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) $\left((-2)^{-3}\right)^{-2}$ 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) $\frac{n^3 - n}{n^3 + n^2}$

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) $\frac{d-1}{18d} \cdot \frac{12d^2}{1-d}$

g) $\frac{\frac{u}{v}}{x}$ h) $\frac{x}{\frac{u}{v}}$ i) $\frac{2e-6f}{\frac{3e^2-9ef}{2f}}$

j) $\dfrac{\dfrac{n}{n^2-1}}{\dfrac{1}{n+1}-\dfrac{1}{n-1}}$ k) $\dfrac{x^2}{x^2-4}-\dfrac{x+1}{x+2}$

R0.8 Harshbarger/Reynolds*: Chapter 0, Algebraic Concepts
(Scanned pages 2-55 and A1-A5 in file "Algebraic Concepts.pdf" on Moodle)

Exercises in sections
- 0.3 (p. 18-20)
- 0.5 (p. 34-36)
- 0.6 (p. 41-42)
- 0.7 (p. 48-49)
- Review Exercises (p. 51-54)
- Chapter Test (p. 54-55)

*Harshbarger, R.J. and 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: Chapter 0, Algebraic Concepts
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