



S5 B Test, June 2024

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## MATHEMATICS 4 PERIODS

### PART A

DATE : 17 June 2024

Name : \_\_\_\_\_

Class : \_\_\_\_\_

Score : \_\_\_\_\_ / 35

**DURATION OF TEST :**

45 minutes : 13h00 - 13h45

**AUTHORIZED MATÉRIAL :**

NON-CALCULATOR

Pencil

Ruler



**SPECIAL REMARKS :**

- The subject includes 4 compulsory exercises.
- The answers must be accompanied by the explanations necessary for their elaboration.
- Full points cannot be awarded for a correct answer in the absence of the reasoning and explanations that lead to this answer.

Stay calm and focused.  
Good job and good luck.

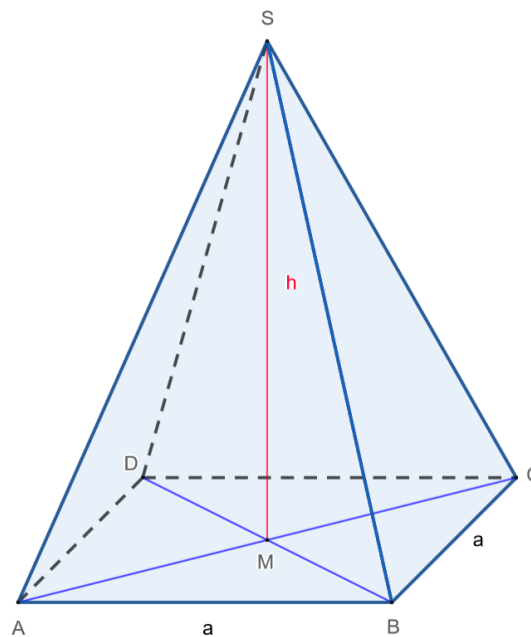
Exercise A1	Marks
<p>In a certain country the growth of a certain rabbit population (per week) can be modelled with the following function:</p> $f(x) = 100 \cdot 2^x$ <p>with <math>f(x)</math> describing the number of rabbits after <math>x</math> weeks and <math>x = 0</math> being the time at the beginning of the observation of the rabbit population.</p> <p>1) <b>Give</b> the number of rabbits, that have been in the country at the beginning of the observation.</p> <p>2) <b>Calculate</b> how many rabbits will live in the country after 1 week and after 3 weeks and <b>compare</b> the values.</p> <p>3) <b>Sketch</b> the graph of the function <math>f(x)</math> for <math>x \in [0,5]</math>. Use the sheet of graph paper you received at the beginning of the exam.</p>	<p><b>1 p</b></p> <p><b>4 p</b></p> <p><b>2 p</b></p>

<b>Exercise A2</b>	<b>Marks</b>
<p data-bbox="164 264 1118 297"><b>Determine</b> real numbers for which the following equations are true:</p> <p data-bbox="651 353 839 387">a) <math>3^{x+2} = 1</math></p> <p data-bbox="639 443 850 477">b) <math>5^{x-1} = \sqrt{5}</math></p> <p data-bbox="643 533 847 589">c) <math>\left(\frac{1}{4}\right)^x = 64</math></p>	<p data-bbox="1342 353 1393 387"><b>2 p</b></p> <p data-bbox="1342 443 1393 477"><b>2 p</b></p> <p data-bbox="1342 533 1393 566"><b>3 p</b></p>

**Exercise A3****Marks**

The figure shows a pyramid  $ABCDS$  with a square base.

The base is  $a = 6 \text{ cm}$  and the height of the pyramid is  $h = 4 \text{ cm}$ .



1) Given that the formula for the volume of a pyramid is

$$V = \frac{\text{Base area} \cdot \text{Height}}{3}$$

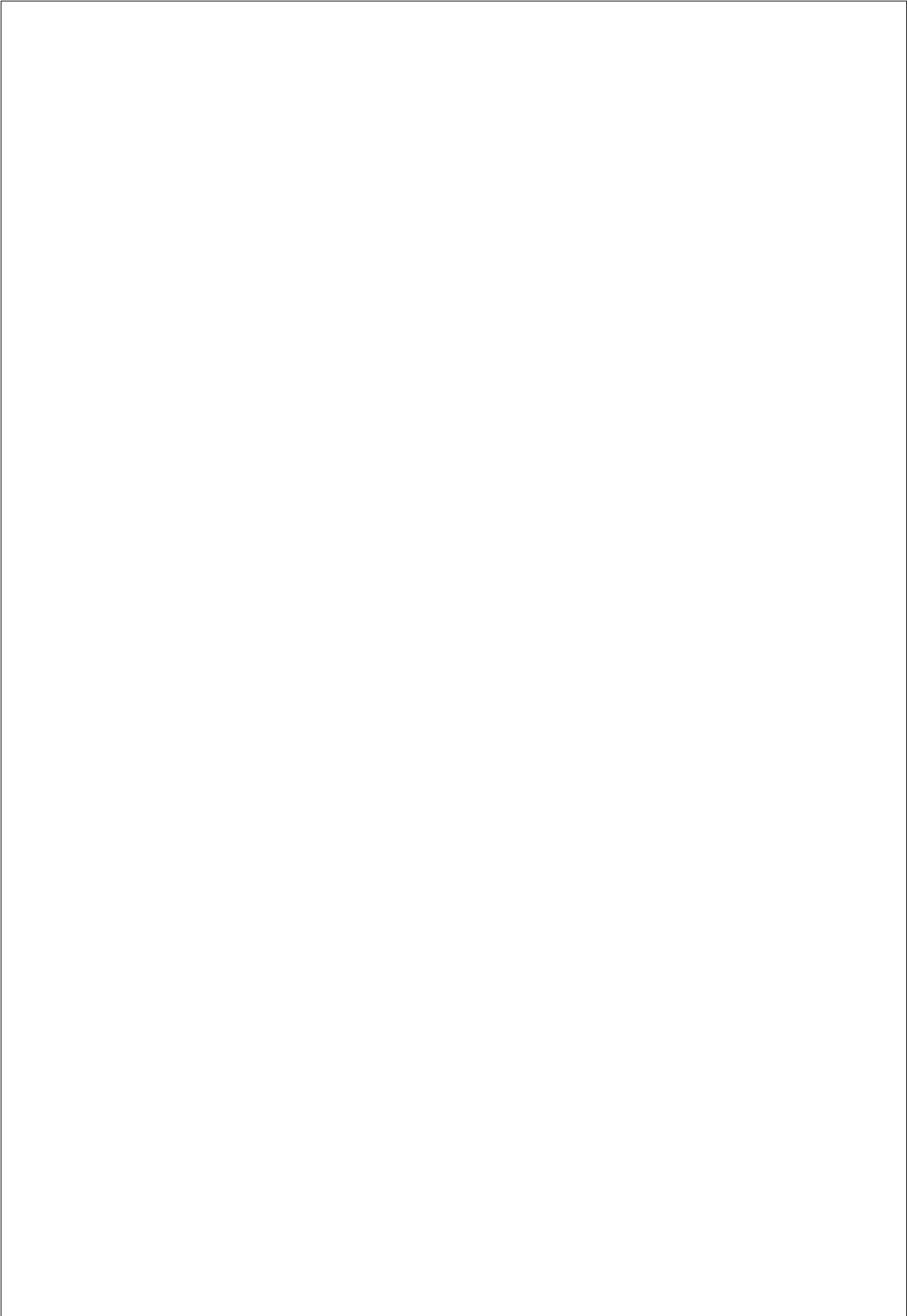
**calculate** the volume of this pyramid.

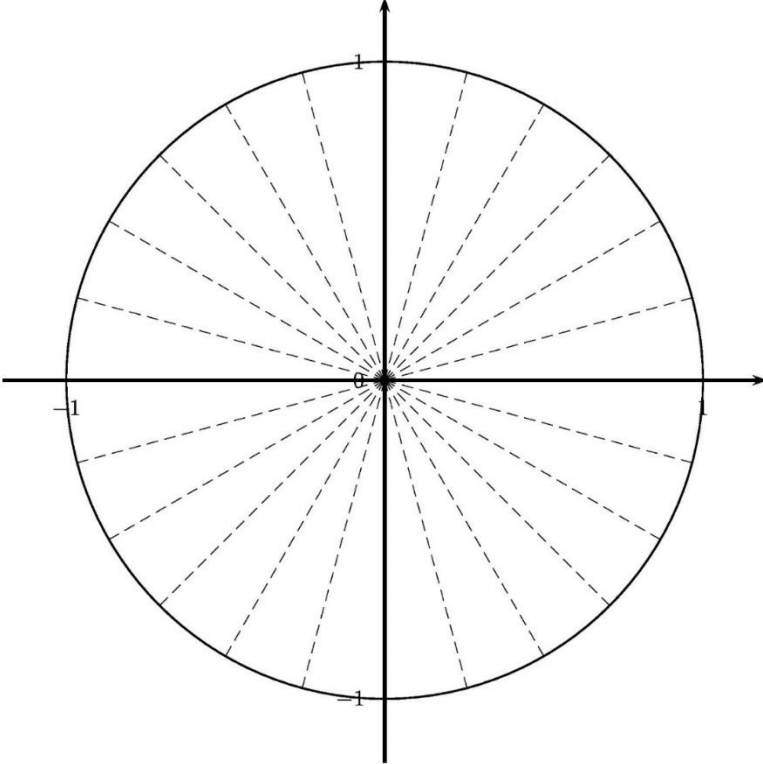
2) **Calculate** the height of triangle BCS.

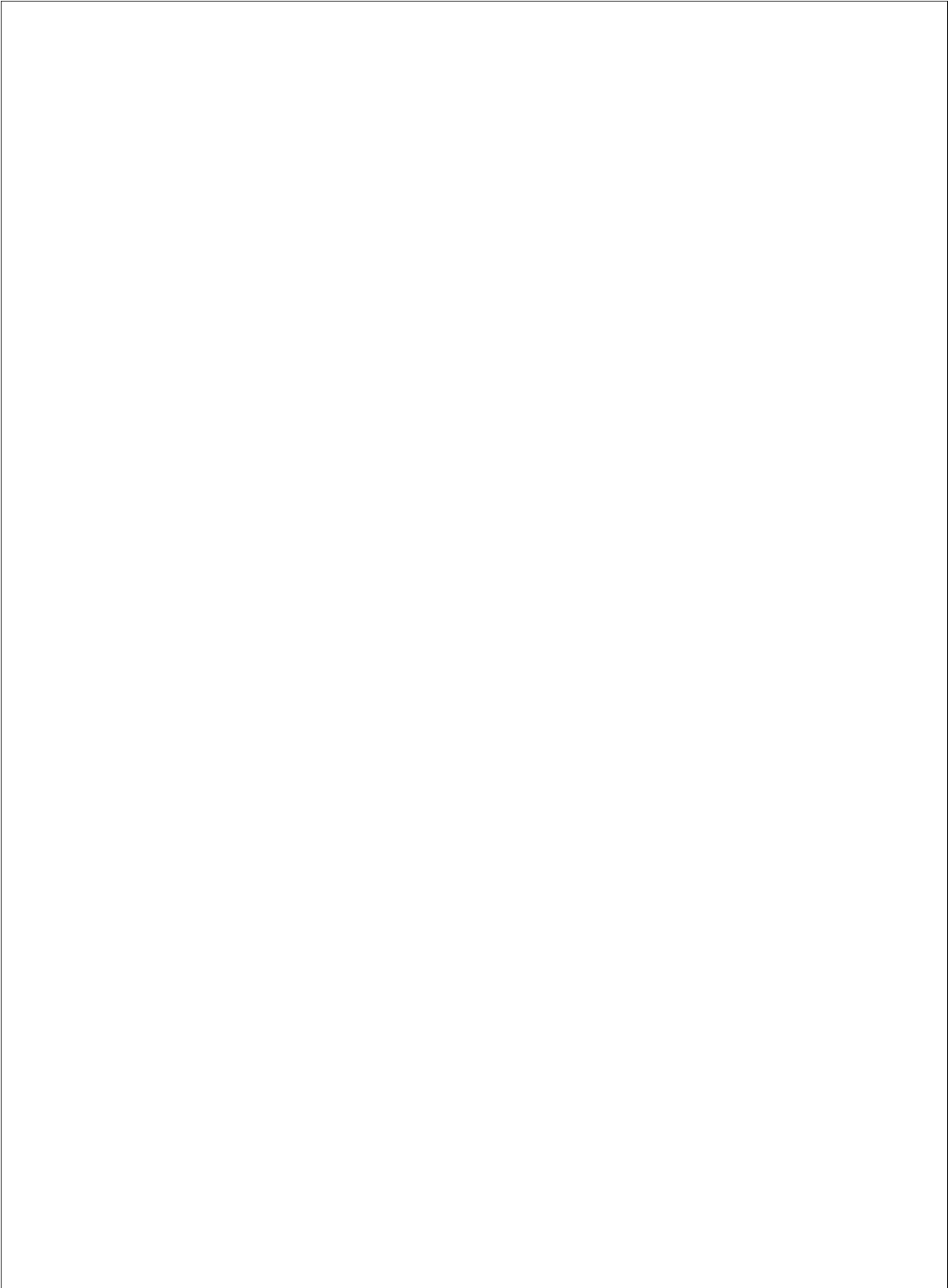
3) **Calculate** the area of triangle BCS.

4) **Calculate** the surface area of this pyramid.

**2 p****2 p****2 p****3 p**



Exercise A4	Marks
<p>1) <b>Determine</b> what each angle in degrees is equivalent to in radians:</p> <p>i. <math>45^\circ = \underline{\hspace{2cm}}</math> rad</p> <p>ii. <math>150^\circ = \underline{\hspace{2cm}}</math> rad</p> <p>iii. <math>300^\circ = \underline{\hspace{2cm}}</math> rad</p>	3 p
<p>2) <b>Determine</b> what each angle in radians is equivalent to in degrees:</p> <p>iv. <math>\frac{1}{3} \cdot \pi \text{ rad} = \underline{\hspace{2cm}}^\circ</math></p> <p>v. <math>\frac{5}{4} \cdot \pi \text{ rad} = \underline{\hspace{2cm}}^\circ</math></p>	2 p
<p>3) <b>Insert</b> those 5 angles listed above on the unit circle</p> 	2 p
<p>4) Given is <math>\cos(60^\circ) = \frac{1}{2}</math>.</p> <p>Based on this information <b>find</b> all the values of <math>\alpha</math> (<math>0 &lt; \alpha &lt; 360^\circ</math>) for which <math>\cos(\alpha) = -\frac{1}{2}</math>.</p> <p><b>Enter</b> the answers in radians and <b>plot</b> it on the above unit circle.</p>	5 p



**END OF THE EXAMINATION**