Oppgaver for kapittel 0

0.1.1

Exploit the relation between repeated addition and multiplication (see Rule ?? and Rule ??) to simplify the expressions.

a) $a+a+a$ b) $a+a+a+a$ c) $a+a+a+a+a+a+a$

d) $-b-b$ e) $-b-b-b-b-b$ f) $-k-k-k$

0.1.2

Simplify the expressions.

a) $2a+b-a$ b) $-4a+2b+3a$ c) $7b-3a+2b$

0.1.3

Simplify the expressions.

a) $4c+2b-5a-3c$ b) $-9a-3c+3b+3c$ c) $9b-3a+2b$

0.1.4

Use Rule ?? to write the expression without parentheses.

a) $7(a+2)$ b) $9(b+3)$ c) $8(b-3c)$ d) $(-2)(3a+5b)$

e) $(9a+2)$ f) $(3b+8)a$ g) $(b-3c)(-a)$

h) $2(a+3b+4c)$ i) $9(3b-c+7a)$ j) $(3b-c+7a)(-2)$

0.1.5

Use Rule ?? to factorize the expression.

a) $2a+2b$ b) $4ab+5b$ c) $9bc-c$ d) $4ac-2a$

0.1.6

Prove that

a) $(a+b)^2 = a^2 + 2ab + b^2$

b) $(a-b)^2 = a^2 - 2ab + b^2$

c) $(a+b)(a-b) = a^2 - b^2$

0.1.7 (GV21D1)

a) Simplify the expression.

$$\frac{a+a+a+a}{4a}$$

b) What value will the expression $\dfrac{y^2-2y}{y^2}$ attain if $x = 4$ and $y = -2$?

0.1.8 (E22)

Given the expression $(a+b)^2 = 16$. Decide whether the below alternatives makes the expression valid.

- $a = 2$ and $b = 2$
- $a = 8$ and $b = 4$
- $a = 8$ and $b = -4$

0.2.1

Write as a power.

a) $3 \cdot 3 \cdot 3 \cdot 3$ b) $5 \cdot 5$ c) $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$

d) $a \cdot a \cdot a$ e) $b \cdot b$ f) $(-c)(-c)(-c)(-c)$

0.2.2

Find the value of the power.

a) 8^2 b) 2^5 c) 4^3 d) $(-2)^3$ e) $(-3)^5$ f) $(-4)^4$

0.2.3

Write the expression as a power.

a) $2^7 \cdot 2^9$ b) $3^4 \cdot 3^7$ c) $9 \cdot 9^5$ d) $6^8 \cdot 6^{-3}$ e) $5^3 \cdot 5^{-7}$

f) $10^8 \cdot 10^{-3} \cdot 10^6$ g) $a^9 \cdot a^7$ h) $k^5 \cdot k^2$ i) $x^5 \cdot x^{-2}$

k) $x^{-4} \cdot x^5$ l) $a^{-5} \cdot a \cdot a^4$ m) $a^3 \cdot b^5 \cdot a^2 \cdot b^{-8}$

0.2.4

Calculate..

a) $\sqrt{25}$ b) $\sqrt{100}$ c) $\sqrt{144}$

d) $\sqrt[3]{27}$ e) $\sqrt[3]{729}$ f) $\sqrt[5]{100000}$

Gruble 1

(1TH21D1)
Simplify the expression

$$\frac{9^{\frac{1}{2}} \cdot 3^{-1} + 9^0}{8^{\frac{3}{4}}}$$

Gruble 2

By adding the digits of a number, we find the **digit sum** of the number. For example is the digit sum of 14 equal to $1 + 4 = 5$, and the digit sum of 918 equals $9 + 1 + 8 = 18$. Prove that if the digit sum of a 3-digit integer is divisible by 3, then the number is also divisible by 3.

Note: Generalizing the 3-digit case is quite easy, thus proving that the rule is valid for an integer with any number of digits.