

Time Limit: 4 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.

1. Which curves arise as (x -, y -, or z -) traces for the surface

$$z = x^2 + 4y^2?$$

Give **all** correct answers.

circles (non-circular) ellipses parabolas hyperbolas intersecting lines

Reason: The traces $x = k$ and $y = k$ give the parabolas $z = k^2 + 4y^2$ and $z = x^2 + 4k^2$. The trace $z = k$ gives $x^2 + 4y^2 = k$, which is a (non-circular) ellipse.

2. Identify each surface.

(a) $z = x^2 + 4y^2$

ellipsoid paraboloid hyperboloid of 1 sheet hyperbolic paraboloid cone

(b) $\langle 1, 1, 0 \rangle \cdot \langle x^2, y^2, z^2 \rangle = 15$

sphere (non-spherical) ellipsoid cone plane cylinder

Reason. The dot product expands to $20x^2 + 15y^2 = 15$, which is a (circular) cylinder along the z -axis.