

# Ficha de Trabalho de Matemática

## Conceção (Valores Exatos)

1

$$\begin{aligned}\underline{1.1} \quad \cos 30^\circ - 2 \operatorname{tg} 60^\circ &= \frac{\sqrt{3}}{2} - 2 \times \sqrt{3} = \frac{\sqrt{3}}{2} - 2\sqrt{3} = \\ &= \frac{\sqrt{3}}{2} - \frac{4\sqrt{3}}{2} = \boxed{\frac{-3\sqrt{3}}{2}}\end{aligned}$$

$$\underline{1.2} \quad \frac{\sqrt{3}}{2} \times \cos 30^\circ - \left(\frac{3}{2}\right)^2 = \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} - \frac{9}{4} = \frac{3}{4} - \frac{9}{4} = -\frac{6}{4} = \boxed{-\frac{3}{2}}$$

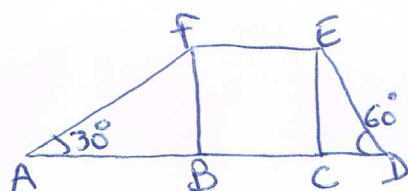
$$\begin{aligned}\underline{1.3} \quad 2 \sin 45^\circ + (2 \cos 45^\circ)^2 - 3 \operatorname{tg} 45^\circ &= \\ &= 2 \times \frac{\sqrt{2}}{2} + \left(2 \times \frac{\sqrt{2}}{2}\right)^2 - 3 \times 1 = \\ &= \sqrt{2} + (\sqrt{2})^2 - 3 = \sqrt{2} + 2 - 3 = \boxed{-1 + \sqrt{2}}\end{aligned}$$

$$\begin{aligned}\underline{1.4} \quad (\cos 45^\circ - \sin 30^\circ)(\cos 45^\circ + \sin 30^\circ) &= \\ &= \left(\frac{\sqrt{2}}{2} - \frac{1}{2}\right) \left(\frac{\sqrt{2}}{2} + \frac{1}{2}\right) = \frac{\sqrt{4}}{4} + \frac{\sqrt{2}}{4} - \frac{\sqrt{2}}{4} - \frac{1}{4} = \\ &= \frac{2}{4} - \frac{1}{4} = \boxed{\frac{1}{4}}\end{aligned}$$

$$\begin{aligned}\underline{1.5} \quad \sin 30^\circ + 2 \cos 45^\circ - (\operatorname{tg} 60^\circ)^2 &= \\ &= \frac{1}{2} + 2 \times \frac{\sqrt{2}}{2} - (\sqrt{3})^2 = \frac{1}{2} + \sqrt{2} - 3 = \\ &= \frac{1 + 2\sqrt{2} - 6}{2} = \boxed{\frac{-5 + 2\sqrt{2}}{2}}\end{aligned}$$

$$\begin{aligned}\underline{1.6} \quad \frac{\sin 60^\circ}{2} + \cos 30^\circ - 3 \operatorname{tg} 30^\circ &= \\ &= \frac{\frac{\sqrt{3}}{2}}{2} + \frac{\sqrt{3}}{2} - 3 \times \frac{\sqrt{3}}{3} = \frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{2} - \sqrt{3} = \\ &= \frac{\sqrt{3}}{4} + \frac{2\sqrt{3}}{4} - \frac{4\sqrt{3}}{4} = \frac{3\sqrt{3}}{4} - \frac{4\sqrt{3}}{4} = \boxed{\frac{-\sqrt{3}}{4}}\end{aligned}$$

2



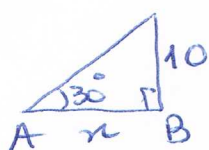
Quadrado de lado 10

2.1 Área do trapézio?

$$\text{Área do trapézio} = \frac{\text{Base maior} + \text{base menor}}{2} \times \text{altura}$$

Base maior:  $\overline{AB} + \overline{BC} + \overline{CD}$

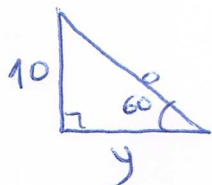
$\overline{AB}$ ?



$$\text{tg } 30^\circ = \frac{10}{x} \Rightarrow x = \frac{10}{\text{tg } 30^\circ} = \frac{10}{\frac{1}{\sqrt{3}}} =$$

$$= \frac{30}{\sqrt{3}} = \frac{30\sqrt{3}}{3}$$

$\overline{CD}$ ?



$$\text{tg } 60^\circ = \frac{10}{y} \Rightarrow y = \frac{10}{\sqrt{3}} = \frac{10\sqrt{3}}{3}$$

Então

$$\text{Base maior: } \frac{30\sqrt{3}}{3} + \frac{10}{(1)} + \frac{10\sqrt{3}}{3} =$$

$$= \frac{30\sqrt{3} + 30 + 10\sqrt{3}}{3} =$$

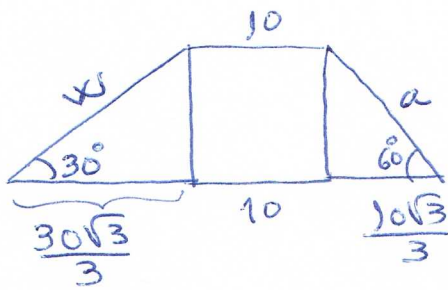
$$= \frac{40\sqrt{3} + 30}{3} = \frac{40\sqrt{3}}{3} + 10$$

$$\text{Então: } \text{Área} = \frac{\frac{40\sqrt{3}}{3} + 10 + 10}{2} \times 10 =$$

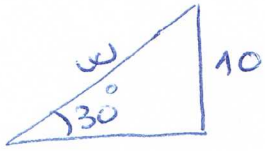
$$= \frac{\frac{40\sqrt{3}}{3} + 20}{2} \times 10 =$$

$$= \left( \frac{40\sqrt{3}}{3} + 20 \right) \times 5 = \frac{200\sqrt{3}}{3} + 100$$

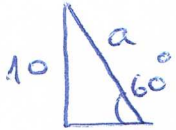
2.2



Falta-nos calcular w e a



$$\text{Sen } 30^\circ = \frac{10}{w} \Rightarrow w = \frac{10}{\text{Sen } 30^\circ} = \frac{10}{\frac{1}{2}} = 20$$



$$\begin{aligned} \text{Sen } 60^\circ &= \frac{10}{a} \Rightarrow a = \frac{10}{\text{Sen } 60^\circ} = \frac{10}{\frac{\sqrt{3}}{2}} = \frac{20}{\sqrt{3}} \\ &= \frac{20\sqrt{3}}{3} \end{aligned}$$

Então

$$\begin{aligned} \text{Perímetro} &= 20 + 10 + \frac{20\sqrt{3}}{3} + \frac{10\sqrt{3}}{3} + 10 + \frac{30\sqrt{3}}{3} \\ &= 40 + \frac{60\sqrt{3}}{3} = 40 + 20\sqrt{3} \end{aligned}$$