SM 223$_{\text{TSM}}$ Quiz #13 25 Oct 2012 Last Name SOLUTIONS Section ●4023 ●5023 ●6023

Time Limit: 5 minutes

Instructions: Calculator allowed. Closed book. Closed notes.

Instructions for all quizzes: **Do not discuss any aspect of this quiz with other midshipmen until after 6th period.**

Print your last name above. Also, fill in the bubble for your section.

Fill the bubble for the correct answer. Also, write your answers in any blanks provided.

Your work will not be graded unless the instructions request you show your work.

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1. The general formula (involving partial derivatives) for the differential dV of the function $V = V(r, h)$ is

$$dV = \left(\frac{\partial V}{\partial r}\right) dr + \left(\frac{\partial V}{\partial h}\right) dh$$

2. The volume of a cylinder with radius r and height h is $V = V(r, h) =$

○ $(\pi/3)r^2h$ ● $\pi r^2 h$ ○ $\pi r h^2$ ○ $(\pi/3)rh^2$ ○ none of above

3. A cylindrical metal can with radius 5 cm and height 7 cm will be covered with thick paint. The thickness of the paint for the top and bottom is 0.3 cm, and thickness for the lateral (side) part of the can is 0.2cm. Use differentials to estimate the volume of paint required.

○ 6.5π cm^3 ● 29.0π cm^3 ○ 43.0π cm^3 ○ 45.0π cm^3 ○ 51.5π cm^3

SHOW YOUR WORK BELOW TO RECEIVE FULL OR PARTIAL CREDIT

Reason. We have

$$\begin{aligned} dV &= \left(\frac{\partial V}{\partial r}\right) dr + \left(\frac{\partial V}{\partial h}\right) dh \\ &= (2\pi rh)\, dr + \left(\pi r^2\right) dh \\ &= (2\pi \cdot 5 \cdot 7)\, 0.2 + \left(\pi \cdot 5^2\right) (2 \cdot 0.3) \\ &= 29\pi \text{ cm}^3 \end{aligned}$$