Types of problems

- Mathematical problems
- “Hidden Mathematics” problems
- Contextual problems
- Numeracy problems

2. Solve: $-3(x-2) \geq 3(x+3)$

The inequality is equal to

a. $x \leq -2\frac{1}{2}$

b. $x \leq -2$

c. $x \leq -\frac{5}{6}$

d. $x \leq -\frac{1}{2}$

e. $x \geq -2$

f. $x \geq -\frac{1}{2}$

3. Solve: $\frac{1}{2}x^2 - 5x - 3 < 0$.

The set of 2 utions is

a. $(x \mid 5-\sqrt{19} < x < 5+\sqrt{19})$

b. $(x \mid 5-\sqrt{31} < x < 5+\sqrt{31})$

c. $(x \mid -5-\sqrt{31} < x < -5+\sqrt{31})$

d. $(x \mid x < 5-\sqrt{19} \vee x > 5+\sqrt{19})$

e. $(x \mid x < 5-\sqrt{31} \vee x > 5+\sqrt{31})$

f. $(x \mid x < -5-\sqrt{31} \vee x > -5+\sqrt{31})$

Source: CEVO (1991), VMBO examen [Dutch Final Examination, grade 10]

7. A bottle $\frac{3}{4}$ filled with liquid weighs 3 kg. The liquid alone weighs $\frac{3}{4}$ kg more than the empty bottle. If the bottle is completely filled, how much will the contents weigh?

Source: SingaporeMath (2007), placement test ,

Question 4. Traffic jam

Between Breukelen and Abcoude in the direction of Abcoude, there is a traffic jam of 5 km. The road has three lanes in each direction.

19. Estimate the number of cars in the traffic jam.
Write down how you arrive at your answer.

Source: CEVO (1997), VMBO examen [Dutch Final Examination, grade 10]

31 Jan knapt zijn slaapkamer op. Hij gaat de drie wanden lichtblauw verven. Hij heeft 5 liter verf gekocht, genoeg voor 30 m^2.

a De eerste muur heeft een oppervlakte van 4 m^2. Hoeveel verf heeft Jan voor deze muur nodig? Gebruik een verhoudingstabel.

b De volgende muur heeft een oppervlakte van 10 m^2. Heeft Jan dan genoeg aan 1 liter verf?

c De grootste muur is 14 m^2 groot. Bereken hoeveel verf hiervoor nodig is.

d Hoeveel liter verf is nodig voor 50 m^2?

Source: Moderne Wiskunde (1998) MW 2 HV

I work in a butcher’s shop from Monday to Thursday. One of my jobs is to check the temperature of the fridge twice a day. At the right hand side you see a thermometer.
What is the temperature?

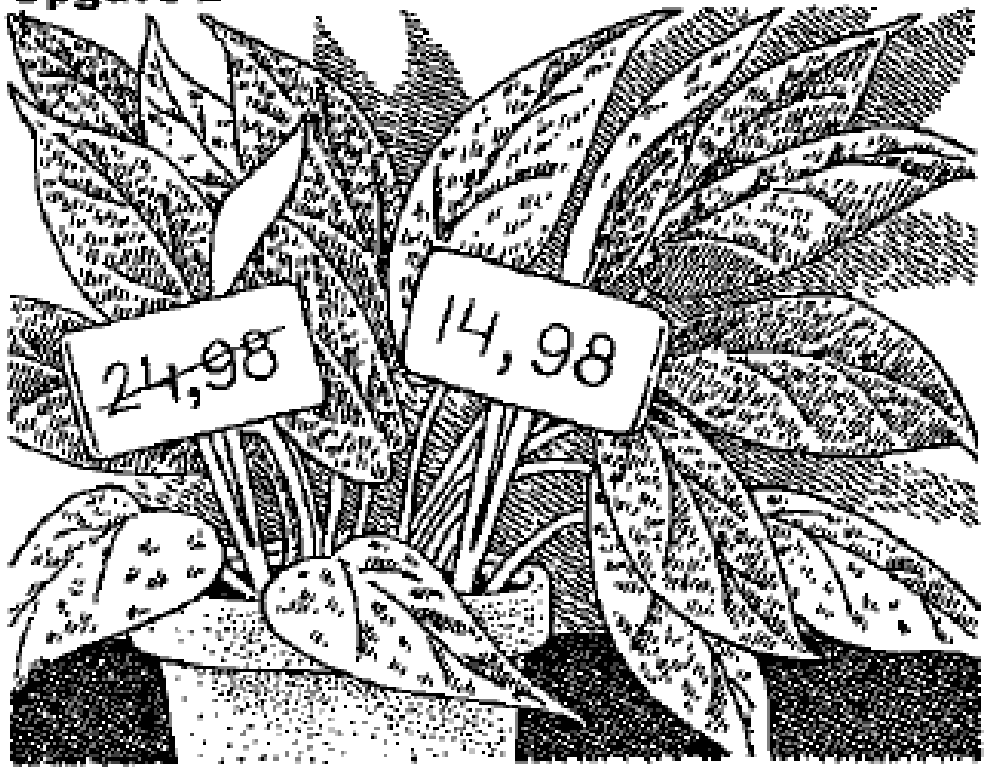
A +15° C

B -15° C

C + 15° F

D - 15° F

Opgave 2



Hoeveel procent korting krijg je ongeveer op de kamerplant?

A 40%
B 10%
C 67%
D 60%

Source: Cito (2009). Referentietoetsen 1F/2F

M047: Lichen

A result of global warming is that the ice of some glaciers is melting. Twelve years after the ice disappears, tiny plants, called lichen, start to grow on the rocks.

Each lichen grows approximately in the shape of a circle.

The relationship between the diameter of this circle and the age of the lichen can be approximated with the formula:

$$d = 7.0 \times \sqrt{(t - 12)} \quad \text{for } t \geq 12$$

where d represents the diameter of the lichen in millimetres, and t represents the number of years after the ice has disappeared.

Question 1: LICHEN

M047Q01- 0 1 8 9

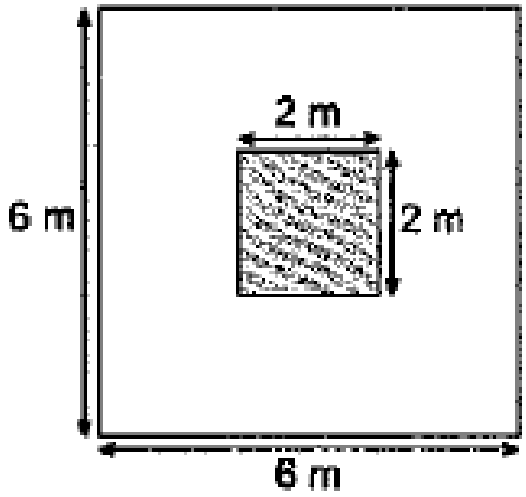
Using the formula, calculate the diameter of the lichen, 16 years after the ice disappeared.

Show your calculation.

Source: PISA Samples 2004

Opgave 20

Binnenplaats



Robin gaat deze binnenplaats betegelen. In het midden is een vijver.
Voor hoeveel m² heeft Robin tegels nodig?

A 16 m²
B 28 m²
C 32 m²
D 34 m²

The computer activity

sample item from Authentic World®

Question 22 of 30

Extract the relevant information from the prescription chart and the medication product label. Calculate the correct dose to administer and choose the appropriate syringe with which to administer it.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

REGULAR PRESCRIPTION MEDICINES			DATE
			ADMINISTRATION TIMES
MEDICINE (Approved Name): Ampicillin		START DATE: 3/10/2007	06:00
DOSE: 500mg	ROUTE: I.M.	SPECIAL INSTRUCTIONS: -	14:00
DOCTOR'S SIGNATURE: Dr. Jones	PHARMACY SUPPLY: A. Mann		22:00

1ml | 5ml | 20ml

2ml | 10ml

From
school mathematics
to
numeracy problems
in 4 or 5 steps

Criteria Numeracy problems

- It is **N**umeracy when …..
- ….. **I**maginable questions
- **C**onnected with the real world, but ..
- ….with a **M**inimum of language and a **M**aximum of images.

I work in a butcher’s shop from Monday to Thursday. One of my jobs is to check the temperature of the fridge twice a day. At the right hand side you see a thermometer.
What is the temperature?

A +15° C

B -15° C

C + 15° F

D - 15° F

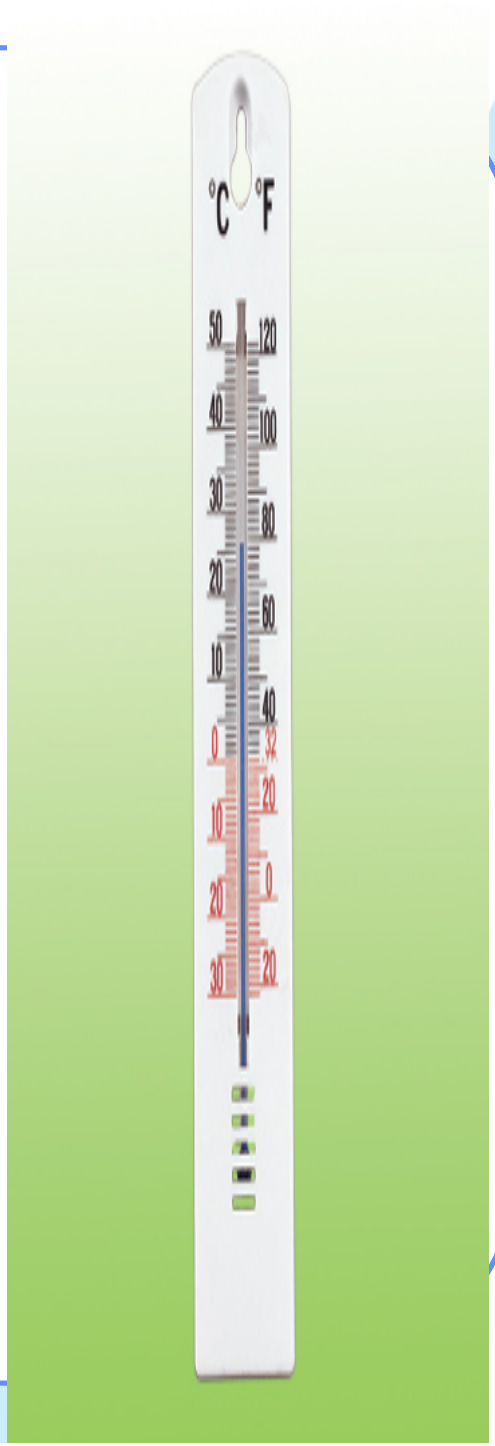
I work in a butcher’s shop from Monday to Thursday. One of my jobs is to check the temperature of the fridge twice a day. At the right hand side you see a thermometer.
What is the temperature?

A

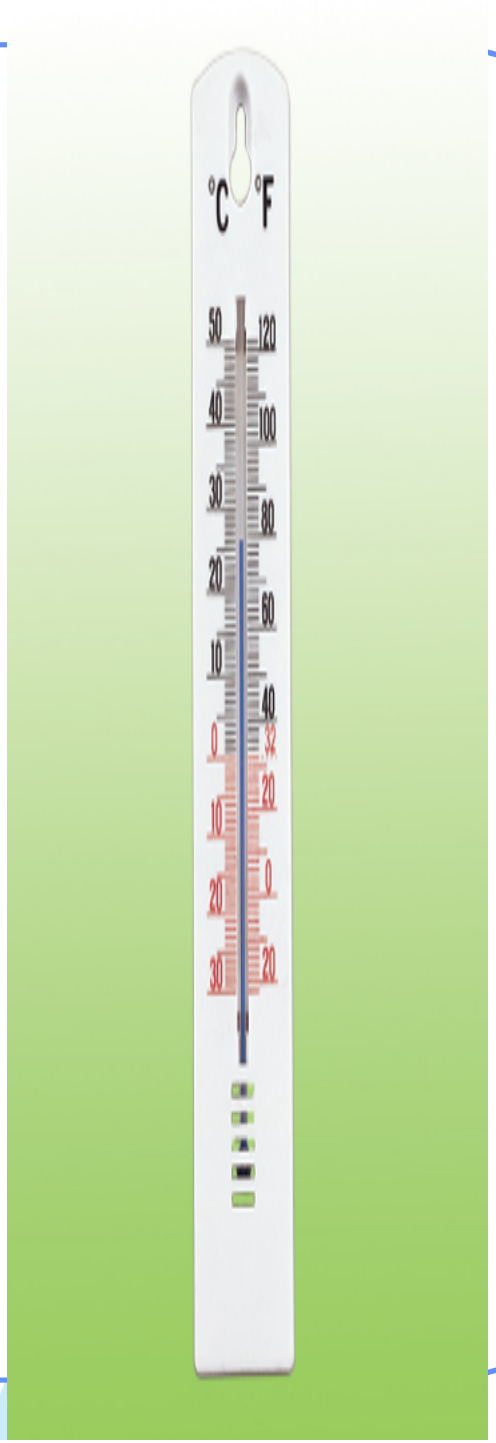
B

C

D



What is the temperature?



A

B

C

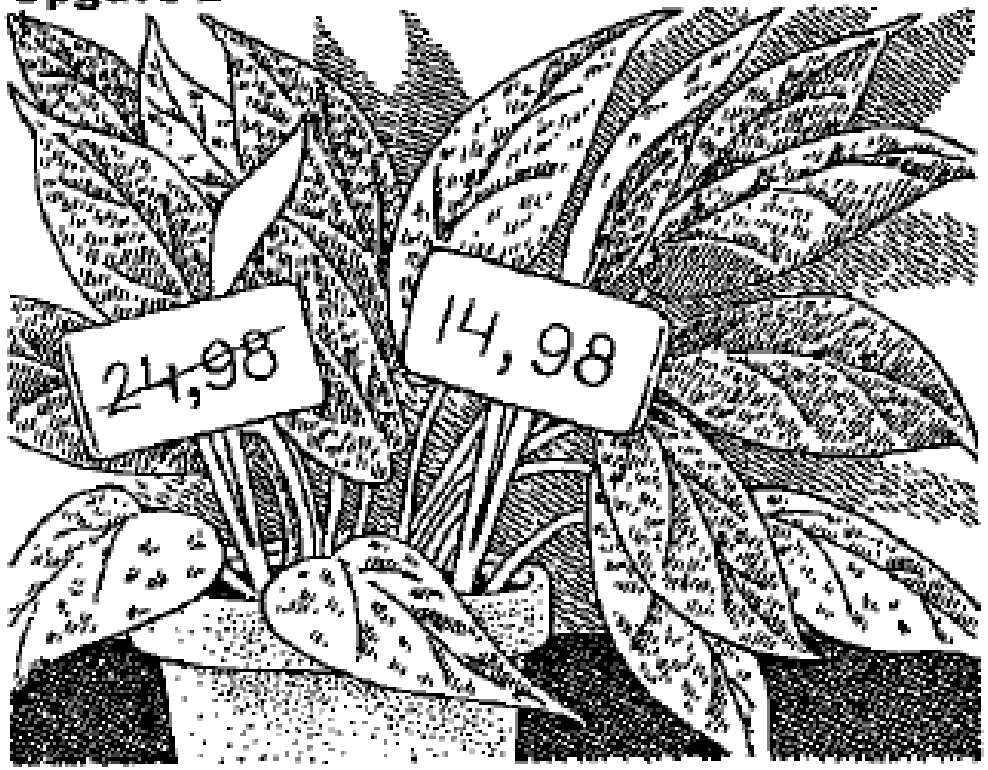
D

Fridge thermometers

What is the temperature?

……　　　　　　……　　　　　　……

Opgave 2

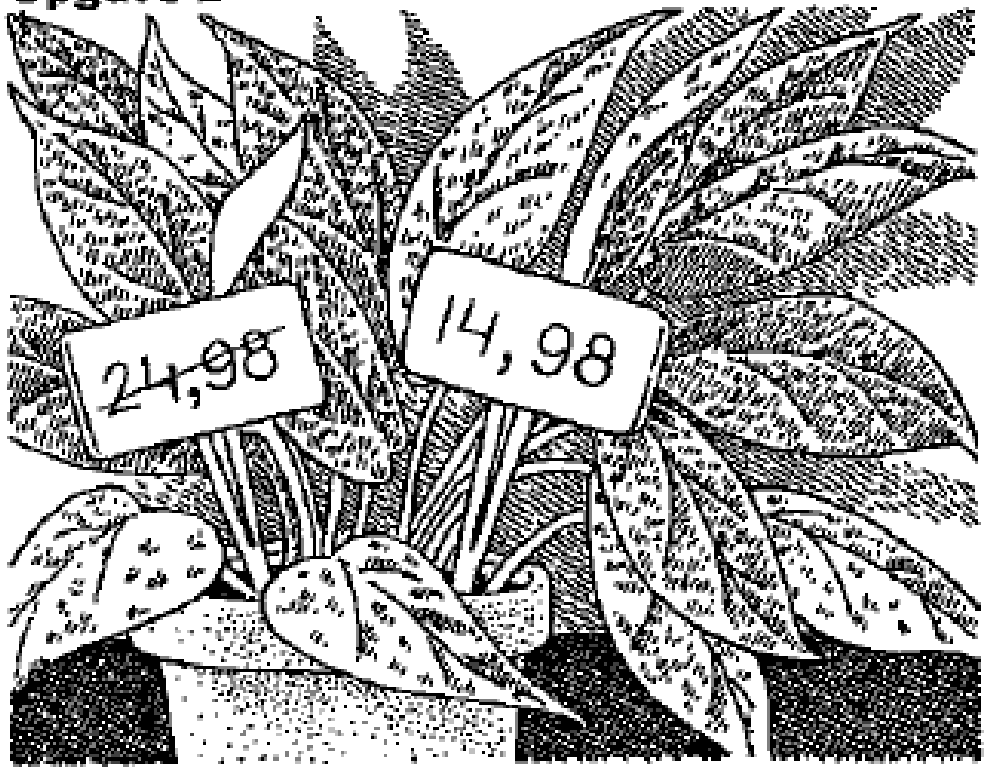


Hoeveel procent korting krijg je ongeveer op de kamerplant?

A 40%
B 10%
C 67%
D 60%

Source: Cito (2009). Referentietoetsen 1F/2F

Opgave 2



What is the discount?

A 40%
B 10%
C 67%
D 60%

Opgave 2

Discount

..... %

A 40%
B 10%
C 67%
D 60%

Opgave 2

A 40%
B 10%
C 67%
D 60%

Discount

….. %

Opgave 2

Discount

….. %

A 40%
B 10%
C 67%
D 60%

M047: Lichen

A result of global warming is that the ice of some glaciers is melting. Twelve years after the ice disappears, tiny plants, called lichen, start to grow on the rocks.

Each lichen grows approximately in the shape of a circle.

The relationship between the diameter of this circle and the age of the lichen can be approximated with the formula:

$$d = 7.0 \times \sqrt{(t - 12)} \quad \text{for } t \geq 12$$

where d represents the diameter of the lichen in millimetres, and t represents the number of years after the ice has disappeared.

Question 1: LICHEN

M047Q01- 0 1 8 9

Using the formula, calculate the diameter of the lichen, 16 years after the ice disappeared.

Show your calculation.

Source: PISA Samples 2004

$$d = 7.0 \times \sqrt{(t - 12)} \quad \text{for } t \geq 12$$

$$f(x) = 7\sqrt{x - 12}$$

Calculate $f(16)$

M047: Lichen

A result of global warming is that the ice of some glaciers is melting. Twelve years after the ice disappears, tiny plants, called lichen, start to grow on the rocks.

Each lichen grows approximately in the shape of a circle.

The relationship between the diameter of this circle and the age of the lichen can be approximated with the formula:

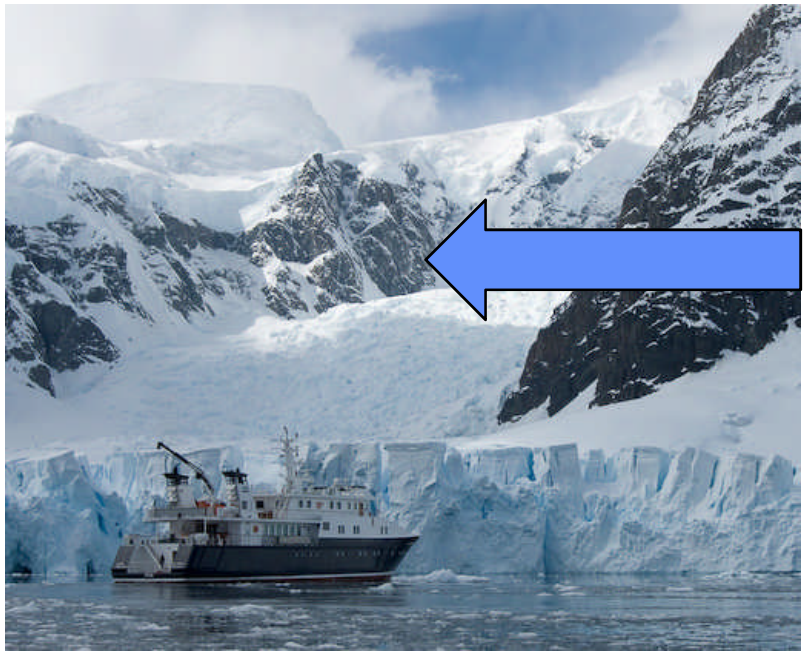
$$d = 7.0 \times \sqrt{(t - 12)} \quad \text{for } t \geq 12$$

where d represents the diameter of the lichen in millimetres, and t represents the number of years after the ice has disappeared.

16 years after the ice disappears.

What is the diameter?

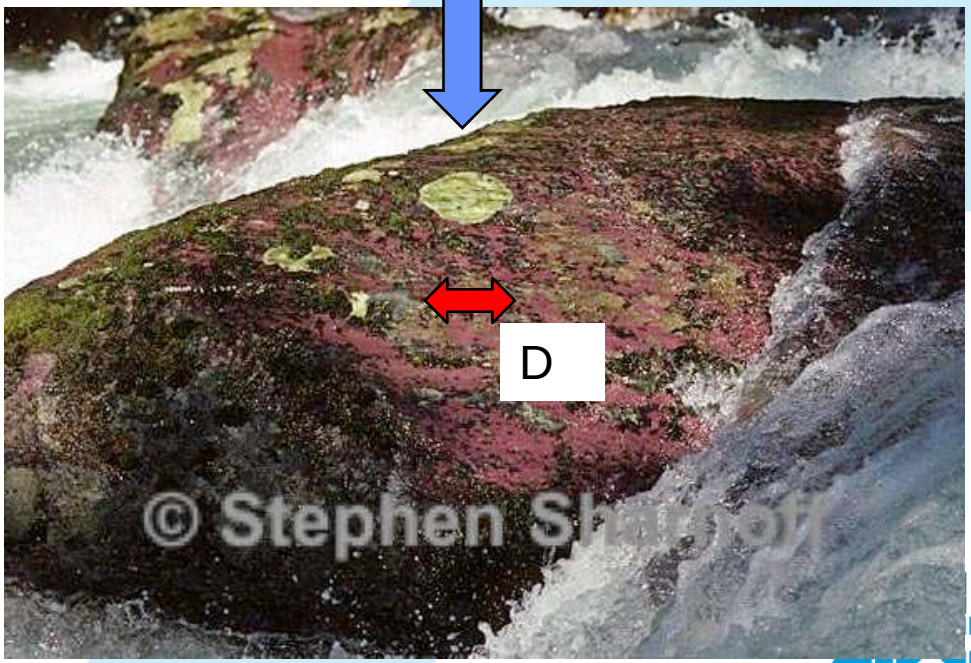
Source: PISA Samples 2004



Global warming

The ice melts

12 years later Lichen starts to grow.



D = 7 * SQRT (t)
D is diameter in mm
T is age of Lichen in years

In the picture D = 20 centimeter
How old is the lichen?
How long ago the ice melted?

Challenge?

Send me a word problem (published somewhere, with reference to source), I will make it a numeracy problem and send it back within one week.

K.Hoogland@aps.nl

Or visit the website

www.gecijferdheid.nl

or

www.mathematical-literacy.eu