

AG1 Grundbegriffe der Algebra (Lösungen)

Lösungen Maturaaufgaben:

- 1) Gehe zum Aufgabenpool Mathematik AHS: <https://prod.aufgabenpool.at/amn/index.php?id=M>
- 2) Gib im Feld „**Volltextsuche**“ die **Nummer** ein. Du kommst zur zugehörigen Aufgabe. Die Lösungen sind bei der Aufgabe enthalten.

Grundkompetenz

Aufgabentyp ▾

Schulstufe ▾

Volltextsuche

Angestelltenghalt* 1_578, AN1.1, Offenes Antwortformat

↑
Nummer

Bsp. 1)

$\frac{3}{1} = 3$	N	$\sqrt{9} = 3$	N	$1\frac{15}{15}$	N
-2	Z	$\frac{1}{7}$	Q	3,5	Q
$\frac{3}{2}$	Q	$\sqrt{11}$	II	$-\sqrt{16} = -4$	Z
$\frac{\pi}{3,14}$	II	$-\frac{4}{8}$	Q	$\frac{1}{19}$	Q
$\frac{4}{2} = 2$	N	1,1236	Q	$\sqrt{3}$	II
$-\frac{2}{3}$	Q	$\frac{3}{\sqrt{8}}$	II	$\frac{0}{2} = 0$	N
3,2	Q	$-\sqrt{9} = -3$	Z	$\frac{7}{7} = 1$	N
$-\frac{2}{1} = -2$	Z	$\frac{16}{8}$	N	3,5	Q
$\frac{5}{3}$	Q	$\sqrt{100} = 10$	N	$\sqrt{27}$	II
0,3	Q	$\frac{\sqrt{81}}{\sqrt{9}} = \frac{9}{3} = 3$	N	$\frac{\sqrt{11}}{13}$	II
$\sqrt{2}$	II	-1009	Z	$\sqrt{3^2} = 3$	N
$13^2 = 169$	N	π	II	$\sqrt{2^3} = \sqrt{8}$	II

Bsp. 2)

-3	$\mathbb{Z}, \mathbb{Q}, \mathbb{R}$	$-\frac{1}{\sqrt{3}}$	\mathbb{I}, \mathbb{R}	$\frac{1}{19}$	\mathbb{Q}, \mathbb{R}
$\frac{100}{50} = 2$	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$	1,2236	\mathbb{Q}, \mathbb{R}	$-\sqrt{9} = -3$	$\mathbb{Z}, \mathbb{Q}, \mathbb{R}$
$-\frac{0}{3} = -0 = 0$	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$	$\sqrt{18}$	\mathbb{I}, \mathbb{R}	$\frac{0}{2} = 0$	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$
$0, \dot{6}$	\mathbb{Q}, \mathbb{R}	$\frac{\sqrt{36}}{\sqrt{9}} = \frac{6}{3} = 2$	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$	$\frac{\sqrt{11}}{\sqrt{11}} = 1$	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$
$\sqrt{23}$	\mathbb{I}, \mathbb{R}	-4	$\mathbb{Z}, \mathbb{Q}, \mathbb{R}$	$\sqrt{10^2} = 10$	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$
$5^2 - 6^2$	$\mathbb{Z}, \mathbb{Q}, \mathbb{R}$	$\frac{\pi}{3}$	\mathbb{I}, \mathbb{R}	$\sqrt{4^3} = \sqrt{64} = 8$	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$

$25 - 36 = -11$

Bsp. 3)

<p>a. $T(v) = \frac{1}{v}$</p> <p>$D = \mathbb{R} \setminus \{0\}$</p>	<p>b. $T(b) = \frac{5b+2}{4b-24}$</p> <p>$4b - 24 \neq 0 \quad +24$ $4b \neq 24 \quad :4$ $b \neq 6$</p> <p>$D = \mathbb{R} \setminus \{6\}$</p>	<p>c. $T(x) = \frac{1}{(x-1)(x+3)}$ Video 2</p> <p>$x+1 \quad x+3$</p> <p>$D = \mathbb{R} \setminus \{-3, 1\}$</p>
<p>d. $T(u) = \sqrt{u-3}$</p> <p>$u-3 \geq 0 \quad +3$ $u \geq 3$</p> <p>$D = [3; +\infty)$</p>	<p>e. $T(x) = \sqrt{2x-4}$</p> <p>$2x-4 \geq 0 \quad +4$ $2x \geq 4 \quad :2$ $x \geq 2$</p> <p>$D = [2; +\infty)$</p>	<p>f. $T(x) = \frac{1}{(2x-1)(7x+6)}$</p> <p>$2x-1 \geq 0 \quad 7x+6 \geq 0$ $2x \geq 1 \quad 7x \geq -6$ $x \geq \frac{1}{2} \quad x \geq -\frac{6}{7}$</p> <p>$D = \mathbb{R} \setminus \{\frac{1}{2}, -\frac{6}{7}\}$</p>

Bsp. 4)

<p>a. $(x \cdot x)^3 \cdot x^{-5} =$ $(x^2)^3 \cdot x^{-5} = x^6 \cdot x^{-5} = x^1 = \underline{x}$</p>	<p>b. $\left(\frac{a^2}{b^3}\right)^{-2} : \left(\frac{a}{b^{-2}}\right)^2 =$ $\left(\frac{b^3}{a^2}\right)^2 : \frac{a^2}{b^{-4}} = \frac{b^6}{a^4} \cdot \frac{b^{-4}}{a^2} = \underline{\underline{\frac{b^2}{a^6}}}$</p>
<p>c. $a \cdot (a^{-2})^2 \cdot a =$ $a \cdot a^{-4} \cdot a = a^{-2} = \underline{\underline{\frac{1}{a^2}}}$</p>	<p>d. $\frac{2e^5}{e^{-11}} \cdot (6 \cdot e^{24})^2 =$ $2e^5 \cdot e^{11} \cdot 36 \cdot e^{48} = \underline{\underline{72e^{64}}}$</p>
<p>e. $(b \cdot b^2)^{-4} \cdot (b^{-3})^{-2} =$ $(b^3)^{-4} \cdot b^6 =$ $b^{-12} \cdot b^6 = b^{-6} = \underline{\underline{\frac{1}{b^6}}}$</p>	<p>f. $\left(\frac{f^3}{g^{-7}}\right)^2 : \left(\frac{g^{10}}{f^3}\right)^3 =$ $(f^3 g^7)^2 : \frac{g^{30}}{f^9} = f^6 g^{14} \cdot \frac{f^9}{g^{30}} =$ $\frac{f^{15}}{g^{16}}$</p>
<p>g. $2a^2 \cdot \left(\frac{a^7 b^{-8}}{c^{-3}}\right)^2 \cdot 2c^5 =$ $2a^2 \cdot \left(\frac{a^{14} b^{-16}}{c^6}\right)^2 \cdot 2c^5 = 2a^2 \cdot \frac{a^{28} b^{-32}}{c^{12}} \cdot 2c^5$ $= \underline{\underline{4 \frac{a^{30} b^{-32}}{c^7}}}$</p>	<p>h. $8^{-2} a^3 \cdot z^4 \cdot (4z^{-7})^2 =$ $\frac{1}{64} \cdot a^3 \cdot 4 \cdot 16 z^{-14} = \frac{1}{4} a^3 \cdot z^{-10}$ $= \underline{\underline{\frac{a^3}{4z^{10}}}}$</p>

Bsp. 5)

<p>a. $\frac{10a^{-5}b^{-4}}{5a^{-3}b^7 \cdot b^{-2}} = \frac{2 \cancel{10} a^3 b^2}{\cancel{5} a^3 b^9} = \underline{\underline{\frac{2}{2b^7}}}$</p>	<p>b. $\frac{12b^{-6}c^3}{3b^5c^{-2}} = \frac{\cancel{12} c^3 c^2}{\cancel{3} b^5 b^6} = \underline{\underline{\frac{4c^5}{b^{11}}}}$</p>
<p>c. $\frac{3a \cdot a^2 \cdot b^4 \cdot a}{12a^3 \cdot b^3} = \frac{3a^4 b^4}{\cancel{12} a^3 b^3} = \underline{\underline{\frac{ab}{4}}}$</p>	<p>d. $\frac{14c^{-2}d^6}{7d \cdot d^{-2} \cdot d^3} = \frac{\cancel{14} d^6 d^2}{\cancel{7} d d^3 c^2} = \frac{2d^4}{c^2}$</p>

Bsp. 6)

a. $x^{\frac{1}{7}} =$ <u>$\sqrt[7]{x}$</u>	b. $3y^{\frac{2}{5}} =$ <u>$3 \cdot \sqrt[5]{y^2}$</u>	c. $x^{\frac{1}{6}} \cdot x^{\frac{4}{6}} =$ $x^{\frac{5}{6}}$ <u>$\sqrt[6]{x^5}$</u>	d. $c^{-\frac{4}{9}} =$ $\frac{1}{\sqrt[9]{c^4}}$ <u>$\frac{1}{\sqrt[9]{c^4}}$</u>	e. $r^{\frac{5}{6}} \cdot r^{-\frac{9}{6}} =$ $r^{-\frac{4}{6}}$ $r^{-\frac{2}{3}}$ <u>$\frac{1}{\sqrt[3]{r^2}}$</u>
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Bsp. 7)

a. $\sqrt[4]{x^3} =$ <u>$x^{\frac{3}{4}}$</u>	b. $\frac{1}{\sqrt[5]{x^6}} =$ <u>$x^{-\frac{6}{5}}$</u>	c. $\sqrt[6]{x^{-3}} \cdot \sqrt[6]{x^5} =$ $x^{-\frac{3}{6}} \cdot x^{\frac{5}{6}} = x^{\frac{2}{6}} =$ <u>$x^{\frac{1}{3}}$</u>	d. $\frac{\sqrt[3]{x^7}}{\sqrt[3]{x^{-5}}} =$ $x^{\frac{7}{3}} \cdot x^{\frac{5}{3}} = x^{\frac{12}{3}} =$ <u>x^4</u>
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