

**Montag:** Bestimmen Sie die Lösungen:

$$\begin{aligned} \text{(a)} \quad \frac{1}{3}y - 5 &= -\frac{1}{3}y + 3 & | +\frac{1}{3}y \\ \frac{2}{3}y - 5 &= 3 & | +5 \\ \frac{2}{3}y &= 8 & | : \frac{2}{3} \\ y &= 8 : \frac{2}{3} = 8 \cdot \frac{3}{2} = 12 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 12 + 5 &= 3 \cdot (z - 8) & | \text{ AM} \\ 17 &= 3z - 24 & | +24 \\ 41 &= 3z & | : 3 \quad \frac{41}{3} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad \frac{2}{5} + (-\frac{1}{5}z) + \frac{3}{5} &= 9 & | \text{ AM} \\ \frac{2}{5} + \frac{3}{5} - \frac{1}{5}z &= 9 & | +\frac{1}{5}z \\ 1 &= 9 + \frac{1}{5}z & | -9 \\ -8 &= \frac{1}{5}z & | : \frac{1}{5} \\ (-8) : \frac{1}{5} &= (-8) \cdot 5 = -40 = z \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad 3x - (-2x + 15) &= -35x & | \text{ AM} \\ 3x + 2x - 15 &= 5x - 15 = -35x & | +15 \\ 5x &= -35x + 15 & | +35x \\ 40x &= 15 & | : 40 \\ x &= \frac{15}{40} = \frac{3}{8} \end{aligned}$$

**Dienstag:** Berechnen Sie die Lösung mit Hilfe der binomischen Formeln:

$$\begin{aligned} \text{(a)} \quad (x + 1)^2 &= x^2 + 10 \\ x^2 + 2x + 1 &= x^2 + 10 & | -x^2 \\ 2x + 1 &= 10 & | -1 \\ 2x &= 9 & | : 2 \\ x &= \frac{9}{2} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad (2x - 5)^2 &= 4x^2 - 20 \\ 4x^2 - 20x + 25 &= 4x^2 - 20 & | -4x^2 \\ -20x + 25 &= -20 & | -25 \\ -20x &= -45 & | : (-20) \\ x &= \frac{45}{20} = \frac{9}{4} \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad & \left(\frac{1}{2} + 2\right)^2 = \frac{1}{4}x^2 + 16 \\
 & \left(\frac{5}{2}\right)^2 = \frac{25}{4} = \frac{1}{4}x^2 + 16 && | -16 \\
 & \frac{25}{4} - \frac{64}{4} = -\frac{39}{4} = \frac{1}{4}x^2 && | : \frac{1}{4} \\
 & -\frac{39}{4} : \frac{1}{4} = -\frac{39}{4} \cdot 4 = -39 = x^2 \\
 & -39 = x^2 && \nexists
 \end{aligned}$$

$$\begin{aligned}
 \text{(d)} \quad & (3x - 6)^2 + x^2 = 5x^2 + 2 + 5x^2 \\
 & 9x^2 - 36x + 36 + x^2 = 10x^2 + 2 \\
 & 10x^2 - 36x + 36 = 10x^2 + 2 && | -10x^2 \\
 & -36x + 36 = 2 && | +36x \\
 & 36 = 36x + 2 && | -2 \\
 & 34 = 36x && | : 36 \\
 & \frac{34}{36} = \frac{17}{18} = x
 \end{aligned}$$

**Mittwoch:** Lösen Sie die Ungleichungen. Geben Sie die Lösungsmenge an!

$$\begin{aligned}
 \text{(a)} \quad & 2x - 14 > 22 && | +14 \\
 & 2x > 36 && : 2 \\
 & x > 18 \\
 & \mathbb{L} = \{x > 18\}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad & 1,5x - 9 < 7,5 && | +9 \\
 & 1,5x < 16,5 && | : 1,5 \\
 & x < 11 \\
 & \mathbb{L} = \{x < 11\}
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad & (2x - 1)(2x + 5) > (-x - 1)(-4x + 6) && | \text{AM} \\
 & 4x^2 + 8x - 5 > 4x^2 - 2x - 6 && | -4x^2 \\
 & 8x - 5 > -2x - 6 && | +2x \\
 & 10x - 5 > -6 && | +5 \\
 & 10x > -1 && | : 10 \\
 & x > -\frac{1}{10} \\
 & \mathbb{L} = \{x > -\frac{1}{10}\}
 \end{aligned}$$

$$\begin{aligned}
 \text{(d)} \quad 12 - (3x + 2) &< x - 6 && | \text{ AM} \\
 12 - 3x - 2 &= 10 - 3x < x - 6 && | +3x \\
 10 &< 4x - 6 && +6 \\
 16 &< 4x && : 4 \\
 4 &< x \\
 \mathbb{L} &= \{4 < x\}
 \end{aligned}$$

**Donnerstag:** Geben Sie für die folgenden Gleichungen die Lösungsmenge an:

(a) $3x + 5 = 7x - 5$	$  -3x$	(b) $-x = -6x + \frac{25}{2}$	$  +6x$
$5 = 10x - 5$	$  +5$	$5x = \frac{25}{2}$	$  : 5$
$10 = 10x$	$  : 10$	$x = \frac{25}{2} \cdot \frac{2}{2}$	
$x = 1$		$x = \frac{5}{2}$	
$\mathbb{L} = \{1\}$		$\mathbb{L} = \{\frac{5}{2}\}$	

(c) $\frac{1}{2}x = 2,5x - 60$	$  +60$	(d) $5 \cdot (2x - 4) = 26$	$  \text{ AM}$
$\frac{1}{2}x + 60 = 2,5x$	$  -\frac{1}{2}x$	$10x - 20 = 26$	$  +20$
$60 = 2x$	$  : 2$	$10x = 46$	$  : 10$
$30 = x$		$x = \frac{46}{10} \cdot \frac{23}{23}$	
$\mathbb{L} = \{30\}$		$x = \frac{23}{5}$	
		$\mathbb{L} = \{\frac{23}{5}\}$	

(e) $-3 \cdot (x + 15) = 5 + 2x$	$  \text{ AM}$	(f) $-\frac{1}{3}(x - 1) = \frac{1}{6}(2x + 12)$	$  \text{ AM}$
$-3x - 35 = 5 + 2x$	$  +3x$	$-\frac{1}{3}x + \frac{1}{3} = \frac{1}{3}x + 2$	$  +\frac{1}{3}x$
$-35 = 5 + 5x$	$  -5$	$\frac{1}{3} = \frac{2}{3}x + 2$	$  -2$
$-40 = 5x$	$  : 5$	$-\frac{5}{3} = \frac{2}{3}x$	$  : \frac{2}{3}$
$-8 = x$		$-\frac{5}{2} = x$	
$\mathbb{L} = \{-8\}$		$\mathbb{L} = \{-\frac{5}{2}\}$	

**Freitag:** Bestimmen Sie die Lösungsmenge der Gleichungen bzw. der Ungleichungen:

(a) $\frac{1}{3}x + 6 + \frac{5}{3}x - 5 = 0$		(b) $-6x - 3 < 4x + 7$	$ +6x$
$2x + 1 = 0$	$ -1$	$-3 < 10x + 7$	$ -7$
$2x = -1$	$ \div 2$	$-10 < 10x$	$ \div 10$
$x = -\frac{1}{2}$		$-1 < x$	
$\mathbb{L} = \{-\frac{1}{2}\}$		$\mathbb{L} = \{-1 < x\}$	

(c) $(-2x-2)(3x-5) > -6x \cdot (x+3)$	$  \text{ AM}$	(d) $-\frac{2}{3}x + \frac{1}{4} = (\frac{4}{3}x - \frac{2}{4})$	$  +\frac{2}{3}x$
$-6x^2 + 4x + 10 > -6x^2 - 18x$	$ +6x^2$	$\frac{1}{4} = 2x - \frac{2}{4}$	$ +\frac{2}{4}$
$4x + 10 > -18x$	$ +18x$	$\frac{3}{4} = 2x$	$ \div 2$
$22x + 10 > 0$	$ -10$	$\frac{3}{8} = x$	
$22x > -10$	$ \div 22$	$\mathbb{L} = \{\frac{3}{8}\}$	
$x > -\frac{10}{22}$			
$\mathbb{L} = \{x > -\frac{5}{11}\}$			

(e) $-(\frac{5}{2}x + 3) = \frac{5}{2}x + 6$	$ +\frac{5}{2}x$	(f) $(-4x + 4)(3x - 3) > (2x - 5)(-6x + 3)$	$  \text{ AM}$
$3 = 5x + 6$	$ -6$	$-12x^2 + 24x - 12 > -12x^2 + 36x - 15$	$ +12x^2$
$-3 = 5x$	$ \div 5$	$24x - 12 > 36x - 15$	$ -24x$
$-\frac{3}{5} = x$		$-12 > 12x - 15$	$ +15$
$\mathbb{L} = \{-\frac{3}{5}\}$		$3 > 12x$	$ \div 12$
		$\frac{1}{4} > x$	
		$\mathbb{L} = \{\frac{1}{4} > x\}$	