DIA-valinta 2009

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sarja **A**

18.5.2009
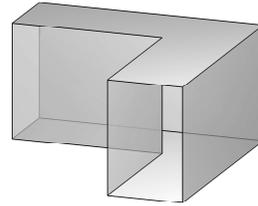
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Common University Admission in Engineering and Architecture (dia-admission) 2009
Architecture admission, mathematics, May 18, 2009

Series A-EN

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Attachment: Table of formulae.

A1 A corridor makes a 90 degree turn as illustrated in the attached figure. The corridor's cross section is a rectangle. The width of the corridor is $d = 2,0$ m and the height $h = 3,0$ m. How long a bar can be transported through the corridor without bending it?

The thickness of the bar can be neglected. Give the answer rounded to integral centimeters.

A2 Consider a piece of land having the form of a right-angled triangle, where the lenght of the two shorter edges are $a = 37$ m, $b = 41$ m. What is the land area free for constructing when one is required to leave a 3 m wide strip unexploited along the entire length of the longest edge.

Give the answer rounded to the accuracy of 0.1 m².

A3 Architects M. Uoto, F. Örm, and S. Hapé have designed a monument consisting of a gilded steel cube to be placed in the entré of Aalto-university.   The gilding is thin.

During the execution of the project, the planned location for the monument is altered, whereby the volume of the steel cube is increased by 19% compared to the original size. In the final billing, the cost of the materials is also found to be 19% larger than that in the original budget.

(a) How much did the amount of gold needed for the gilding grow during the execution of the project?

(b) The unit price of the steel did not change during the execution of the project. Thus, how did the unit price of gold change?

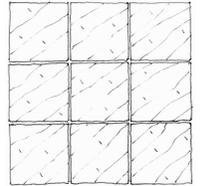Give the answers in percent rounded to the accuracy of 0.1 percentage points.

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(The volume of a segment of a sphere of radius R is given by $V = \pi h^2(R - \frac{h}{3})$.)

Give the exact answer and its approximation rounded to the accuracy of three decimal places.

A5 To commemorate the Finnish War (Swedish-Russian war 1809) one arranges a mosaic placed on a wall. The mosaic is made of nine square ceramic tiles, which are placed at even intervals in the mosaic. Each tile is chosen randomly from an infinite pile of blue and yellow tiles. Of the tiles, 60% are blue.

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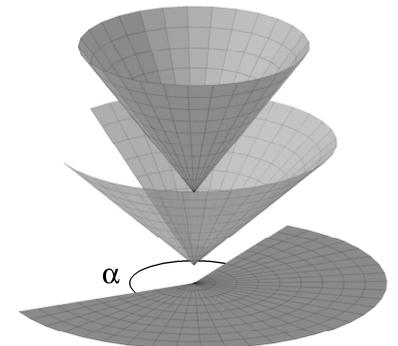

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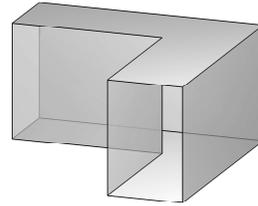**Architecture admission, mathematics, May 18, 2009**

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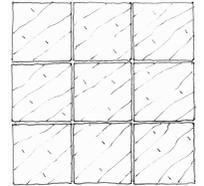Give the answers in percent rounded to the accuracy of 0.1 percentage points.

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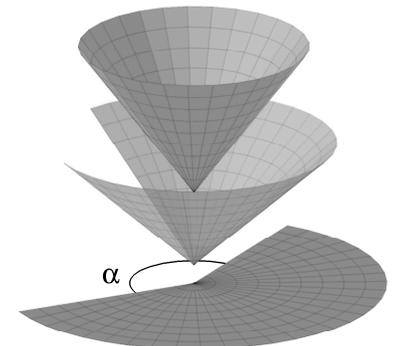
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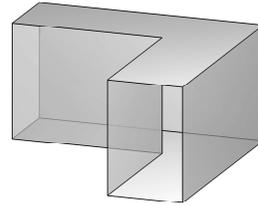
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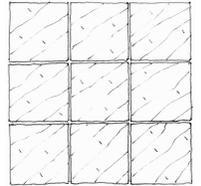Give the answers in percent rounded to the accuracy of 0.1 percentage points.

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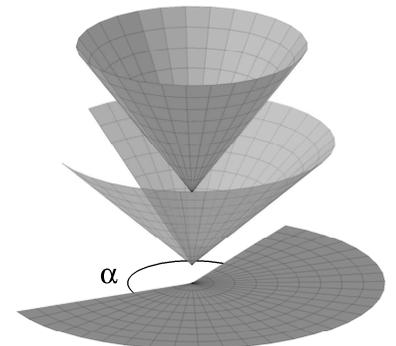

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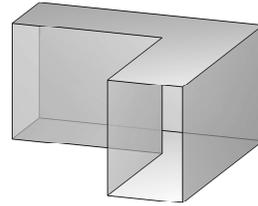
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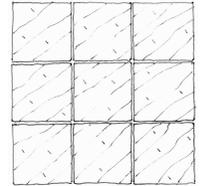Give the answers in percent rounded to the accuracy of 0.1 percentage points.

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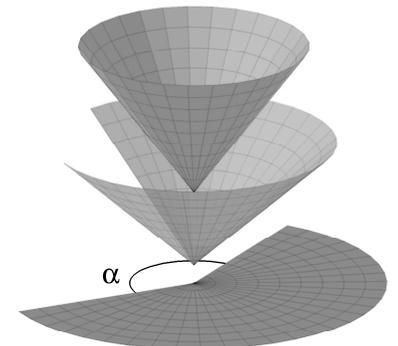
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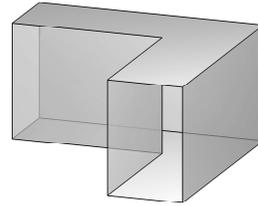
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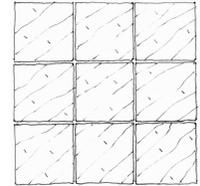Give the answers in percent rounded to the accuracy of 0.1 percentage points.

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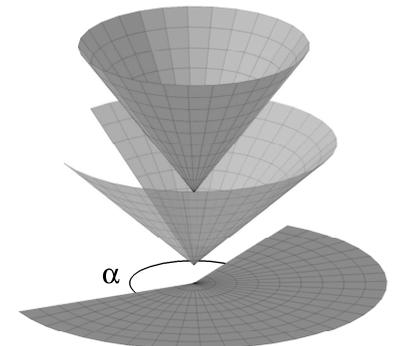
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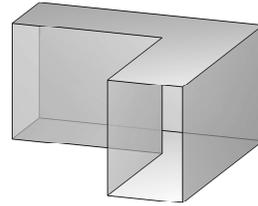
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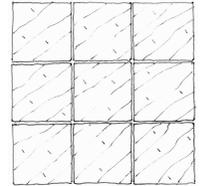
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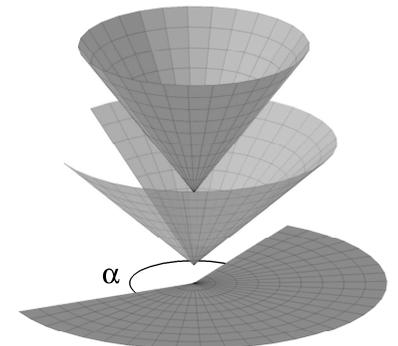

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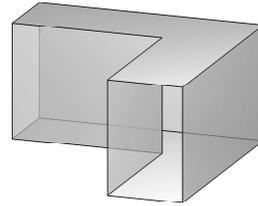
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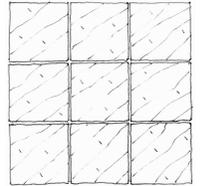Give the answers in percent rounded to the accuracy of 0.1 percentage points.

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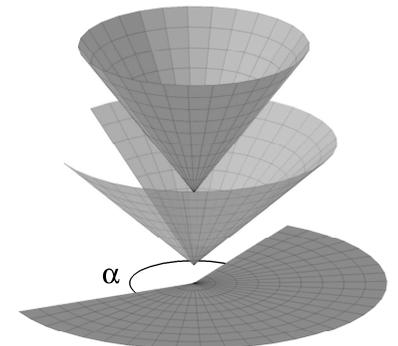
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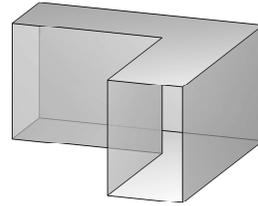
Series A-EN

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Attachment: Table of formulae.

A1 A corridor makes a 90 degree turn as illustrated in the attached figure. The corridor's cross section is a rectangle. The width of the corridor is $d = 2,0$ m and the height $h = 3,0$ m. How long a bar can be transported through the corridor without bending it?

The thickness of the bar can be neglected. Give the answer rounded to integral centimeters.

A2 Consider a piece of land having the form of a right-angled triangle, where the lenght of the two shorter edges are $a = 37$ m, $b = 41$ m. What is the land area free for constructing when one is required to leave a 3 m wide strip unexploited along the entire length of the longest edge.

Give the answer rounded to the accuracy of 0.1 m^2.

A3 Architects M. Uoto, F. Örm, and S. Hapé have designed a monument consisting of a gilded steel cube to be placed in the entré of Aalto-university. The gilding is thin.

During the execution of the project, the planned location for the monument is altered, whereby the volume of the steel cube is increased by 19% compared to the original size. In the final billing, the cost of the materials is also found to be 19% larger than that in the original budget.

(a) How much did the amount of gold needed for the gilding grow during the execution of the project?

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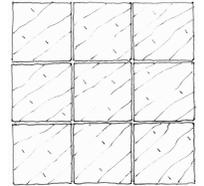Give the answers in percent rounded to the accuracy of 0.1 percentage points.

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Give the exact answer and its approximation rounded to the accuracy of three decimal places.

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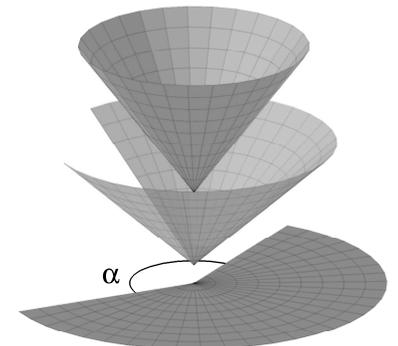

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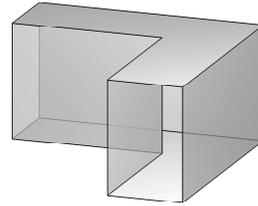
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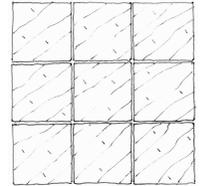
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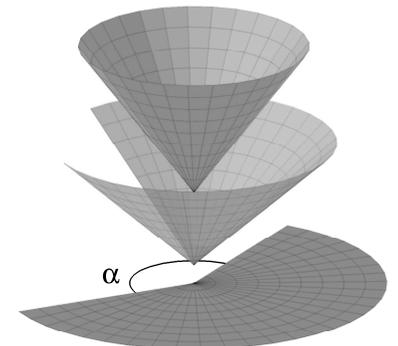
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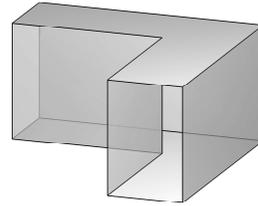Series $\boxed{\textbf{A-EN}}$

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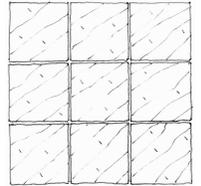Give the answers in percent rounded to the accuracy of 0.1 percentage points.

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