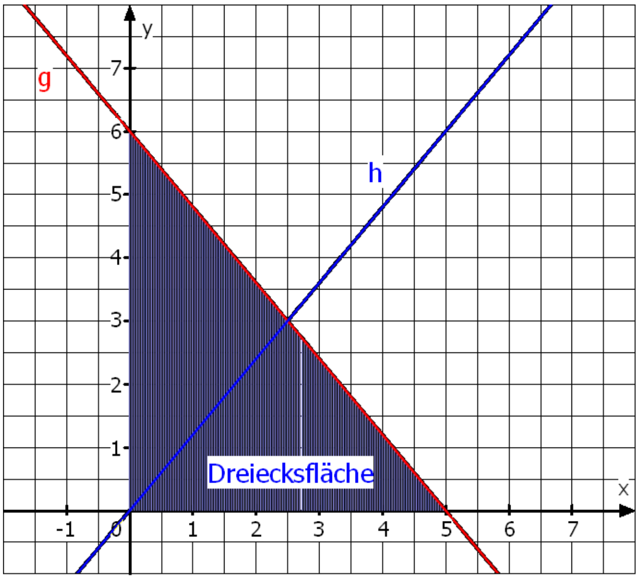
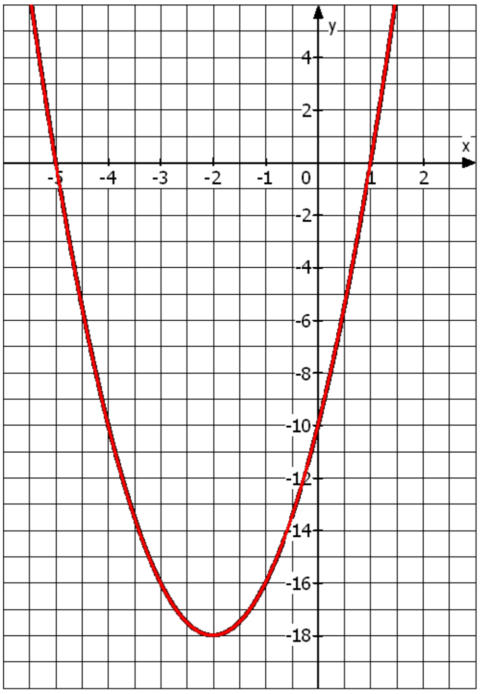
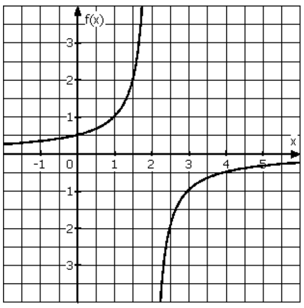
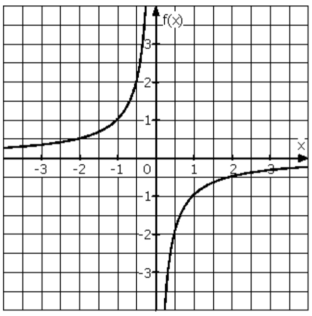
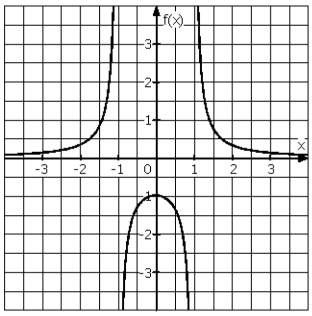
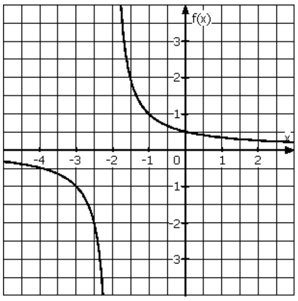
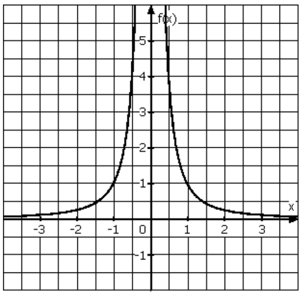
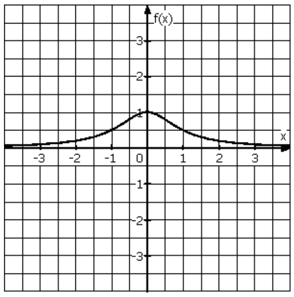
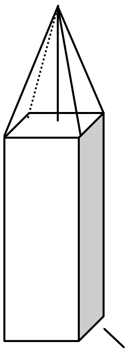
Test zum Übergang in E1 / 2012
Lösungen und Punkteverteilung

1.	a.	Gerade g: $m = \frac{-6}{5} = -1{,}2$; $b = 6$; $y = -1{,}2x + 6$	**2 P**
		 	**1 P**
	b.	Dreiecksfläche: $A = \frac{1}{2} \cdot 5 \cdot 6 = 15\,\text{FE}$	**1 P**
	c.	Möglicher Ansatz: $\frac{1}{2} A = 7{,}5\,\text{FE}$; $7{,}5\,\text{FE} = \frac{1}{2} \cdot 5 \cdot h \Rightarrow h = 3\text{LE}$ $-1{,}2x_h + 6 = 3 \Rightarrow x_h = 2{,}5$	**2 P**
	.	Gerade h: $m = \frac{3}{2{,}5} = 1{,}2$; $y = 1{,}2x$	**2 P**
2.	1.a. .	I) $\frac{1}{2}x - 3 = 3x - 7y$ $x = 24$; $y = 9$ II) $\frac{1}{3}y + 3 = x - 2y$ (Probe)	**3 P** **1 P**
	1.b.	I) $ax + 3y = a$ II) $x = y$ in I) $ay + 3y = a$ II) $x - y = 0$ $(a+3)y = a$ $y = \frac{a}{a+3}$ $a \neq -3$	**2 P**
	2.	Möglicher Ansatz mit LGS: E Einzelzimmer ; D Doppelzimmer B Bus ; T Taxi I) $2E + B = 180$ mit $T = 5B$ und $D = 1{,}2E$ II) $1D + T = 196$	**3 P**
		Lösung z.B. mit TR: E= 80€ , B = 20€ , D = 96€ , T = 100€	**1 P**

3.	1.a.	$\sqrt{\frac{10k}{9}} : \sqrt{\frac{40k^3}{3^3}} = \sqrt{\frac{10k \cdot 3^3}{9 \cdot 40k^3}} = \sqrt{\frac{3}{4k^2}} = \frac{\sqrt{3}}{2k}$	**2 P**
	1.b.	z.B. $\frac{3\sqrt{6}}{\sqrt{18}} = \frac{3}{\sqrt{3}} = \frac{3\sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \sqrt{3}$	**2 P**
	2.	$\frac{3x}{\sqrt{x+1}} = 8$; $9x^2 = 64 \cdot (x+1)$; $9x^2 - 64x - 64 = 0$	**3 P**
		$x_1 = 8$, $x_2 = -\frac{8}{9}$; $L = \{8\}$ (mit Probe)	**1 P**
4.		 a. Schnittpunkte mit der x-Achse: Lösen der quadratischen Gleichung $2x^2 + 8x - 10 = 0$ $N_1(-5 \mid 0)$; $N_2(1 \mid 0)$ $M(0 \mid -10)$	**3 P**
		b. Skalierung	**1 P**
		c. Z.B. $x_s = \frac{-5+1}{2} = -2$ Scheitelpunkt $S(-2 \mid -18)$	**2 P**
		d. $p^*(x) = -2x^2 - 8x + 10$	**1 P**
5.		 $f_4(x) = \frac{1}{x-2}$ $D_{f,max} = IR \setminus \{2\}$  $f_1(x) = -\frac{1}{x}$ $D_{f,max} = IR \setminus \{0\}$  $f_3(x) = \frac{1}{x^2 - 1}$ $D_{f,max} = IR \setminus \{-1;1\}$	**3 P**

		 $f_5(x) = \frac{1}{x+2}$ $D_{f,max} = IR \setminus \{-2\}$  $f_6(x) = \frac{1}{x^2}$ $D_{f,max} = IR \setminus \{0\}$  $f_2(x) = \frac{1}{x^2+1}$ $D_{f,max} = IR$	**3 P**
6.		 Höhe h der Pyramide h = 30cm 50cm 2cm 8cm Zeichnung nicht maßstabsgetreu! a. $V_{Quader} = 800 cm^3$ $V_{Pyramide} = 160 cm^3$ $V_{gesamt} = 960 cm^3$	**1 P** **1 P** **1 P**
		$O_{Quader} = 1016 cm^2$ Pyramide: Seitenhöhe $h_1 = \sqrt{916}$ cm Seitenhöhe $h_2 = \sqrt{901}$ cm $O_{Pyramide} = 300,66 cm^2$ $O_{gesamt} = 1316,66 cm^2$	**3 P**
		b. Masse $m = \rho \cdot V$; $m = 0,6528 kg$	**1 P**
7.	1.	a. <u>Kosinussatz</u>: $(d_{HB})^2 = 5,49^2 + 5,43^2 - 2 \cdot 5,49 \cdot 5,43 \cdot \cos(54,6°)$ $d_{HB} = 5,01 km$	**2 P**
	.	b. Kosinussatz : $5,43^2 = 5,49^2 + 5,01^2 - 2 \cdot 5,49 \cdot 5,01 \cdot \cos(\beta)$ $\beta = 62,1°$ oder Sinussatz: $\frac{\sin(54,6°)}{5,01} = \frac{\sin(\beta)}{5,43}$; $\beta = 62,1°$ (Bensheim)	**2 P**
		$\gamma = 63,3°$ (Heppenheim)	**1 P**
	2.1.	a. $\frac{1}{2} - \sin^2(\alpha) = \cos^2(\alpha) - \frac{\tan(\alpha) \cdot \cos(\alpha)}{2 \cdot \sin(\alpha)}$	

$$1 - \sin^2(\alpha) - \frac{1}{2} = \cos^2(\alpha) - \frac{\sin(\alpha)\cdot\cos(\alpha)}{2\cdot\cos(\alpha)\cdot\sin(\alpha)}$$

$$\sin^2(\alpha) + \cos^2(\alpha) - \sin^2(\alpha) - \frac{1}{2} = \cos^2(\alpha) - \frac{1}{2}$$

$$\cos^2(\alpha) - \frac{1}{2} = \cos^2(\alpha) - \frac{1}{2}$$

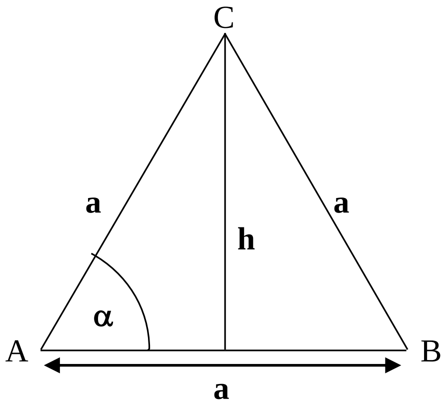
3 P

b. Höhe im gleichseitigen Dreieck:

$$h = \frac{a}{2}\sqrt{3}$$

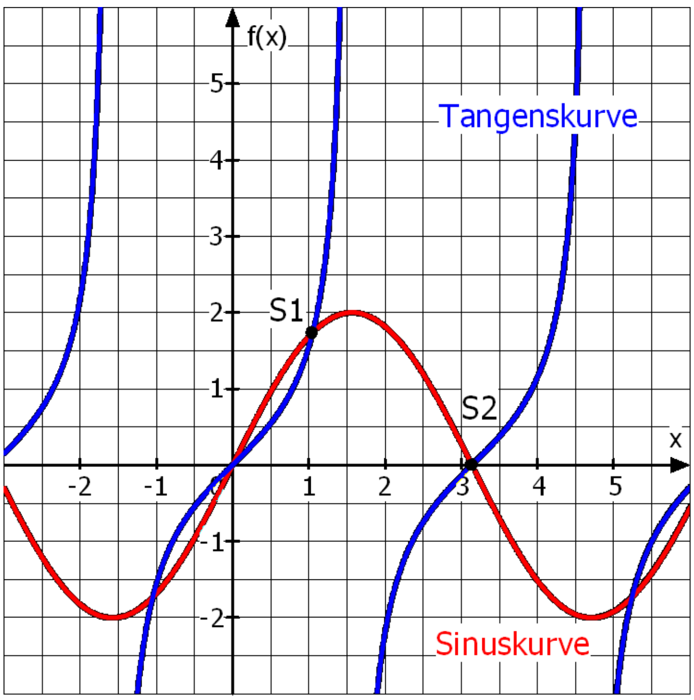
$$\sin(\alpha) = \frac{\frac{a}{2}\sqrt{3}}{a} = \frac{1}{2}\sqrt{3}$$

[$\alpha = 60°$]



3 P

2.2.



a. Zuordnung **1 P**
Skalierung **1 P**

b. **S1**:

$$2\cdot\sin(x) = \tan(x)$$

$$2 = \frac{1}{\cos(x)}$$

$$\cos(x) = \frac{1}{2}$$

$$x = \frac{\pi}{3} \approx 1{,}05$$

$$S1\left(\frac{\pi}{3} \,\middle|\, 0\right)$$

2 P

S2:
sin(x) und tan(x) nehmen für $x = 0$, $x = \pi$, $x = 2\pi$, … den Wert null an.

$$S2(\pi \mid 0)$$

2 P

Summe	**55P**