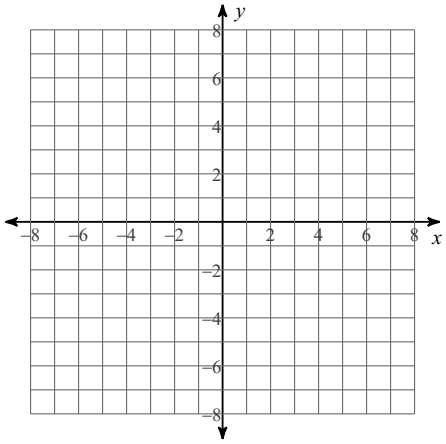
Calculus Name_____ ID: 1

Checkup 11

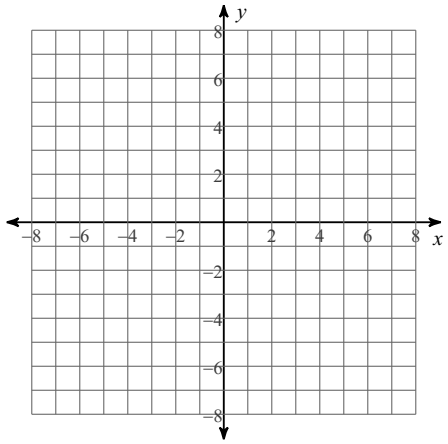
Date_____

For each problem, find the area of the region enclosed by the curves. You may use the provided graph to sketch the curves and shade the enclosed region.

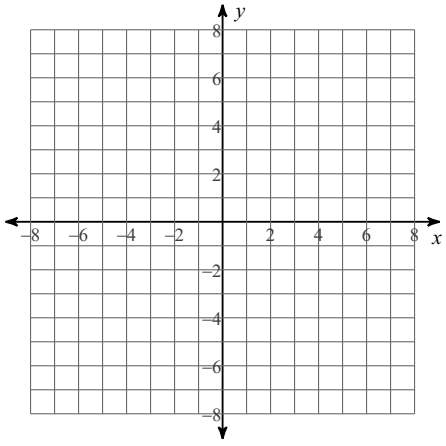
1) $y = -\frac{3}{x^2},\ y = 1,$
$x = 1,\ x = 4$



2) $x = 2\sqrt{y},\ x = \frac{y^2}{4}$

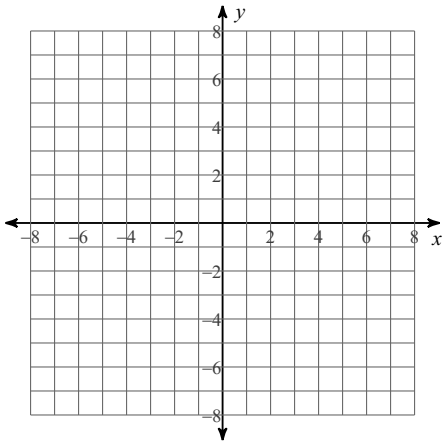


3) $y = x^3 - 6x,\ y = x^2$

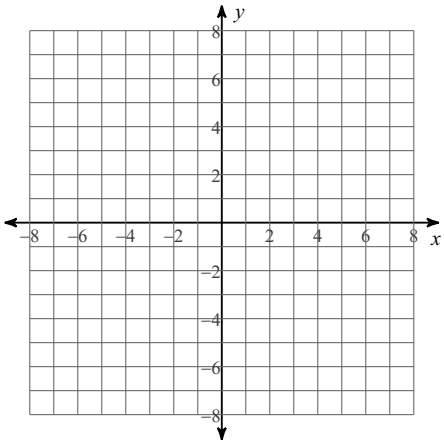


For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the given axis. You may use the provided graph to sketch the curves and shade the enclosed region.

4) $y = \sqrt{x} + 2,\ y = 2,\ x = 1$
Axis: $y = 2$

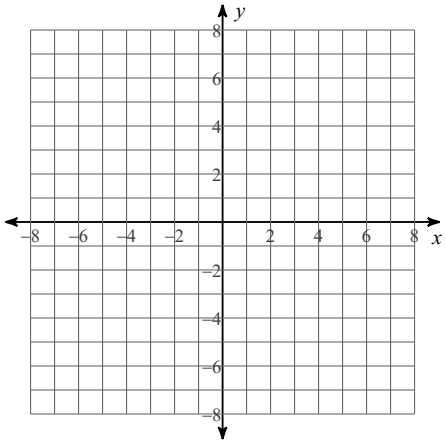


5) $x = -y^2 + 5,\ x = 1,\ y = 0,\ y = 2$
Axis: $x = -1$



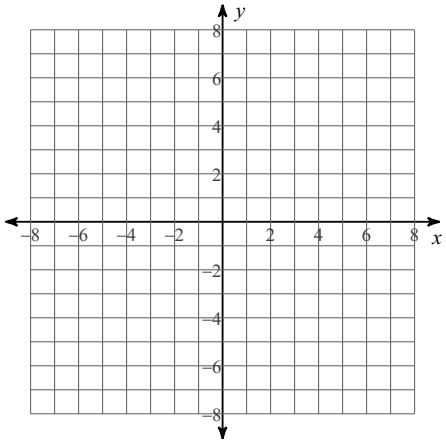
For each problem, use the method of cylindrical shells to find the volume of the solid that results when the region enclosed by the curves is revolved about the given axis. You may use the provided graph to sketch the curves and shade the enclosed region.

6) $y = \sqrt{x} + 2,\ y = 2,\ x = 4$
Axis: $x = 5$



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

7) The base of a solid is the region enclosed by $y = 4$ and $y = x^2$. Cross-sections perpendicular to the x-axis are semicircles.



Calculus Name_____ ID: 1

Checkup 11

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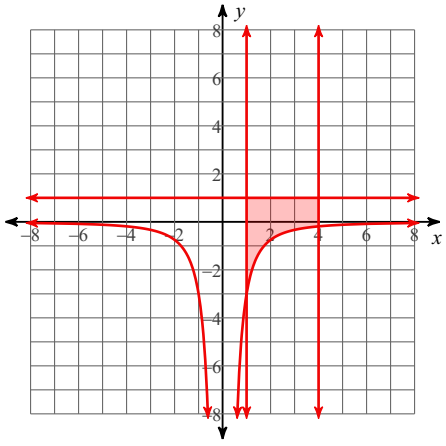
For each problem, find the area of the region enclosed by the curves. You may use the provided graph to sketch the curves and shade the enclosed region.

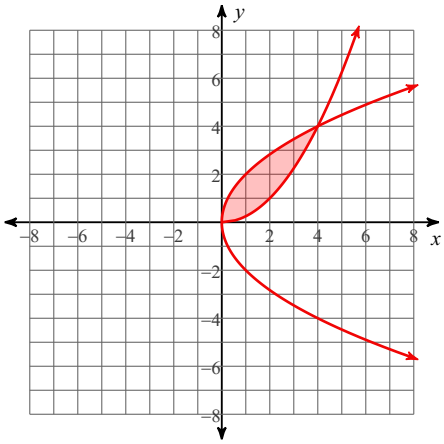
1) $y = -\frac{3}{x^2}$, $y = 1$, $x = 1$, $x = 4$



$$\int_1^4 \left(1 + \frac{3}{x^2}\right) dx$$

$$= \frac{21}{4} = 5.25$$

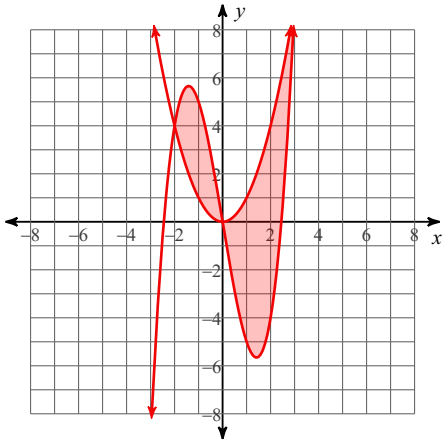
2) $x = 2\sqrt{y}$, $x = \frac{y^2}{4}$



$$\int_0^4 \left(2\sqrt{y} - \frac{y^2}{4}\right) dy$$

$$= \frac{16}{3} \approx 5.333$$

3) $y = x^3 - 6x$, $y = x^2$



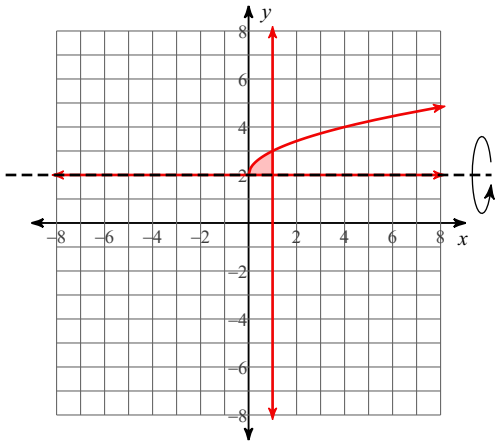
$$\int_{-2}^0 \left(x^3 - 6x - x^2\right) dx +$$

$$\int_0^3 \left(x^2 - \left(x^3 - 6x\right)\right) dx$$

$$= \frac{253}{12} \approx 21.083$$

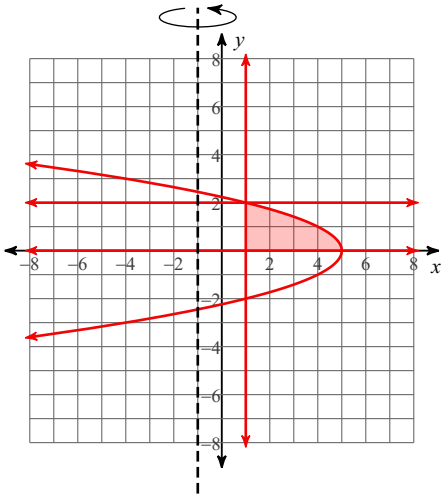
For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the given axis. You may use the provided graph to sketch the curves and shade the enclosed region.

4) $y = \sqrt{x} + 2,\ y = 2,\ x = 1$
Axis: $y = 2$



$$\pi \int_0^1 \left(\sqrt{x}\right)^2 dx$$
$$= \frac{1}{2}\pi \approx 1.571$$

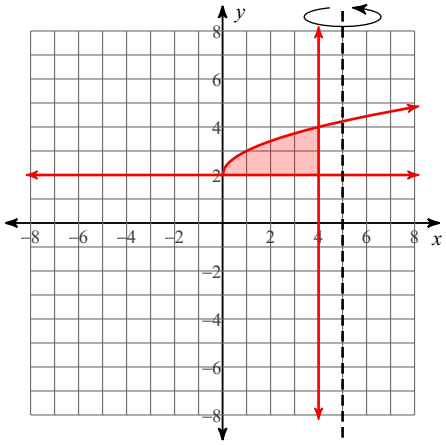
5) $x = -y^2 + 5,\ x = 1,\ y = 0,\ y = 2$
Axis: $x = -1$



$$\pi \int_0^2 \left(\left(-y^2 + 6\right)^2 - 2^2\right) dy$$
$$= \frac{192}{5}\pi \approx 120.637$$

For each problem, use the method of cylindrical shells to find the volume of the solid that results when the region enclosed by the curves is revolved about the given axis. You may use the provided graph to sketch the curves and shade the enclosed region.

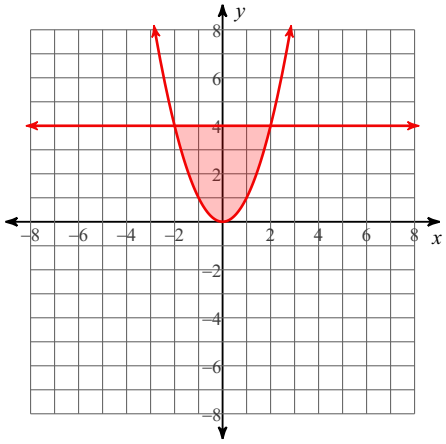
6) $y = \sqrt{x} + 2,\ y = 2,\ x = 4$
Axis: $x = 5$



$$2\pi \int_0^4 (5 - x)\left(\sqrt{x} + 2 - 2\right) dx$$
$$= \frac{416}{15}\pi$$

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

7) The base of a solid is the region enclosed by $y = 4$ and $y = x^2$. Cross-sections perpendicular to the x-axis are semicircles.



$$\frac{\pi}{8}\int_{-2}^{2}\left(4 - x^2\right)^2\,dx$$

$$= \frac{64\pi}{15} \approx 13.404$$