

## Review exercises 0 Algebra

### Problems

R0.1 Evaluate each expression:

a)	$2^4$	b)	$(-2)^4$	c)	$-2^4$
d)	$3^{-4}$	e)	$\frac{5^{23}}{5^{21}}$	f)	$\left(\frac{2}{3}\right)^{-2}$

R0.2 Evaluate each expression:

a)	$2^4 \cdot 2^3$	b)	$2^4 \cdot 2^{-3}$	c)	$2^4 \cdot (-2)^{-3}$
d)	$(2^3)^2$	e)	$(2^{-3})^2$	f)	$(-2^{-3})^{-2}$
g)	$((-2)^{-3})^{-2}$	h)	$-(2^{-3})^{-2}$	i)	$\left(-\frac{1}{5}\right)^{-2}$
j)	$\left(-\frac{3}{4}\right)^{-3}$				

R0.3 Decide whether each statement is true or false:

a)	$(p + q)^2 = p^2 + q^2$	b)	$\sqrt{ab} = \sqrt{a} \sqrt{b}$	c)	$\sqrt{a^2 + b^2} = a + b$
d)	$\frac{1+ab}{b} = 1 + a$	e)	$\frac{1}{x-y} = \frac{1}{x} - \frac{1}{y}$		

R0.4 Simplify each expression:

a)	$a^3 \cdot a^2$	b)	$5^{n-1} \cdot 5^4$	c)	$7^{n+1} \cdot 7^{n-1}$
d)	$a^{x+5} : (a^x \cdot a^5)$	e)	$(2a^3 \cdot 3a^2)^2$	f)	$(a^2b)^{25} \cdot (ab^4)^{25}$
g)	$\frac{10a^{-3}}{5a^{-2}} 2a^3$				

R0.5 Simplify the following expression:

a)	$x^5 \cdot x^{-7}$	b)	$\frac{x^8}{x^{-2}}$	c)	$(-y^{-3})^{-2}$
d)	$(x - y)(x^2 + xy + y^2)$	e)	$\frac{4x^2y^3 - 6x^3y^4}{2x^2y^2 - 3xy^3}$	f)	$\frac{x-1 - \frac{x-1}{x}}{\frac{1}{x-1} + 1}$

R0.6 Simplify each fraction:

a)	$\frac{24a^2bc^2}{56abc}$	b)	$\frac{uw}{uv + uw}$	c)	$\frac{n^3 - n}{n^3 + n^2}$
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R0.7 Simplify and rewrite the expression with a single fraction:

a)	$\frac{1}{m+1} + \frac{m}{m+1}$	b)	$\frac{2p}{15q} + \frac{8p}{9q}$	c)	$\frac{1}{r^2} - \frac{1}{r^3}$
d)	$d - \frac{nd-2}{n}$	e)	$\frac{t+7}{3t-6} - \frac{t+4}{t^2-2t}$	f)	$\frac{d-1}{18d} - \frac{12d^2}{1-d}$
g)	$\frac{\frac{u}{v}}{x}$	h)	$\frac{x}{\frac{u}{v}}$	i)	$\frac{2e-6f}{\frac{3e^2-9ef}{2f}}$

$$\text{j) } \frac{\frac{n}{n^2-1}}{\frac{1}{n+1} - \frac{1}{n-1}}$$

$$\text{k) } \frac{x^2}{x^2-4} - \frac{x+1}{x+2}$$

R0.8 You will find a pdf-file with scanned pages of the textbook Harshbarger/Reynolds\* on Moodle:  
“Algebraic Concepts (Harshbarger/Reynolds)”  
(pages 2 to 55 of chapter “0 Algebraic Concepts” and pages A1 to A5)

Go to the sections below. Study the theory (if necessary), and do the exercises.

- a) Section “0.3 Integral Exponents” (theory: pages 15 to 18, exercises: pages 18 to 20)
- b) Section “0.5 Operations with Algebraic Expressions” (theory: pages 27 to 34, exercises: pages 34 to 36)
- c) Section “0.6 Factoring” (theory: pages 37 to 40, exercises: pages 41 and 42)
- d) Section “0.7 Algebraic Fractions” (theory: pages 42 to 48, exercises: pages 48 and 49)
- e) Review Exercises (pages 51 to 54)
- f) Chapter Test (pages 54 and 55)

\*Harshbarger, R.J., Reynolds, J.J.: Mathematical Applications for the Management, Life, and Social Sciences; Houghton Mifflin Company, Boston / New York 2007, 8th edition, ISBN 978-0-618-73162-6

**Answers**

R0.1	a)	16	b)	16	c)	- 16
	d)	$\frac{1}{81}$	e)	25	f)	$\frac{9}{4}$
R0.2	a)	128	b)	2	c)	-2
	d)	64	e)	$\frac{1}{64}$	f)	64
	g)	64	h)	-64	i)	25
	j)	$-\frac{64}{27}$				
R0.3	a)	false	b)	true	c)	false
	d)	false	e)	false		
R0.4	a)	$a^5$	b)	$5^{n+3}$	c)	$7^{2n}$
	d)	1	e)	$36a^{10}$	f)	$a^{75} b^{125}$
	g)	$4a^2$				
R0.5	a)	$\frac{1}{x^2}$	b)	$x^{10}$	c)	$y^6$
	d)	$x^3 - y^3$	e)	$\frac{2xy(2-3xy)}{2x-3y}$	f)	$\frac{(x-1)^3}{x^2}$
R0.6	a)	$\frac{3ac}{7}$	b)	$\frac{w}{v+w}$	c)	$\frac{n-1}{n}$
R0.7	a)	1	b)	$\frac{46p}{45q}$	c)	$\frac{r-1}{r^3}$
	d)	$\frac{2}{n}$	e)	$\frac{t+6}{3t}$	f)	$-\frac{2d}{3}$
	g)	$\frac{u}{vx}$	h)	$\frac{vx}{u}$	i)	$\frac{4f}{3e}$
	j)	$-\frac{n}{2}$	k)	$\frac{1}{x-2}$		

R0.8 see Harshbarger/Reynolds (pages A1 to A4)

Note:

- Apart from the Review Exercises and the Chapter Test, only answers of the odd-numbered exercises (1, 3, 5, ...) are available.