

No books, notes or graphing calculators. Scary costumes are allowed. Please turn off your cell phones. Show ALL your work.

- (4) 1. For the following surfaces mark the shapes which can occur as cross sections by planes parallel to a given plane.

(a) $x^2 + 2y^2 + 5z^2 = 1$

xy-plane	yz-plane	xz-plane
<input type="checkbox"/> circle	<input type="checkbox"/> circle	<input type="checkbox"/> circle
<input type="checkbox"/> ellipse	<input type="checkbox"/> ellipse	<input type="checkbox"/> ellipse
<input type="checkbox"/> hyperbola	<input type="checkbox"/> hyperbola	<input type="checkbox"/> hyperbola
<input type="checkbox"/> parabola	<input type="checkbox"/> parabola	<input type="checkbox"/> parabola
<input type="checkbox"/> line	<input type="checkbox"/> line	<input type="checkbox"/> line

(b) $z = x^2 - 2y^2$

xy-plane	yz-plane	xz-plane
<input type="checkbox"/> circle	<input type="checkbox"/> circle	<input type="checkbox"/> circle
<input type="checkbox"/> ellipse	<input type="checkbox"/> ellipse	<input type="checkbox"/> ellipse
<input type="checkbox"/> hyperbola	<input type="checkbox"/> hyperbola	<input type="checkbox"/> hyperbola
<input type="checkbox"/> parabola	<input type="checkbox"/> parabola	<input type="checkbox"/> parabola
<input type="checkbox"/> line	<input type="checkbox"/> line	<input type="checkbox"/> line

(c) $(y - 1)^2 + (z + 1)^2 = 4$

xy-plane	yz-plane	xz-plane
<input type="checkbox"/> circle	<input type="checkbox"/> circle	<input type="checkbox"/> circle
<input type="checkbox"/> ellipse	<input type="checkbox"/> ellipse	<input type="checkbox"/> ellipse
<input type="checkbox"/> hyperbola	<input type="checkbox"/> hyperbola	<input type="checkbox"/> hyperbola
<input type="checkbox"/> parabola	<input type="checkbox"/> parabola	<input type="checkbox"/> parabola
<input type="checkbox"/> line	<input type="checkbox"/> line	<input type="checkbox"/> line

(d) $y^2 = z^2 - x^2$

xy-plane	yz-plane	xz-plane
<input type="checkbox"/> circle	<input type="checkbox"/> circle	<input type="checkbox"/> circle
<input type="checkbox"/> ellipse	<input type="checkbox"/> ellipse	<input type="checkbox"/> ellipse
<input type="checkbox"/> hyperbola	<input type="checkbox"/> hyperbola	<input type="checkbox"/> hyperbola
<input type="checkbox"/> parabola	<input type="checkbox"/> parabola	<input type="checkbox"/> parabola
<input type="checkbox"/> line	<input type="checkbox"/> line	<input type="checkbox"/> line

- (6) 2. Find the length (perimeter) of the ellipse given by the equation

$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

You do NOT have to evaluate the integral.

Hint: parametrize the ellipse and then use the formula for the arc length of a parametric curve.