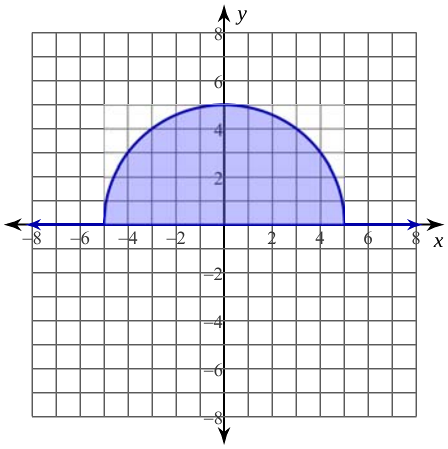
Kuta Software - Infinite Calculus Name____________________

Volume of Solids with Known Cross Sections

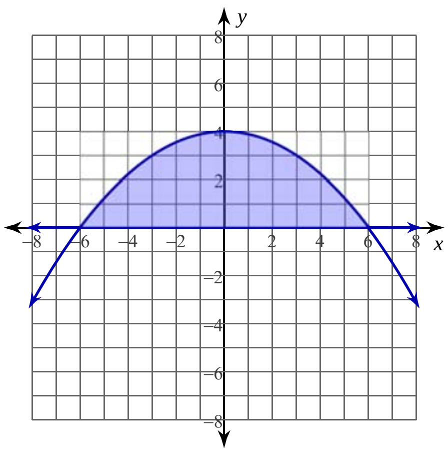
Date________________ Period____

For each problem, find the volume of the specified solid. A graph representing the base is provided.

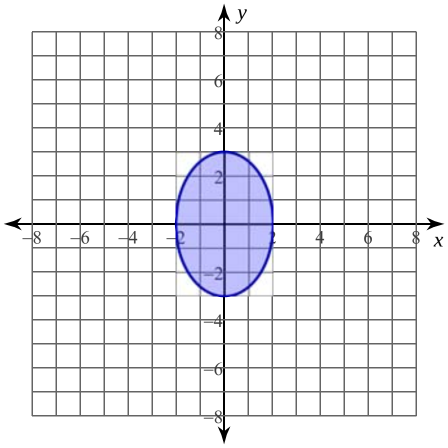
1) The base of a solid is the region enclosed by the semicircle $y = \sqrt{25 - x^2}$ and the x-axis. Cross-sections perpendicular to the x-axis are squares.



2) The base of a solid is the region enclosed by $y = -\frac{x^2}{9} + 4$ and $y = 0$. Cross-sections perpendicular to the x-axis are rectangles with heights twice that of the side in the xy-plane.

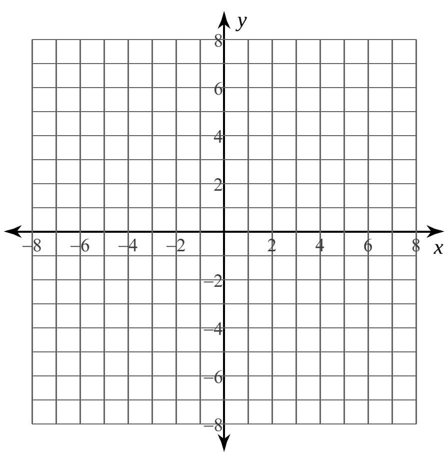


3) The base of a solid is the region enclosed by an ellipse with a major axis of 6 along the y-axis and a minor axis of 4. Cross-sections perpendicular to the x-axis are isosceles right triangles with the hypotenuse in the base.



For each problem, find the volume of the specified solid. You may use the provided graph to sketch the base.

4) The base of a solid is the region enclosed by a semicircle with a radius of 3, lying flat on the x-axis. Cross-sections perpendicular to the y-axis are squares.



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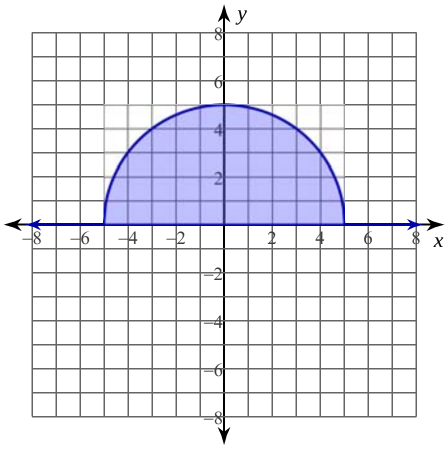
Volume of Solids with Known Cross Sections

Date________________ Period____

For each problem, find the volume of the specified solid. A graph representing the base is provided.

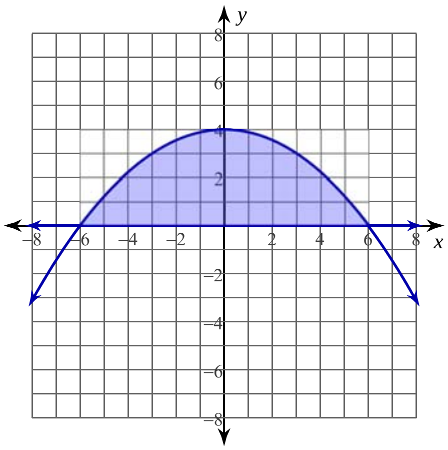
1) The base of a solid is the region enclosed by the semicircle $y = \sqrt{25 - x^2}$ and the x-axis. Cross-sections perpendicular to the x-axis are squares.



$$\int_{-5}^{5} \left(\sqrt{25 - x^2}\right)^2 \, dx$$

$$= \frac{500}{3} \approx 166.667$$

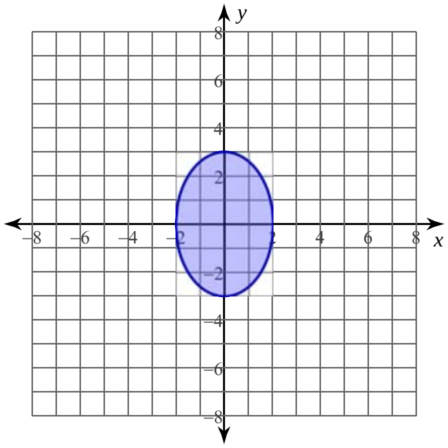
2) The base of a solid is the region enclosed by $y = -\frac{x^2}{9} + 4$ and $y = 0$. Cross-sections perpendicular to the x-axis are rectangles with heights twice that of the side in the xy-plane.



$$2\int_{-6}^{6} \left(-\frac{x^2}{9} + 4\right)^2 \, dx$$

$$= \frac{1024}{5} = 204.8$$

3) The base of a solid is the region enclosed by an ellipse with a major axis of 6 along the y-axis and a minor axis of 4. Cross-sections perpendicular to the x-axis are isosceles right triangles with the hypotenuse in the base.



$$\frac{1}{4}\int_{-2}^{2}\left(\sqrt{9-\frac{9x^2}{4}}+\sqrt{9-\frac{9x^2}{4}}\right)^2 dx$$
$= 24$

For each problem, find the volume of the specified solid. You may use the provided graph to sketch the base.

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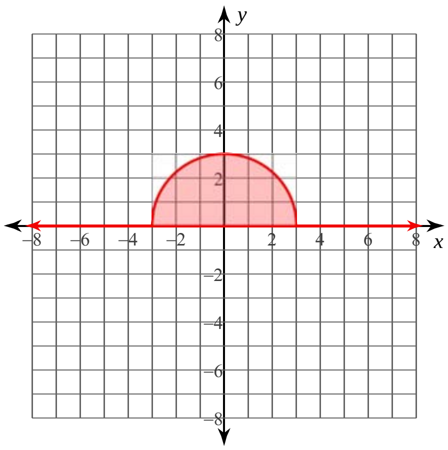

$$\int_{0}^{3}\left(\sqrt{9-y^2}+\sqrt{9-y^2}\right)^2 dy$$
$= 72$