

William Lyon Mackenzie CI
Practice MaCS Questions
Mathematics

1. A long tunnel has the shape of a rectangular prism. It is about 100 cm high, 10 m wide and 1 km long. What is the volume of the tunnel expressed as an exponent?

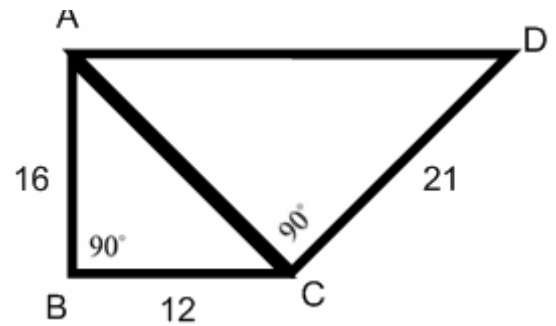
- A. $10^4 m^3$ B. $1000 cm^3$ C. $1 km^3$ D. $10^3 m^3$

2. If $a = \frac{1}{2}$ and $b = -\frac{1}{3}$, then $\frac{a+b}{ab}$ equals

- A. -1 B. -5 C. $-\frac{1}{36}$ D. 1 E. 2

3. In the diagram, what is the length of AD?

- A) 31 B) 30 C) 29 D) 24



4. When 1 kg of salt is added to a solution of salt and water, the solution becomes $33\frac{1}{3}\%$ salt by

mass. When 1 kg of water is added to the new solution, the resulting solution is 30% by mass. The percentage of salt in the original solution is

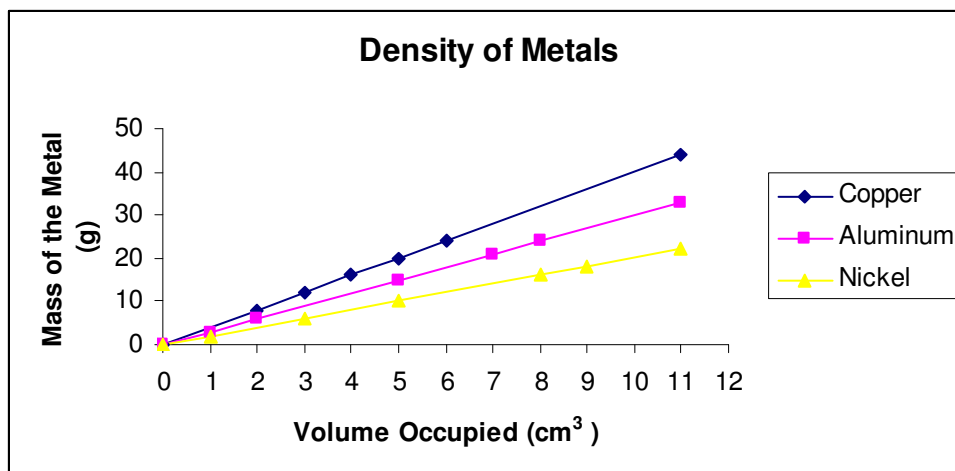
- A) $18\frac{2}{11}$ B) $22\frac{2}{9}$ C) 25 D) 30 E) $31\frac{2}{3}$

5. Simplify $\frac{6^4 \times 15^3}{3^3 \times 2^4}$ without using a calculator

- A) 15^3 B) $3^4 5^3$ C) $2 \cdot 3 \cdot 5$ D) $\frac{3 \times 5}{2}$ E) $(2^2 3^4 5^3)^4$

Science

1. Rumour has it that a piece of buttered bread, when dropped, will always land buttered side down. What information would you need to definitively confirm or deny this rumor? Provide three examples.
(alternatively: Rumour has it that it takes 7 years for a piece of gum to go through your digestive system)
2. You are given a mixture of sand, salt, metal filings and small stones. What would you do to separate all four items?



3. Given that $\text{Density} = \text{Mass} / \text{Volume}$, which of the three metals has the greatest density? Estimate the mass of aluminum that would occupy 9 cm^3 ? Why is $(0,0)$ a point on this graph?
4. A student is planning on investigating the relationship between eating chocolate and performance on tests. What is the dependent variable for this experiment? What is the independent variable for this experiment? (Do we use the independent/dependent vocabulary? Are these students familiar with these specific terms?) Identify three possible variables the student needs to keep constant to make his/her experiment scientifically valid? If the student notices no difference in test scores, what might the student do next?