einsetzen in (II): $3 \cdot 5 - y = 4$

$$15 - y = 4 \quad | -15$$

$$-y = -11 \quad | \cdot (-1)$$

$$\underline{\underline{y = 11}}$$

$$c) \quad (I) \quad 2y - x = -6 \quad | -2y$$

$$(II) \quad y - x = -12 \quad | -y$$

$$(I) \quad -x = -6 - 2y$$

$$(II) \quad -x = -12 - y$$

$$-6 - 2y = -12 - y \quad | +2y$$

$$-6 = -12 + y \quad | +12$$

$$\underline{\underline{6 = y}}$$

$$y = 6 \text{ einsetzen in (II)} \quad 6 - x = -12 \quad | -6$$

$$-x = -18 \quad | \cdot (-1)$$

$$\underline{\underline{x = 18}}$$

$$(7) \quad x \text{ Tramsparrunde} \quad 120 \text{ €}$$

$$y \text{ Jogganlage} \quad 70 \text{ €}$$

$$(I) \quad x + y = 12 \quad | -x$$

$$(II) \quad 120x + 70y = 1150$$

$$(I) \quad y = 12 - x \text{ einsetzen in (II)}$$

$$120x + 70 \cdot (12 - x) = 1150$$

$$120x + 840 - 70x = 1150 \quad | -840$$

$$50x = 350 \quad | :50$$

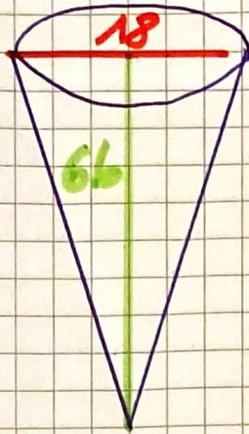
$$\underline{\underline{x = 7}}$$

$$\text{einsetzen in (I)} \quad 7 + y = 12$$

$$\underline{\underline{y = 5}}$$

8

$$d=18 \rightarrow r=9\text{m}$$



$$V = \frac{G \cdot h}{3}$$

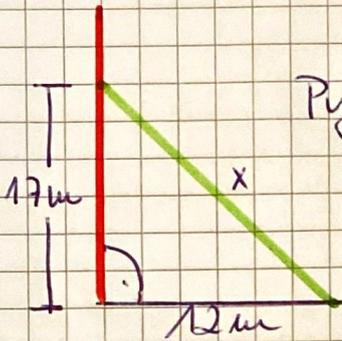
$$V = \frac{\pi \cdot r^2 \cdot h}{3}$$

$$V = \frac{\pi \cdot 9^2 \cdot 66}{3}$$

$$V = \frac{16794,46\text{m}^3}{3}$$

$$\underline{\underline{V = 5598,15\text{m}^3}}$$

9



Pythagoras:

$$x^2 = 17^2 + 12^2$$

$$x^2 = 289 + 144$$

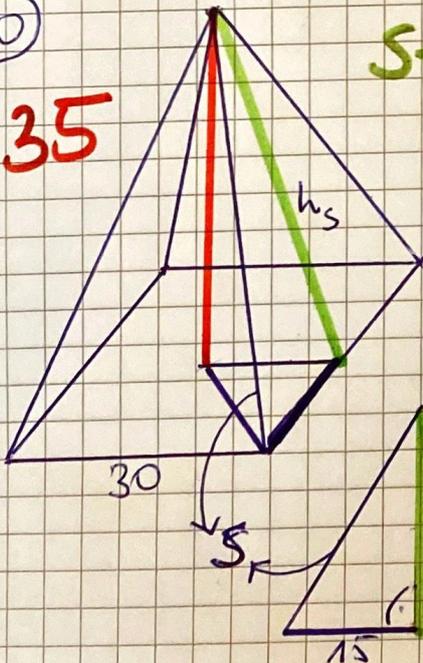
$$x^2 = 433 \quad |\sqrt{\quad}$$

$$\underline{\underline{x = 20,81\text{m}}}$$

$$20,81\text{m} \cdot 4 = \underline{\underline{83,23\text{m}}}$$

10

35



Seitenhöhe:

$$h_s^2 = 15^2 + 35^2$$

$$h_s^2 = 225 + 1225$$

$$h_s^2 = 1450 \quad |\sqrt{\quad}$$

$$\underline{\underline{h_s = 38,08\text{m}}}$$

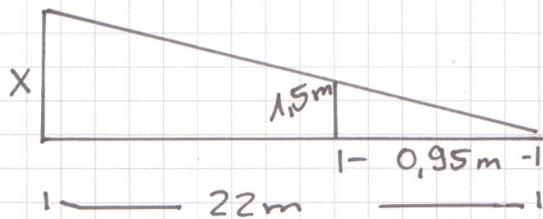
$$s^2 = 15^2 + 38,08^2$$

$$s^2 = 225 + 1450$$

$$s^2 = 1675 \quad |\sqrt{\quad}$$

$$\rightarrow \underline{\underline{s = 40,93\text{m}}}$$

11)



$$\frac{x}{1,5} = \frac{22}{0,95} \quad | \cdot 1,5$$

$$\underline{\underline{x = 34,74 \text{ m}}}$$

Der Turm ist 34,74 m hoch.

12)

$x =$ Stichsägen

$$x + (x + 25) + \frac{x}{2} = 75$$

$x + 25 =$ Bohrmasch.

$$2,5x + 25 = 75 \quad | -25$$

$\frac{x}{2} =$ Schwingschleifer

$$2,5x = 50 \quad | : 2,5$$

$$\underline{\underline{x = 20}}$$

Sie verkaufte 20 Stichsägen,

$20 + 25 = 45$ Bohrmaschinen und $\frac{20}{2} = 10$ Schwingschl.

13)

$$\frac{x + 560}{560} = \frac{1060}{640} \quad | \cdot 560$$

$$x + 560 = \frac{1060}{640} \cdot 560 \quad | -560$$

$$\underline{\underline{x = 367,5 \text{ m}}}$$

Die unzugängliche Strecke ist 367,5 m lang.

14) $x = \text{Einzelzimmer}$ $y = \text{Doppelzimmer}$

$$\text{I} \quad x + 2 \cdot y = 28$$

$$\text{II} \quad x + y = 17 \quad | \cdot (-1)$$

$$\text{I} \quad x + 2y = 28$$

$$\text{II} \quad -x - y = -17 \quad \text{Additionsvverfahren}$$

$$\text{I+II} \quad y = 11$$

$$y = 11 \rightarrow \text{II} \quad x + 11 = 17 \quad | - 11$$

$$x = 6$$

Es gibt 11 Doppelzimmer und 6 Einzelzimmer, also kann das Angebot angenommen werden.

15) Quader: $V = a \cdot b \cdot c$

$$V = 40 \cdot 50 \cdot 6$$

$$V = 12000 \text{ m}^3$$

Pyramide: $V = \frac{1}{3} \cdot G \cdot h_K$

$$V = \frac{1}{3} \cdot 40 \cdot 50 \cdot 15$$

$$V = 10000 \text{ m}^3$$

$$V_Q + V_P =$$

$$12000 + 10000$$

$$= 22000 \text{ m}^3$$

Daszelt hat ein Volumen von 22000 m^3

16) $\frac{x}{50} = \frac{140}{35} \quad | \cdot 50$

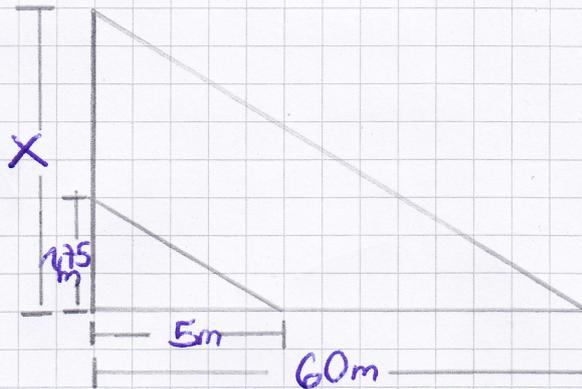
$$x = \frac{140}{35} \cdot 50$$

$$x = 200 \text{ m}$$

Die Bäume stehen
200 m weit voneinander
entfernt.

Übungsaufgaben zur Vorbereitung der ZP 10
Mathematik Seite 3

Nr. 17



$$\frac{x}{1,75} = \frac{60}{5}$$

$$\frac{x}{1,75} = 12 \quad | \cdot 1,75$$

$$x = 21 \text{ m}$$

Nr. 18

$$x^2 - 8x = 20 \quad | -20$$

$$x^2 - 8x - 20 = 0$$

$$p = -8 \quad q = -20$$

$$x_{1/2} = \frac{8}{2} \pm \sqrt{\left(\frac{-8}{2}\right)^2 + 20}$$

$$x_{1/2} = 4 \pm \sqrt{36}$$

$$x_1 = 4 + 6$$

$$x_2 = 4 - 6$$

$$x_1 = 10$$

$$x_2 = -2$$

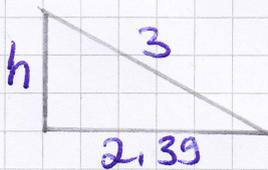
Nr. 19

$$s = 3 \text{ m} \quad u = 15 \text{ m} \quad r = ? \quad h = ? \quad V = ?$$

a) $u = 2 \cdot \pi \cdot r$

$$15 = 2 \cdot \pi \cdot r \quad | : (2\pi)$$

$$r = 2,39 \text{ m}$$



$$3^2 = h^2 + 2,39^2 \quad | -2,39^2$$

$$h^2 = 3^2 - 2,39^2$$

$$h^2 = 3,29 \quad | \sqrt{\quad}$$

$$h = 1,81 \text{ m}$$

$$V = \frac{1}{3} \cdot \pi \cdot r^2 \cdot h$$

$$= \frac{1}{3} \cdot \pi \cdot 2,39^2 \cdot 1,81$$

$$= 10,83 \text{ m}^2$$

b) $10,83 \text{ m}^2 \cdot 1,8 \text{ t} = 19,49 \text{ t}$

Nr. 20 $x =$ Anzahl der Dosen Cola

$y =$ Anzahl der Dosen Bier

$$\text{I} \quad x + y = 80 \quad | -y$$

$$\text{II} \quad 0,8x + 0,65y = 56,80$$

$$\text{I}' \quad x = 80 - y$$

$$\text{I}' \text{ in II} \quad 0,8(80 - y) + 0,65y = 56,80$$

$$64 - 0,8y + 0,65y = 56,80$$

$$64 - 0,15y = 56,80 \quad | -64$$

$$-0,15y = -7,2 \quad | :(-0,15)$$

$$y = 48$$

$$y \text{ in I}' \quad x = 80 - 48$$

$$= 32$$

Nr. 21 Bernd $d = 6\text{cm}$ $r = 3\text{cm}$ $h = 8\text{cm}$

$$V = \frac{1}{3} \cdot \pi \cdot 3^2 \cdot h$$

$$= 75,4 \text{ ml}$$

$$75,4 \text{ ml} \cdot 5 = 377 \text{ ml}$$

Anne $d = 3\text{cm}$ $r = 1,5\text{cm}$ $h = 4\text{cm}$

$$V = \frac{1}{3} \cdot \pi \cdot 1,5^2 \cdot 4$$

$$= 9,42 \text{ ml}$$

$$9,42 \cdot 10 = 94,25 \text{ ml}$$

$$377 \text{ ml} - 94,25 \text{ ml} = 282,75 \text{ ml}$$

$$\text{Nr. 22} \quad V = V_z - 2V_k$$

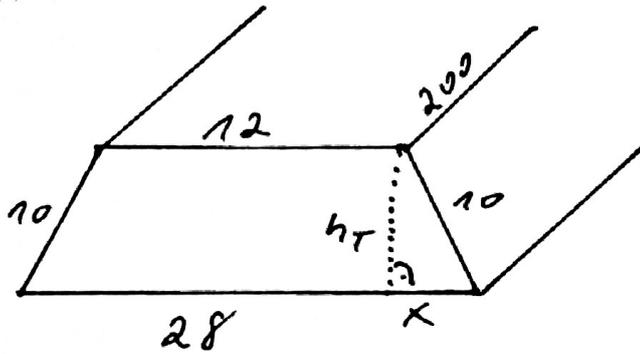
$$d = 8\text{cm} \quad r = 4\text{cm} \quad h_z = 10\text{cm} \quad h_k = 5\text{cm}$$

$$\begin{aligned} V_z &= \pi \cdot r^2 \cdot h \\ &= \pi \cdot 4^2 \cdot 10 \\ &= 502,65\text{cm}^3 \end{aligned}$$

$$\begin{aligned} V_k &= \frac{1}{3} \cdot \pi \cdot r^2 \cdot h \\ &= \frac{1}{3} \cdot \pi \cdot 4^2 \cdot 5 \\ &= 83,78\text{cm}^3 \end{aligned}$$

$$\begin{aligned} V &= 502,65\text{cm}^3 - 2 \cdot 83,78\text{cm}^3 \\ &= 335,09\text{cm}^3 \end{aligned}$$

Nr. 23



$$V = G \cdot h_p$$

G → Trapez

$$x = \frac{28 - 12}{2} = \frac{16}{2} = 8$$

$$V = G \cdot h_p$$

$$V = \frac{a+c}{2} \cdot h_T \cdot h_p$$

$$V = \frac{28+12}{2} \cdot 8 \cdot 200$$

$$V = 32000 \text{ m}^3$$

24 $V = G \cdot h$

$$V = a \cdot a \cdot h$$

$$V = 1,8 \cdot 1,8 \cdot 2$$

$$V = 6,48$$

0 = 4 · Drucke + Boden
 \uparrow
 Säulen

Wir brauchen die Höhe der Seitenfläche

$$h^2 + \left(\frac{a}{2}\right)^2 = s_a^2$$

$$2^2 + 0,9^2 = x^2$$

$$4,81 = x^2 \quad | \sqrt{\quad}$$

$$2,19 = x$$

$$A_1 = \frac{g \cdot h}{2} = \frac{1,8 \cdot 2,19}{2}$$

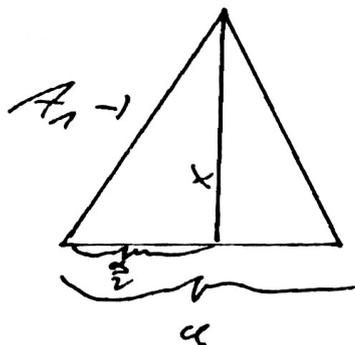
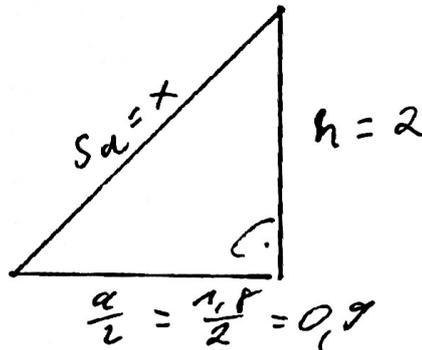
$$A_1 = 1,97$$

$$A = 4 \cdot A_1 + A_2 (\text{Boden})$$

$$A = 4 \cdot 1,97 + a^2$$

$$A = 7,88 + 1,8^2$$

$$A = 11,12$$



25

$$\begin{aligned}
 a) \quad -6x^2 - 9x &= -42 \quad | +6x^2 \\
 -9x &= 6x^2 - 42 \quad | +9x \\
 0 &= 6x^2 + 9x - 42 \quad | :6 \\
 0 &= x^2 + 1,5x - 7
 \end{aligned}$$

↳ p-q-Formel

$$x_{1/2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$$

$$x_{1/2} = -\frac{1,5}{2} \pm \sqrt{\left(\frac{1,5}{2}\right)^2 + 7}$$

$$x_{1/2} = -0,75 \pm \sqrt{10,0625}$$

$$x_{1/2} = -0,75 \pm 3,17$$

$$x_1 = -0,75 + 3,17 = 2,42$$

$$x_2 = -0,75 - 3,17 = -3,92$$

$$b) \quad 3(27 - 8x) = x(x - 24)$$

$$81 - 24x = x^2 - 24x \quad | +24x$$

$$81 = x^2 \quad | \sqrt{\quad}$$

$$\pm 9 = x$$

$$26) \quad x \cdot (x + 1) = 132$$

$$x^2 + 2x = 132 \quad | -132$$

$$x^2 + 2x - 132 = 0$$

$\begin{matrix} p & q \end{matrix}$

$$x_{1/2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$$

$$x_{1/2} = -\frac{2}{2} \pm \sqrt{\left(\frac{2}{2}\right)^2 + 132}$$

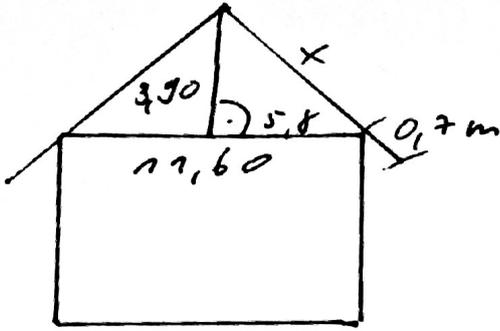
$$x_{1/2} = -1 \pm \sqrt{133}$$

$$x_{1/2} = -1 \pm 11,53$$

$$x_1 = -1 + 11,53 = 10,53$$

$$x_2 = -1 - 11,53 = -12,53$$

27



$$11,6 : 2 = 5,8$$

$$5,8^2 + 3,9^2 = x^2$$

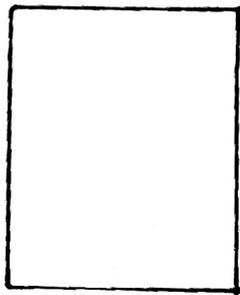
$$33,64 + 15,21 = x^2$$

$$48,85 = x^2 \quad | \sqrt{\quad}$$

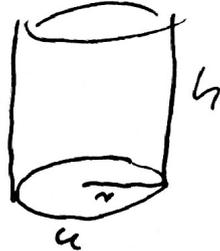
$$6,99 \text{ m} = x$$

$$x + 0,7 = 6,99 + 0,7 = \underline{\underline{7,69 \text{ m}}}$$

28



$$h = 40 \text{ cm}$$



$$u = 2 \cdot \pi \cdot r$$

$$30 = 2 \cdot 3,14 \cdot r$$

$$30 = 6,28 \cdot r \quad | : 6,28$$

$$4,78 \text{ cm} = r$$

$$V = G \cdot h$$

$$V = \pi \cdot r^2 \cdot h$$

$$V = 3,14 \cdot 4,78^2 \cdot 40$$

$$V = 609,37 \text{ cm}^3$$

28 $4 \text{ H\u00f6rner} + 8 \text{ Seitenkanten} = 112 \text{ cm}$

$$\text{I} \quad 4x + 8y = 112$$

$$\text{Seitenkante} + \text{H\u00f6rner} = 18 \text{ cm}$$

$$\text{II} \quad x + y = 18$$

$$\text{I} \quad 4x + 8y = 112$$

$$\text{II} \quad x + y = 18 \quad | \cdot y$$

$$\text{II} \quad x = 18 - y$$

$$\text{II in I einsetzen}$$

$$\text{I} \quad 4x + 8y = 112$$

$$4 \cdot (18 - y) + 8y = 112$$

$$72 - 4y + 8y = 112$$

$$72 + 4y = 112 \quad | -72$$

$$4y = 40 \quad | :4$$

$$y = 10$$

$$y = 10 \text{ in II einsetzen}$$

$$\text{II} \quad x + y = 18$$

$$x + 10 = 18 \quad | -10$$

$$x = 8$$