Lösungshinweise: Feststellungsprüfung 2017 im Fach Mathematik

1	$(2x-5)^2 = x(3x-20)+50$ $4x^2-20x+25 = 3x^2-20x+50$ $x^2 = 25$ $x = \pm 5$, also $L = \{-5;\ 5\}$	(5)
2.1	$p(x) = x^2 + \frac{7}{5}x + \frac{27}{400}$ $p(0) = \frac{27}{400}$, also $Y_0(0\,\vert\,\frac{27}{400})$ $p(x)=0;\quad x_{1,2} = \frac{-\frac{7}{5} \pm \sqrt{(\frac{7}{5})^2 - 4\cdot\frac{27}{400}}}{2} = \frac{-\frac{7}{5} \pm \sqrt{\frac{49}{25} - \frac{27}{100}}}{2} = \frac{-\frac{7}{5} \pm \frac{13}{10}}{2}$ $x_1 = -\frac{1}{20} = -0{,}05$, $x_2 = -\frac{27}{20} = -1{,}35$, also $X_1(-0{,}05\,\vert\,0)$, $X_2(-1{,}35\,\vert\,0)$	(4)
2.2	$x_S = \frac{1}{2}(x_1+x_2) = \frac{1}{2}(-\frac{1}{20} - \frac{27}{20}) = -\frac{7}{10};\ y_S = p(x_s) = p(-\frac{7}{10}) = -\frac{169}{400} = -0{,}4225$ Also: Scheitel $S(-\frac{7}{10}\,\vert\,-\frac{169}{400})$	(2)
3	$m = \frac{y_A - y_B}{x_A - y_B} = \frac{-2-4}{1-(-3)} = -\frac{3}{2}$ Vorschlag 1: $y_A = -\frac{3}{2}x_A + t \Rightarrow t = y_A + \frac{3}{2}x_A = -2 + \frac{3}{2}\cdot 1 = -\frac{1}{2}$ Vorschlag 2: $y = -\frac{3}{2}(x - x_A) + y_A \Rightarrow t = -\frac{3}{2}(0 - x_A) + y_A = -\frac{3}{2}(-1) - 2 = -\frac{1}{2}$ $\Rightarrow Q(0\,\vert\,-\frac{1}{2})$	(4)
4	$\frac{2y-3}{2(2y-1)} - \frac{2y+1}{2y} + \frac{y}{2y-1} = \frac{(2y-3)y}{2y(2y-1)} - \frac{(2y-1)(2y+1)}{2y(2y-1)} + \frac{y\cdot 2y}{2y(2y-1)} =$ $= \frac{2y^2 - 3y - (4y^2-1) + 2y^2}{2y(2y-1)} = \frac{-3y+1}{2y(2y-1)}$	(5)
5.1	$A(a) = \frac{a^2\pi}{2} + \frac{2a+a}{2}\cdot a = \frac{a^2\pi}{2} + \frac{3a^2}{2} = \frac{3+\pi}{2}\cdot a^2$	(4)
5.2	$\frac{A_{Halbkreis}}{A(a)} = \frac{\frac{a^2\pi}{2}}{\frac{\pi+3}{2}a^2} = \frac{\pi}{\pi+3} \approx 0{,}51$; d. h. der Anteil beträgt rund 51 %.	(2)
5.3	$U = 2\cdot 10m + 2\cdot 10m + \frac{1}{2}\cdot 2\pi\cdot 10m + \sqrt{(10m)^2 + (10m)^2} \approx 85{,}56m$ Oder: $U = 2a + 2a + \frac{1}{2}2\pi a + \sqrt{2a^2} = 4a + \pi a + a\sqrt{2} = a(4+\pi+\sqrt{2}) \approx 85{,}56m$ (mit $a = 10m$)	(4)
		(30)

Bewertung:

BE	30–26	25–22	21–17	16–13	12–7	6–0
Note	1	2	3	4	5	6