Aufgabe 1

$$f(x) = 0{,}5x^2 \qquad g(x) = 3x^3 + 1$$

$$m_s = \frac{y_2 - y_1}{x_2 - x_1} = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

a)

$$I = [0;2]$$

$$f(0) = 0{,}5 \cdot 0^2 = 0$$
$$f(2) = 0{,}5 \cdot 2^2 = 2$$
$$m_s = \frac{2-0}{2-0} = 1$$

$$g(0) = 3 \cdot 0^3 + 1 = 1$$
$$g(2) = 3 \cdot 2^3 + 1 = 25$$
$$m_s = \frac{25-1}{2-0} = 12$$

b)

$$I = [-1;3]$$

$$f(-1) = 0{,}5 \cdot (-1)^2 = 0{,}5$$
$$f(3) = 0{,}5 \cdot 3^2 = 4{,}5$$
$$m_s = \frac{4{,}5 - 0{,}5}{3-(-1)} = 1$$

$$g(-1) = 3 \cdot (-1)^3 + 1 = -2$$
$$g(3) = 3 \cdot 3^3 + 1 = 82$$
$$m_s = \frac{82-(-2)}{3-(-1)} = 21$$

c)

$$I = [-1;1]$$

$$f(-1) = 0{,}5 \cdot (-1)^2 = 0{,}5$$
$$f(1) = 0{,}5 \cdot 1^2 = 0{,}5$$
$$m_s = \frac{0{,}5 - 0{,}5}{1 - (-1)} = 0$$

$$g(-1) = 3 \cdot (-1)^3 + 1 = -2$$
$$g(1) = 3 \cdot 1^3 + 1 = 4$$
$$m_s = \frac{4 - (-2)}{1 - (-1)} = 3$$

d)

$$I = [-2;-1]$$

$$f(-2) = 0{,}5 \cdot (-2)^2 = 2$$
$$f(-1) = 0{,}5 \cdot (-1)^2 = 0{,}5$$
$$m_s = \frac{0{,}5 - 2}{-1 - (-2)} = -1{,}5$$

$$g(-2) = 3 \cdot (-2)^3 + 1 = -23$$
$$g(-1) = 3 \cdot (-1)^3 + 1 = -2$$
$$m_s = \frac{-2 - (-23)}{-1 - (-2)} = 21$$

Aufgabe 2

$$m_s = \frac{y_2 - y_1}{x_2 - x_1} = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

a)

$$P_1\,(1 \mid 0)\,, \quad P_2\,(9 \mid 7)$$

$$m_s = \frac{7-0}{9-1} = \frac{7}{8}\ \left[\frac{mm}{\text{Tag}}\right]$$

b)

$$P_1\,(1 \mid 0)\,, \quad P_2\,(3 \mid 0)$$

$$m_s = \frac{0-0}{3-1} = 0\ \left[\frac{mm}{\text{Tag}}\right]$$

c)

$$P_1\,(7 \mid 4)\,, \quad P_2\,(9 \mid 7)$$

$$m_s = \frac{7-4}{9-7} = \frac{3}{2} = 1\frac{1}{2}\ \left[\frac{mm}{\text{Tag}}\right]$$

d)

$$P_1\,(4 \mid 0)\,, \quad P_2\,(6 \mid 2)$$

$$m_s = \frac{2-0}{6-4} = 1\ \left[\frac{mm}{\text{Tag}}\right]$$