Solution Exercice 1

♦ estimation = 2A

$$\text{berechnet} \longrightarrow I = \frac{U}{R} = \frac{230V}{110\Omega} = \mathbf{2.09A}$$

♦ estimation = CHF 500‘000.-

$$\text{berechnet} \longrightarrow \frac{5.5h \bullet 88'000.-}{1h} = \mathbf{CHF\ 484'000.-}$$

♦ estimation = 4h

$$\text{berechnet} \longrightarrow \frac{150km}{36\frac{km}{h}} = \mathbf{4h\ 10min.}$$

♦ estimation = 3‘000m

$$\text{berechnet} \longrightarrow 9 \bullet 325m = \mathbf{2'925m}$$

♦ estimation = 2‘000h

$$\text{berechnet} \longrightarrow \frac{CHF\ 10'000.-}{CHF\ 4.85\ pro\ h} = \mathbf{2'062h}$$

berechnet = calculé

Solution Exercice 2

♦ 0,28
♦ 0,0032
♦ 5,00037
♦ 0,00000067
♦ 13,032
♦ 0,051

Solution Exercice 3

♦ $U_3 = \frac{U_1 \bullet U_4}{U_2}$

♦ $\alpha = \frac{\frac{R_\vartheta}{R_{20}} - 1}{\Delta\vartheta}$

♦ $B_L = \sqrt{\frac{F \bullet 2 \bullet \mu_0}{A}}$

♦ $U = \sqrt{U_R^{\,2} + (U_L - U_C)^2}$

♦ $U = \frac{Q_L}{I \bullet \sqrt{3} \bullet \sin\varphi}$

♦ $I = \sqrt{\frac{P_V \bullet A}{\rho \bullet \ell \bullet 3}}$

Exercice 4

a) 700,35 €, b) 749,1 $, c) 5‘134,95 CNY, d) 605,80 £, e) 44‘457,60 RUB, f) 84‘697,90 ¥

Solution Exercice 5

- $\frac{5b}{3ac}$
- $\frac{5}{4}$
- $\frac{15xy}{8}$
- $\frac{a}{4}$
- $\frac{3y-1}{3-y}$
- $-\frac{1}{3}$

Solution Exercice 6

15 • 4,3 + x = 18 • 4,5
64,5 + x = 81
x = 16,5

x correspond à la somme des notes d'Urs, de Max et de Nicole → $^{x}/_{3}$ = **5,5**

Solution Exercice 7

Surface:
1ère partie → $A_1 = 12mm \bullet 14mm = 168mm^2$
2ème partie → $A_2 = \frac{(22mm-12mm)}{2} \bullet 14mm = 70mm^2$
3ère partie → $A_3 = 8mm \bullet 5mm = 40mm^2$
4ème partie → $A_4 = \frac{(12mm-8mm)}{2} \bullet 5mm = 10mm^2$
Surface A Total = $168mm^2 + 70mm^2 - (40mm^2 + 10mm^2)$ **= 188mm²**

Périmètre:

Longueur des côtés extérieur = $\sqrt{(5mm)^2+(14mm)^2} = 14.866mm$

Longueur des côtés intérieur = $\sqrt{(2mm)^2+(5mm)^2} = 5.385mm$

⇨ U = 12mm + 14,866mm + 7mm + 5,385mm + 12mm + 5,385mm + 7mm + 14,866mm = **78,502mm**

Solution Exercice 8

- $(2a + 7b)^2$
- $(3n + 8)(-3n - 8)$ ou $-1(3n + 8)^2$
- $(4c + d)(4c - d)$
- $(6m + 9n)^2$
- $2(3x - 5)^2$
- $-3(4x + 2y)(4x - 2y)$

Solution Exercice 9

♦ $2x – (1 – 5x) + 25 = – 2x – 3$
$2x – 1 + 5x + 25 = – 2x – 3$
$7x + 24 = – 2x – 3$
$9x = – 27$
$x = \mathbf{– 3}$

♦ $17x – 27 = 35x + 81$
$– 108 = 18x$
$\mathbf{– 6} = x$

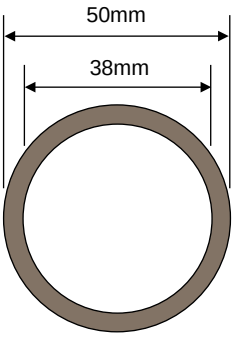
♦ $3(x – 2) – 1 = x + 13$
$3x – 6 – 1 = x + 13$
$2x = 20$
$x = \mathbf{10}$

♦ $22x + (– 27 + 2x) + 6 = 27x$
$22x – 27 + 2x + 6 = 27x$
$– 21 = 3x$
$\mathbf{– 7} = x$

♦ $(x + 1)^2 + (x – 4)^2 = 2x^2 + 5$
$(x + 1)\,(x + 1) + (x – 4)\,(x – 4) = 2x^2 + 5$
$x^2 + x + x + 1 + x^2 – 4x – 4x + 16 = 2x^2 + 5$
$2x^2 – 6x + 17 = 2x^2 + 5$
$12 = 6x$
$\mathbf{2} = x$

♦ $(x – 3)^2 – (x – 2)^2 = 9(x + 5) +15$
$(x – 3)\,(x – 3) – (x – 2)\,(x – 2) = 9(x + 5) +15$
$x^2 – 3x – 3x + 9 – (x^2 – 2x – 2x + 4) = 9x + 45 + 15$
$x^2 – 6x + 9 – x^2 + 4x – 4 = 9x + 60$
$– 2x + 5 = 9x + 60$
$– 55 = 11x$
$\mathbf{– 5} = x$

Solution Exercice 10



Surface $A_1 = \dfrac{(50\text{mm})^2 \bullet \pi}{4} = 1'963.5\text{mm}^2$

Surface $A_2 = \dfrac{(38\text{mm})^2 \bullet \pi}{4} = 1'134.1\text{mm}^2$

Surface du matériau $A_3 = 1'963{,}5\text{mm}^2 – 1'134{,}1\text{mm}^2 = 829{,}4\text{mm}^2$

Volume du matériau $V = 30\text{dm} \bullet 0{,}08294\text{dm}^2 = 2{,}4882\text{dm}^3$

Poids du tube en acier $m = 2.4882\text{dm}^3 \bullet 7.8\dfrac{\text{kg}}{\text{dm}^3} = \mathbf{19.4kg}$

Solution Exercice 11

Entreprise A = $\frac{2 \bullet B}{3}$
Entreprise B = B
Entreprise C = $1.25 \bullet \frac{2 \bullet B}{3}$
Entreprise D = $0.6 \bullet 1.25 \bullet \frac{2 \bullet B}{3}$
Entreprise E = $1.2 \bullet B$

Équation: A + B + C + D + E = 24‘444.-

$$\frac{2 \bullet B}{3} + B + 1.25 \bullet \frac{2 \bullet B}{3} + 0.6 \bullet 1.25 \bullet \frac{2 \bullet B}{3} + 1.2 \bullet B = 24'444.-$$

4.2B = 24‘444.-
B = 5‘820.-

La répartition des frais est la suivante:
Entreprise A = **CHF 3‘880.-**
Entreprise B = **CHF 5‘820.-**
Entreprise C = **CHF 4‘850.-**
Entreprise D = **CHF 2‘910.-**
Entreprise E = **CHF 6‘984.-**

Solution Exercice 12

Rendement de l’entreprise d’électricité Rätia AG = $\frac{40'500.- \bullet 100\%}{540'000.-} = 7.5\%$

Rendement de l’entreprise d’électricité Bella Vita AG = $\frac{62'920.- \bullet 100\%}{968'000.-} = 6.5\%$

L’entreprise Rätia AG a un rendement supérieur de 1%.

Solution Exercice 13

$c = \sqrt{a^2 + b^2} = \sqrt{(2m)^2 + (5m)^2} = \mathbf{5.385m}$

$\cos\alpha = \frac{b}{c} = \frac{5m}{5.385m} = 0.928 \longrightarrow \mathbf{21.8°}$

$\beta = 90° - \alpha =$ **68,2°**

Solution Exercice 14

a) $K_n = K_0 \left(1 + \frac{p}{100\%}\right)^n = 100'000.- \left(1 + \frac{4\%}{100\%}\right)^{20} = \mathbf{219'112.30}$

b) $K_n = K_0 \left(1 + \frac{p}{100\%}\right)^n = 100'000.- \left(1 + \frac{1\%}{100\%}\right)^{20} = \mathbf{122'019.-}$

Solution Exercice 15

$2x \bullet x + 700cm^2 = (2x - 10cm)(x + 20cm)$
$2x^2 + 700cm^2 = 2x^2 + 40cmx - 10cmx - 200cm^2$
$900cm^2 = 30cmx$
$30cm = x$
Longueur = 60cm (2x) / Largeur = 30cm (x)

Solution Exercice 16

$46 \bullet x = 43 (x + 1{,}2cm)$
$46x = 43x + 51{,}6cm$
$3x = 51{,}6cm$
$x = 17{,}2cm$

La hauteur d'une marche est de **17,2cm**.