

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)	$\frac{d-1}{18d} \cdot \frac{12d^2}{1-d}$
g)	$\frac{\frac{u}{v}}{x}$	h)	$\frac{x}{\frac{u}{v}}$	i)	$\frac{2e-6f}{\frac{3e^2-9ef}{2f}}$

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

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

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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