

## Übungsaufgaben 4.3

### Aufgabe 1

a)  $3X + 7Y = 17$   
 $X - Y = -1$       | \* 3      auf gleiches X-bringen

$$\begin{array}{r} 3X + 7Y = 17 \\ 3X - 3Y = -3 \end{array} \quad \begin{array}{l} | - 7Y \\ | + 3Y \end{array}$$

$$\begin{array}{r} 3X = 17 - 7Y \\ 3X = -3 + 3Y \end{array} \quad \begin{array}{l} | \text{Brüche gleichstellen} \\ | \end{array}$$

$$17 - 7Y = -3 + 3Y \quad | + 7Y ; + 3$$

$$17 + 3 = 3Y + 7Y$$

$$20 = 10Y \quad | : 10$$

$$2 = Y$$

$$\begin{array}{r} X - Y = -1 \\ X - 2 = -1 \end{array} \quad | + 2$$
$$X = -1 + 2$$
$$X = 1$$

Probe :

$$\begin{array}{r} 3X + 7Y = 17 \\ 3*1 + 7*2 = 17 \\ 17 = 17 \end{array}$$

$$\begin{array}{r} X - Y = -1 \\ 1 - 2 = -1 \end{array}$$

$$\begin{array}{l}
 \text{b) } 27X - 3Y = 0 \\
 \quad 2X + 4Y = 38 \quad | :2 \\
 \\
 27X - 3Y = 0 \\
 \quad X + 2Y = 19 \quad | - 2Y \\
 \\
 27X - 3Y = 0 \\
 \quad X = 19 - 2Y \quad | \text{ einsetzen der Gleichung in die erste} \\
 \\
 27 \cdot (19 - 2Y) - 3Y = 0 \\
 \\
 513 - 54Y - 3Y = 0 \\
 \\
 513 - 57Y = 0 \quad | + 57Y \\
 \\
 513 = 57Y \quad | :57 \\
 \\
 \mathbf{9 = Y}
 \end{array}$$

$$\begin{array}{l}
 2X + 4Y = 38 \\
 2X + 4 \cdot 9 = 38 \\
 2X + 36 = 38 \quad | - 36 \\
 2X = 2 \\
 \mathbf{X = 1}
 \end{array}$$

Probe :

$$\begin{array}{l}
 27X - 3Y = 0 \\
 27 \cdot 1 - 3 \cdot 9 = 0 \\
 27 - 27 = 0 \\
 0 = 0
 \end{array}$$

$$\begin{array}{l}
 2X + 4Y = 38 \\
 2 \cdot 1 + 4 \cdot 9 = 38 \\
 38 = 38
 \end{array}$$

$$c) \quad \frac{X}{10} + \frac{Y}{5} = \frac{1}{2} \quad | * 10$$

$$3X + 2Y = 65 \quad | : 3$$

$$X + 2Y = 5 \quad | \text{Brüche gleichstellen}$$

$$X + \frac{2Y}{3} = \frac{65}{3} \quad |$$

$$X = -2Y + 5$$

$$X = \frac{-2Y}{3} + \frac{65}{3}$$

$$-2Y + 5 = \frac{-2Y}{3} + \frac{65}{3} \quad | -5 ; + \frac{2Y}{3}$$

$$-2Y + \frac{2Y}{3} = -5 + \frac{65}{3}$$

$$1 \frac{1}{3} Y = 16 \frac{2}{3}$$

$$Y = -12,5$$

$$3X + 2Y = 65 \quad | \text{ersetzen von Y durch } -12,5$$

$$3X + 2 * (-12,5) = 65$$

$$3X - 25 = 65 \quad | + 25$$

$$3X = 65 + 25$$

$$3X = 90 \quad | : 3$$

$$X = 30$$

Probe :

$$\frac{X}{10} + \frac{Y}{5} = \frac{1}{2}$$

$$\frac{30}{10} + \frac{(-12,5)}{5} = \frac{1}{2}$$

$$3 + (-2,5) = 0,5$$

$$0,5 = 0,5$$

$$3X + 2Y = 65$$

$$3 * 30 + 2 * (-12,5) = 65$$

$$90 - 25 = 65$$

$$\begin{array}{l} \text{d) } 3X + 14Y = 3 \quad | *2 \\ 2X + \frac{7Y}{3} = \frac{1}{3} \quad | *3 \end{array}$$

$$\begin{array}{l} 6X + 28Y = 6 \quad | - 28Y \\ 6X + 7Y = 1 \quad | - 7Y \end{array}$$

$$\begin{array}{l} 6X = 6 - 28Y \quad | \text{Brüche gleichsetzen} \\ 6X = 1 - 7Y \end{array}$$

$$6 - 28Y = 1 - 7Y \quad | - 6; + 7Y$$

$$-21Y = -5 \quad | : 21$$

$$Y = \frac{5}{21}$$

$$3X + 14Y = 3 \quad | \text{einsetzen von } Y$$

$$3X + 14 * \frac{5}{21} = 3$$

$$3X + 3 \frac{1}{3} = 3 \quad | - 3 \frac{1}{3}$$

$$3X = - \frac{1}{3} \quad | : 3$$

$$X = - \frac{1}{9}$$

$$\text{Probe : } 3X + 14Y = 3$$

$$3X * \frac{(-1)}{9} + 14 * \frac{5}{21} = 3$$

$$\frac{-1}{3} + 3 \frac{1}{3} = 3$$

$$3 = 3$$

$$2X + \frac{7Y}{3} = \frac{1}{3}$$

$$2 * \frac{(-1)}{9} + \frac{7}{3} * \frac{5}{21} = \frac{1}{3}$$

$$-\frac{2}{9} + \frac{5}{9} = \frac{1}{3}$$

$$\frac{1}{3} = \frac{1}{3}$$