Exam VSBO PKL

2025

period 1
Thursday May 15
7.30 - 10.00 am

Mathematics

This exam includes a work booklet.

Write down all answers in the work booklet.

This exam consists of 28 questions.
You can score a maximum of 68 points for this exam.
Before each question number, it is stated how many points can be scored with a correct answer.

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Formulas

Circumference circle = π × diameter

area circle = π × radius × radius

Volume cylinder = area base × height

Volume prism = area base × height

Volume cone = $\frac{1}{3}$ × area base × height

Volume pyramid = $\frac{1}{3}$ × area base × height

Volume sphere = $\frac{4}{3}$ x π x radius x radius x radius

Jenny

2p **1** Jenny weighs 93 kg and she is overweight. To improve her body weight, Jenny's dietician has prescribed the following table.
This table is linear.

number of weeks	0	4	8	12
weight in kg	93	89,8	86,6	83,4

→ How many kilos should Jenny lose **per week** according to this table?
Show your calculation(s).

1p **2** Instead of following her dietitian, Jenny follows a word formula she found on social media. This word formula is:

weight = 93 – 0.8 × number of weeks

Jenny wants to rewrite this word formula, but shorter.

→ Which **letter formula** below is the same as the word formula, but written shorter?

A $93 - 0.8 \times n = w$

B $0.8 - 93 \times n = w$

C $w = 0.8 \times n + 93$

D $w = 0.8 + 93 \times n$

1p **3** Jenny works for a company. Jenny started with a salary of 2,200 guilders a month. Every year Jenny's salary increases by 5%.

The growth of Jenny's salary can be described by a word formula.

→ Which word formula is that?

A $\text{salary} = 2{,}200 + \text{years}^{1.05}$

B $\text{salary} = 2{,}200 \times \text{years}^{1.05}$

C $\text{salary} = 2{,}200 \times 1.05^{\text{years}}$

D $\text{salary} = 2{,}200 + 1.05^{\text{years}}$

6p **4** Below are three different letter formulas I, II and III.
With each formula, there is also a filled in table.

I.

x	0	05	1	1.5	2	
$y = 100 \times x^3$	**0**	**12.5**	**100**	**338**	**800**	

II.

x	0	0.5	1	1.5	2	2.5
$y = 300 \times \sqrt{x}$	**0**	**212**	**300**	**367**	**424**	**474**

III.

x	0.25	0.5	1	1.5	2	2.5
$y = \frac{100}{x}$	**400**	**200**	**100**	**67**	**50**	**40**

→ In the work booklet, draw in the same coordinate system, the graph of table I, of table II and of table III.

1p **5** In the box below, a relationship between x and y is given in bold.

When x increases, y decreases.

The following four formulas I, II, III and IV are given:

formula I	formula II	formula III	formula IV
$y = 100 \times x^3$	$y = 300 \times \sqrt{x}$	$y = \frac{100}{x}$	$y = 0{,}001 \times x$

→ Which formula belongs to the relationship between x and y above in bold?

A formula I
B formula II
C formula III
D formula IV

1p **6** The following four formulas are given:

formula I	formula II	formula III	formula IV
$y = 100 \times x^3$	$y = 300 \times \sqrt{x}$	$y = \frac{100}{x}$	$y = 0{,}001 \times x$

The progression (shape) of a graph is determined by a certain type of formula. In the box below, the progression of a graph is described.

The graph is a growth and the growth is getting smaller.

→ Which formula belongs to this progression of a graph?

A formula I
B formula II
C formula III
D formula IV

Angela heats oil

3p **7** Angela is going to fry potatoes. First, she heats a quantity of cooking oil.
The starting temperature of the cooking oil is 25 degrees.
Every 30 seconds the temperature of the cooking oil rises by 18 degrees.

The work booklet includes a table that belongs to this heating process.

→ Complete the table.

1p **8** After use, Angela stored the cooking oil so that the oil cools down to 25°C. The next day, Angela fries potatoes again. She uses the same cooking oil that she has saved. So, the cooking oil is now no longer fresh.

When the cooking oil was heated for the first time, the following formula was valid:

25 + 0.6 × number of seconds = temperature in °C.

When heating the cooking oil for the second time, the oil takes longer to heat before reaching the desired temperature.
In this new situation a formula also applies.

→ Which of the formulas below could that be?

A 25 + **0.3** × number of seconds = temperature in °C

B 25 + **0.6** × number of seconds = temperature in °C

C 25 + **0.7** × number of seconds = temperature in °C

D 25 + **0.9** × number of seconds = temperature in °C

4p **9** Angela makes the same number of fries 3 times. She measures the temperature of the oil twice with each portion that she fries.
She does it as follows:
Measurement 1 is when she puts a new portion of fries in the oil.
Measurement 2 is 5 minutes after measurement 1.
This gives her six measurements. These six measurements are shown in the table below.

measurement number	1	2	3	4	5	6
temperature in °C	160	185	163	188	166	191

The progression in a table can be:
linear, ***periodic***, ***square root***, ***quadratic*** or ***exponential***.

→ What progression does the table above have? Show your calculations and complete the sentence in the work booklet correctly.

Red snapper

3p **10** Government has set a fixed price per kilo for red snapper. The graph in the work booklet corresponds to this fixed price per kilo.
Charlie sells red snapper. Three of Charlie's sales are listed below.

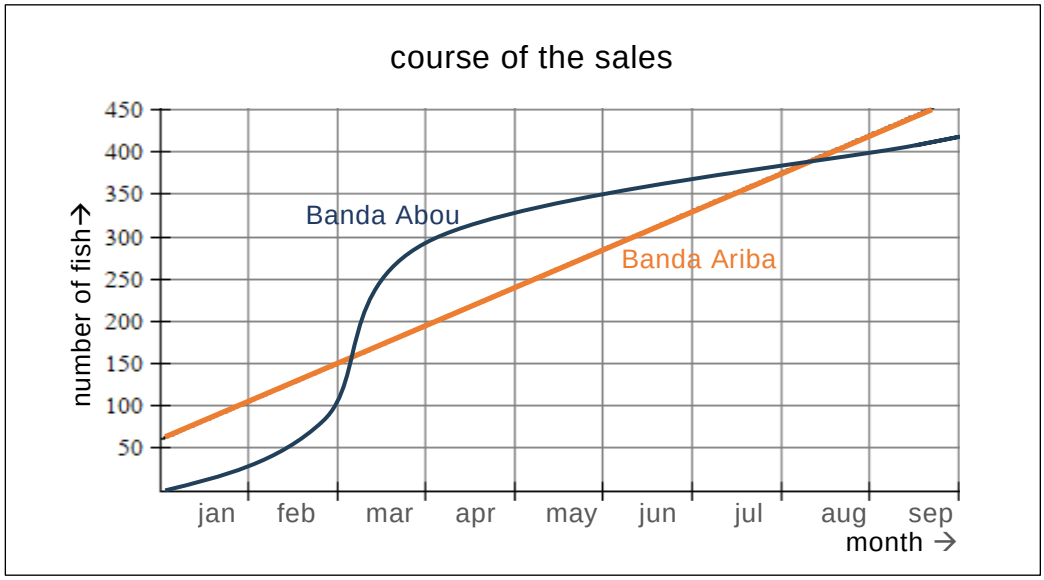
Sale **A**: 2 kilos of red snapper for 62 guilders.

Sale **B**: 5 kilos of red snapper for 155 guilders.

Sale **C**: ½ kilo of red snapper for 15.50 guilders.

→ Check with these three sales in the graph whether Charlie is obeying the government rule. Explain why he ***is*** or ***is not*** obeying the government rule.

2p **11** Charlie sells fish at two locations, one location in Banda Ariba and another location in Banda Abou. The graphs below show the course of the sales at both locations, during the first 9 months of the year.



The table in the work booklet contains statements about the Banda Ariba and Banda Abou graphs.

→ For each statement, indicate whether the statement is **true** or **false**. Do this with an X-mark.

1p **12** The following word formula belongs to the Banda Ariba graph.

number of fish = 54 + 1.6 × number of days

Charlie increases his price per fish. As a result, he now sells less fish in Banda Ariba. The decrease in sales is regular.

→ What happens then to the Banda Ariba graph?

The graph …

A runs steeper
B runs less steep
C shows a downward curve
D shows an upward curve

Valentine cake

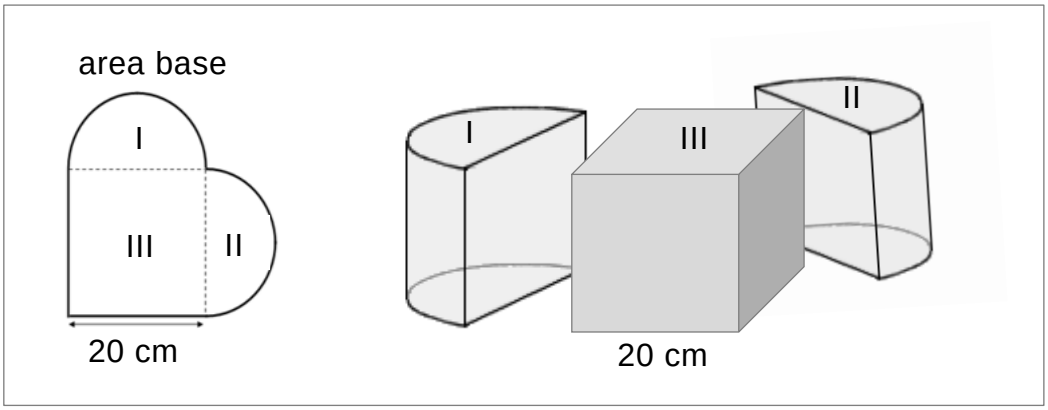
3p **13** For the Valentine's Day celebration, the students at Arti School baked cakes.

- They baked **15 cakes.**
- For this they made **28 liters** of batter.
- **Each cake** contains the **same amount** of batter.
- **$^3/_8$ part** of the batter was **oil**.
- After making all 15 cakes, **0.75 liter** of batter was **left over**.

In each cake, part of the batter consist of oil.

→ How many liters of oil is that in each cake?
Write down your calculation and round off to 1 decimal.

5p **14** Shamira has made the drawing below of one cake.



Shamira says: "My drawing shows that:"

- the cake consist of three pieces I, II and III.
- I and II are two equal half-cylinders,
- III is a cube,
- the bottom part of one cake is actually made up of a square and circle.

On page number 2 a list of formulas is given.

→ Calculate in cm^3 the volume of one cake.

3p **15** Davy has been living in the Netherlands for 10 years now. He now wants to return to the Antilles.

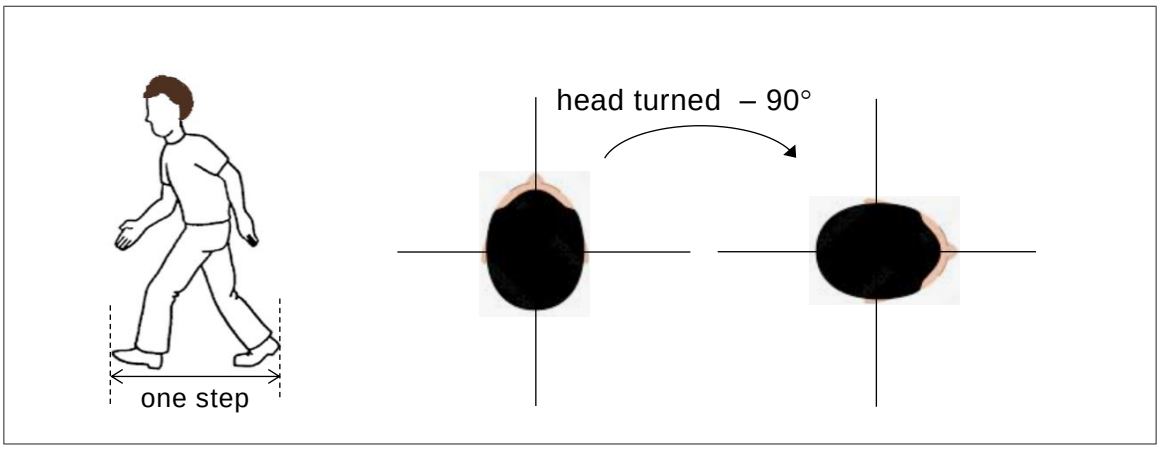
He wonders whether he will also get an apartment with a high ceiling in the Antilles.

With this image and the use of a rule of thumb, one can calculate how high above the floor the ceiling is in reality.

→ Calculate how high above the floor the ceiling is in reality. Write down your calculations and round off to one decimal.

3p **16** Emmely, Davy's girlfriend, has placed a gift for Davy under a book. See the picture at question 15. Emmely says lovingly: “Close your eyes Davy, I'm going to guide you to a surprise.”
Below are four different instructions with which Emmely can guide Davy.

1). Take **.....** step(s) forward.
2). Take **.....** step(s) backwards.
3). Turn your body 90° degrees.
4). Turn your body – 90° degrees.



With her instructions she makes Davy walk with his eyes closed. From the spot where he now stands, he walks, **all the way around the table** and not past the window. According to her instructions, he walks all the way to the book that is on top of the gift on the table.

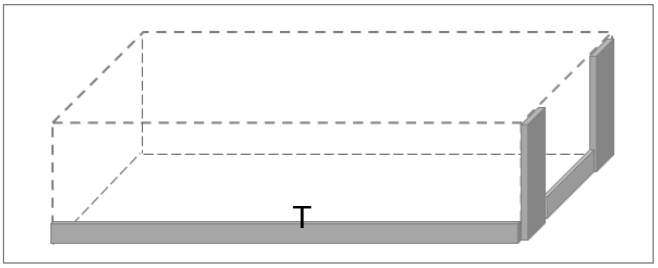
Below is the first instruction that Emmely gives to Davy.
Turn your body – 90°.

→ Write down the other instructions needed to get Davy right in front of the book.

1p **17** Emmely cannot be seen in the picture. But Davy can hear Emmely well.

→ Estimate the distance and by doing so, complete the sentence in the work booklet correctly.

2p **18** Davy needs to temporarily store his stuff. That's why he has Myron make a wooden chest (box) like the one shown alongside.

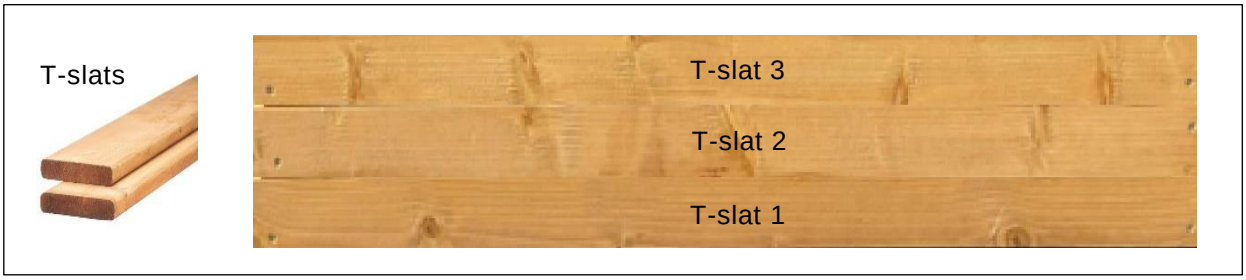


The measurements of this box are:
4 meters long, 1.8 meters wide and 1.5 meters high.
For slat T, Myron wants to purchase a strip of wood measuring 1.25 inches by 6 inches by 14 feet. But he must first calculate whether that strip of wood is long enough.

1 foot = 12 inches = 30.48 cm.

→ Show by calculation whether the strip of wood is long enough for slat T and write down your conclusion.

st4p **19** The wood that Myron bought is called a “T-slat”. The image below shows how Myron uses T-slats to close the front of the box. He nails the slats on top of each other one by one.

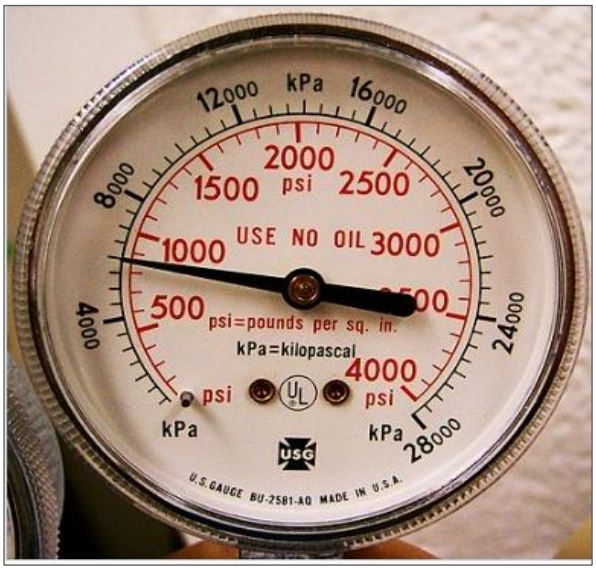


The measurement of one T-slat is: 1.25 inches by 6 inches by 14 feet.
The measurements of the box are:
4 meters long, 1.8 meters wide and 1.5 meters high.

→ Calculate how many T-slats Myron needs for the front of the box.

The divers

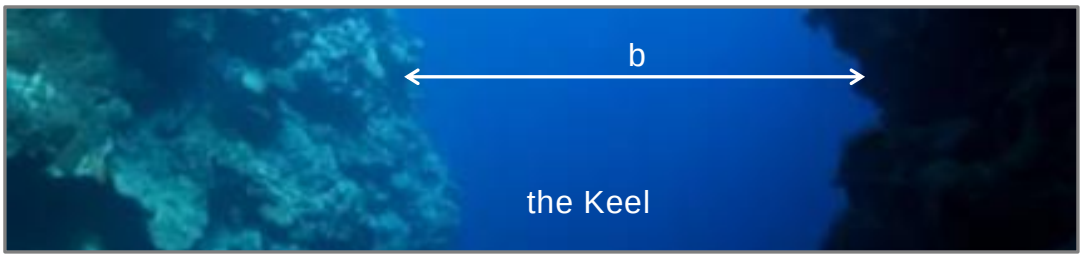
1p **20** Carlos is a professional diver. The picture to the right shows Carlos's pressure gauge during a dive.



On this meter the pressure is given in **kPa** and **psi.**

→ 850 **psi** is how much **kPa**?

2p **21** The Keel is a valley between two large rocks underwater. In the Keel, the width **b** between the two sides becomes narrower as one goes deeper. In the picture below, the distance **b** is drawn.

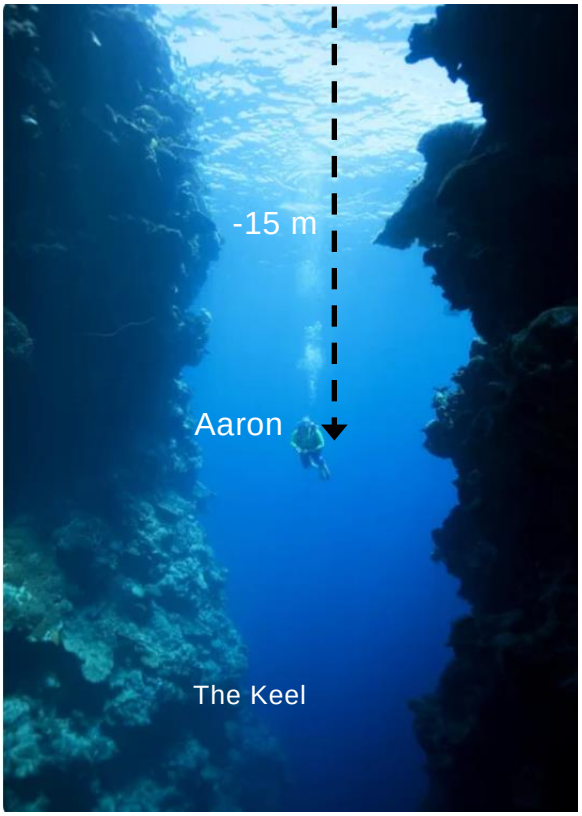


This photo was made on a scale of 1 : 45.

Four divers Aaron, Beto, Carlos and Dino, who always dive together, want to take a photo of the four of them side by side at the bottom of the Keel. They will stand shoulder to shoulder next to each other to take the photo.

→ Measure width **b** in this photo and calculate it's measure in reality. Round to two decimals and complete the conclusion sentence in the work booklet correctly.

2p **22** There they go again! Aaron, Beto, Carlos and Dino, diving together.
Their end goal is to reach the bottom of the Keel.
The Keel is 27 meters deep.



Below are details of this dive.

- In the picture you see Aaron, 15 meters deep, that is -15 m.
- Carlos went the deepest, 5 meters deeper than Aaron.
- Beto got to 1.5 m above Aaron.
- The difference in depth between Dino and Carlos was -4 meters.

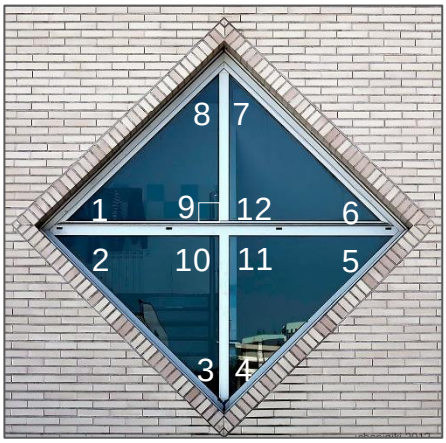
→ Complete the table in the work booklet in order of how deep each diver went.

The special window

3p **23** The pictures I and II below shows a special, symmetrical window.

I

II

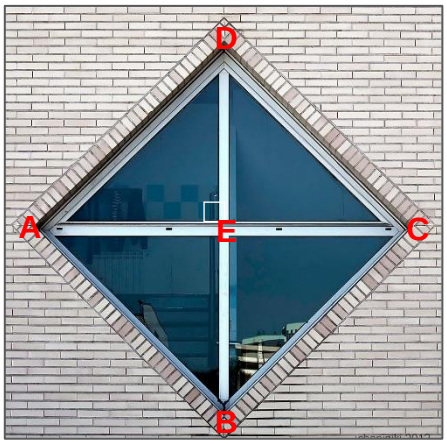


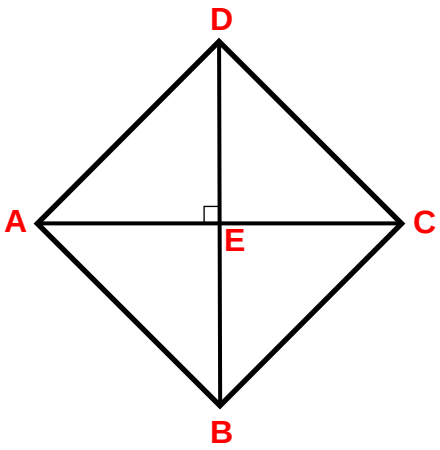
In picture number II the numbers 1 through 12 indicate twelve angles.

The work booklet has three sentences with blanks.

→ Fill in the blanks in the work booklet.
Fill in the correct total in degrees or the correct number of.

3p **24** In the illustration below, triangles AED and CED are examples of two separate, **right-angled** triangles visible in the window.





These two triangles, AED and CED, are of the same size.
Not all visible triangles in the illustration are of the same size.

→ Write down in letters all the other **right-angled** triangles that can be identified in the window.

1p **25** → How many **isosceles** triangles are in the window?

2p **26** → In the work booklet, draw all axes of symmetry of the window.

4p **27** Diagonal AC of the window is 40 cm.

→ Calculate the circumference of the window in cm. Write down your calculations and round to one decimal.

3p **28** Diagonal AC of the window is 40 cm.

→ Calculate the area of the window in m^2.