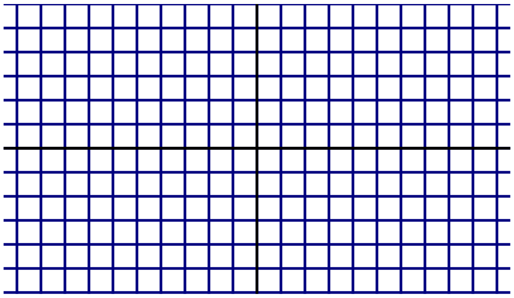
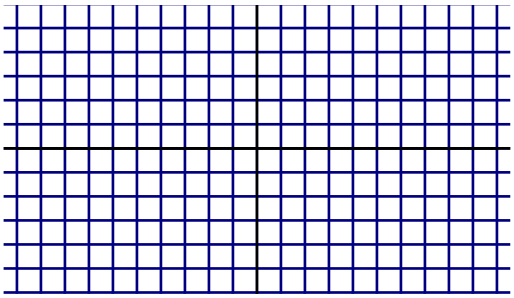
**Chapter 7 Test     January 27, 2014     No Calculators     Name**

**1. Find the area of the region <u>in</u> <u>the</u> <u>first</u> <u>quadrant</u> bounded by the graphs of the equations** $y = \dfrac{9}{x^2}$ **and** $4y = 13 - x^2$

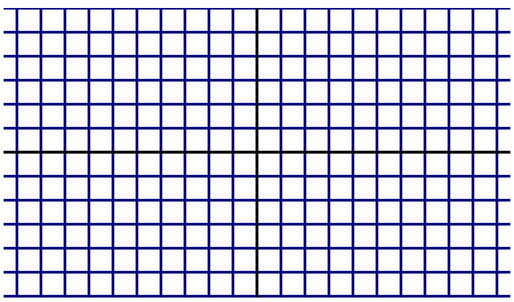


**2. Find the area of the region bounded by the graphs of the equations** $y = e^x$, $x = 0$, **and** $y = 2e^{-x}$

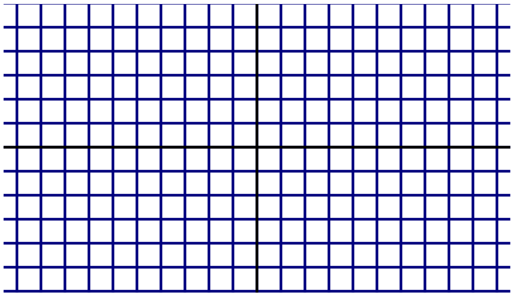


**3. A solid has as its base the region in the xy – plane bounded by the graph of the equations** $\dfrac{x^2}{4} + \dfrac{y^2}{25} = 1.$

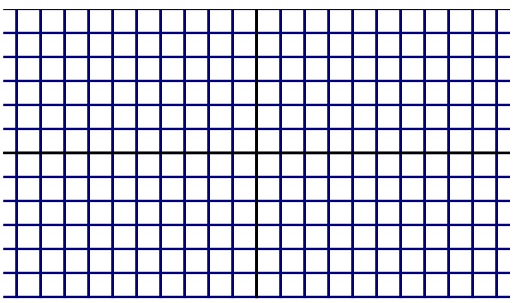
**Every cross section by a plane perpendicular to the x – axis is an isosceles right triangle, with the hypotenuse in the xy – plane. Find the volume of the solid.**



4. A solid has as its base the region in the xy – plane bounded by the graph of the equation $y = \sqrt{16 - x^2}$ and the x – axis. Every cross section by a plane perpendicular to the x – axis is an equilateral triangle, with one side in the xy – plane. Find the volume of the solid. $\left( \text{Hint: } A = \dfrac{\sqrt{3}}{4} s^2 \right)$



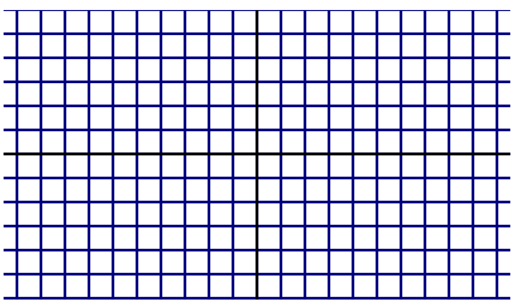
5. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations $x = 2 + \sin y$, $x = 0$, $y = 0$, and $y = \pi$, about the y – axis.



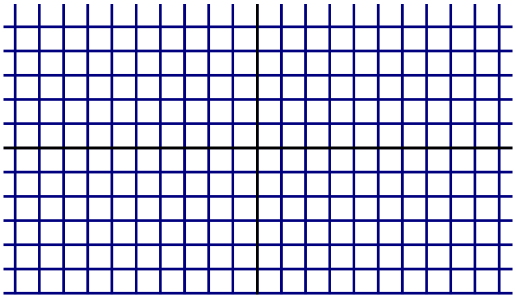
6. A bucket that weighs 4 lbs and a rope of negligible weight are used to draw water from a well that is 80 feet deep. The bucket is initially filled with 40 lbs of water, and is pulled up at a rate of $2 \dfrac{\text{feet}}{\text{second}}$, but the water leaks out at the rate of $\dfrac{1}{5} \dfrac{\text{lb}}{\text{second}}$. Find the work done in lifting the bucket to the top of the well.

7. A trapezoidal plate is submerged in a container of oil weighing $50\ \frac{\text{lbs}}{\text{ft}^3}$. One base of the trapezoid is 12 feet long and is parallel to the surface of the oil at a distance of 3 feet. The plate is 4 feet high, and the base furthest from the surface is 5 feet long (see diagram). Find the force exerted on one side of the plate.

8. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations $y = 2\sqrt{x - 1}$ and $y = x - 1$, about the line $x = -1$. Set up the integral only.



9. **Find the volume of the solid generated by revolving the region bounded by the graphs of the equations $x = y^3$ and $y = x^2$ about the line $y = 2$. Set up the integral only.**



10. **Find the volume of the solid generated by revolving the region bounded by the graphs of the equations $y = \sin(\pi x)$ and $y = 2x$, in the first quadrant about the line $y = 2$. Set up the integral only.**