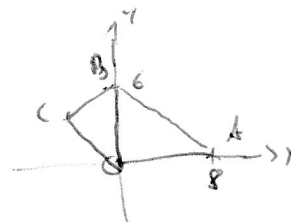


1. $g: \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 6 \\ 14 \end{pmatrix} + t \begin{pmatrix} 3 \\ 4 \end{pmatrix}$

a) $x = 6 + 3t = 0 \rightarrow t = -2 \rightarrow y = 6 + 4(-2) = -2$
 $m = \frac{4}{3} = 133\%$

b) $s: y = -\frac{3}{4}x + 6 \quad y = 0 \rightarrow x = 8 \quad A(8|0)$

c) $h: y = -\frac{8}{3}x$
 $h = g$
 $-\frac{8}{3}x = \frac{4}{3}x + 6$
 $x = -\frac{3}{2} \quad y = 4 \quad C(-\frac{3}{2}|4)$



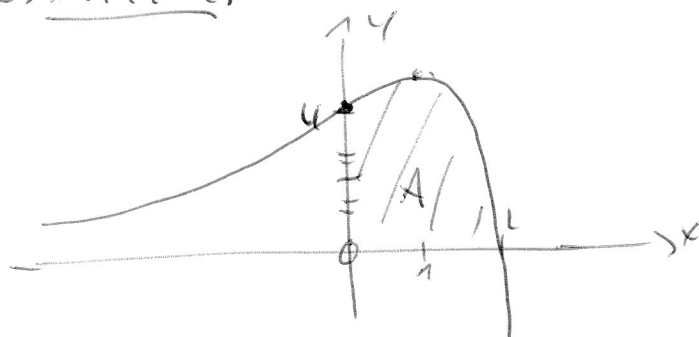
d) $\cos \gamma = \frac{c \cdot b \cdot \cos \alpha}{c \cdot b \cdot \cos \alpha} = \frac{\begin{pmatrix} 3/2 \\ 2 \end{pmatrix} \cdot \begin{pmatrix} 3/2 \\ -4 \end{pmatrix}}{5/2 \cdot \frac{1}{\sqrt{73}}} = \frac{9/4 - 8}{5/2 \cdot \frac{1}{\sqrt{73}}} \rightarrow \gamma = 122.6^\circ$
 $A_{OBC} = \frac{1}{2} \cdot 6 \cdot \frac{3}{2}$
 $A_{OAB} = \frac{1}{2} \cdot 8 \cdot 6$
 $\frac{57}{2} = A_{OABC}$

2. $f(x) = (4 - 2x)e^x$

$f'(x) = -2e^x + (4 - 2x)e^x = 2(2 - 2x)e^x$

$f''(x) = -2e^x + (2 - 2x)e^x = -2xe^x$

a) $f(x) = 0 \quad x = 2$
 $f'(x) = 0 \quad x = 1 \quad y = 2e$
 $f''(x) < 0 \Rightarrow \text{Max}(1|2e)$
 $f''(x) = 0 \quad x = 0 \quad y = 4$
 inflexl
 $y = 4 \quad \text{Wp}(0|4)$



b) $F(x) = 2(3 - x)e^x$

$F'(x) = -2e^x + 2(3 - x)e^x$
 $= (4 - 2x)e^x = f(x) \checkmark$

$A = \int_0^2 f(x) dx = [2(3 - x)e^x]_0^2 = \frac{2e^2 - 6}{1}$

3. A: 45% B: 37% C: 18%
 S: 0,1% 0,5% 1%

a) $P(\text{Strom}) = 0,45 \cdot 0,1 + 0,37 \cdot 0,5 + 0,18 \cdot 1 = 0,44$

b) $P(C|\text{Strom}) = \frac{P(C \cap \text{Strom})}{P(\text{Strom})} = \frac{0,18 \cdot 1}{0,44} = 40,9\%$

c) $P(4A \vee 4C) = (\frac{1}{2})^4 + (\frac{1}{2})^4 = 12,5\%$

d) $P(\text{kein Strom, 10x wieder}) = \frac{1}{3} \cdot (0,999)^{10} + \frac{1}{3} \cdot (0,999)^{10} + \frac{1}{3} \cdot (0,999)^{10} = 94,9\%$

e) $20 \cdot 23 \cdot 22 = 12144$

4.1) $DM = \frac{a}{2}$ $DM_1 = \frac{1}{3}L = \frac{1}{3} \cdot \frac{a}{2}\sqrt{3}$ $DM_2 = \frac{a}{2}\sqrt{3}$

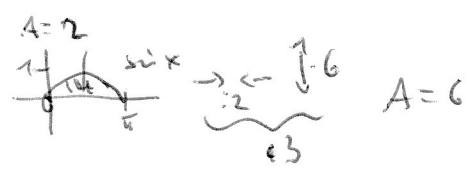
$B = \angle M_1BD - \angle M_2BD = \arctan(\frac{DM_1}{DM}) - \arctan(\frac{DM_2}{DM}) = \arctan(\frac{\sqrt{3}}{3}) - \arctan(\frac{\sqrt{3}}{2})$
 $= 30^\circ - 40,9^\circ = 10,9^\circ$

4.2. a) $f(x) = 6 \sin(2x)$ $P(\frac{\pi}{2} | 0) \rightarrow S(\frac{\pi}{2} | f(\frac{\pi}{2})) = S(\frac{\pi}{2} | 6)$

$B(\frac{\pi}{2} | 0)$ $Q_A = OP = \frac{\pi}{2}$ $Q(\frac{\pi}{2} | 0) \rightarrow R(\frac{\pi}{2} | 6)$

$A_{PQRS} = \frac{1}{2} \cdot 6 \cdot \frac{\pi}{2} = \frac{3}{2}\pi$

b) $B(\frac{\pi}{2} | 0)$
 $A(\frac{\pi}{2} | 6)$



$A = \int_0^{\frac{\pi}{2}} 6 \sin(2x) dx = [-3 \cos(2x)]_0^{\frac{\pi}{2}} = 3 - (-3) = 6$

4.3. $\bar{x} = \frac{4+4+6+4+4+5+4}{7} = 4,5$

$\bar{x^2} = \frac{4^2+4^2+6^2+4^2+4^2+5^2+4^2}{7} = 20,71$

$\sigma = \sqrt{\bar{x^2} - \bar{x}^2} = 0,71$

$x_{med} = 4$