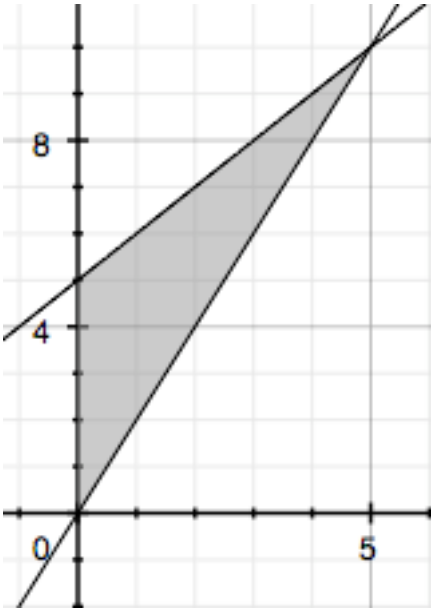
Name: _____

CLASSWORK 123

1. The area between the curves $y = 2x$ and $y = x + 5$ (starting at 0) is rotated around the **y-axis**. Find the volume created.



2. Find the volume in #1 without using calculus.

3. a) In physics, work = force • distance. Find the **work** done when a 10 kg weight is raised 2 meters.

b) The force needed to stretch a spring is related to the distance it has been stretched by the formula

$F = kx$ where x represents the distance it has been stretched beyond its natural length.

i) Find the force required to stretch the spring 2 m and then 3 m.

ii) Find the work done to displace a spring with $k = 2.5$ from $x = 0$ to $x = 4$.

4. The force exerted by the Earth's gravity is defined by the formula $F = \frac{Gm_1m_2}{r^2}$, where G is the gravitational constant (6.67×10^{-11}). The mass of the earth is 5.97×10^{24} kg.

a) Find a formula for the force required to move a 100-kg person away from Earth as it depends on r, the distance from the earth's center.

b) The earth has an average radius of 6.37×10^6 meters. The moon is 3.84×10^6 meters from the surface of the earth. How much work is done moving a person from the surface of the earth to the moon?

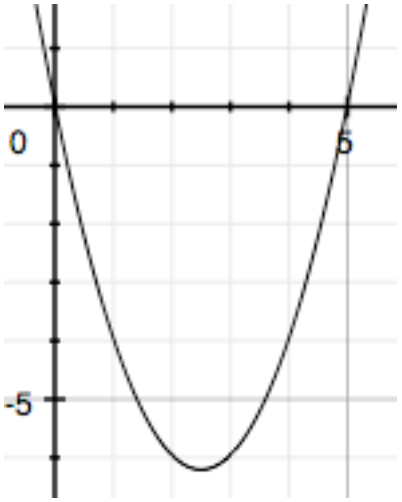
5. Lily is walking away from the candy store. The force of attraction drawing her to the candy store depends on how far away she is (x) according to the formula $F = \frac{2x}{x^2 + 5}$. How much work does it take for Lily to move from 1 meter away from the candy store to a safe distance of 30 meters away?

6. a) An object is at a displacement of 3 meters at t = 2 seconds. 4 seconds later, it is at a displacement of 11 meters. Find the object's average speed.

b) The velocity (v) of an object over time (t) is described by the function $v = 2t^4 - 3t^2 + t + 5$. Find the distance travelled between $t = 2$ and $t = 5$.

c) Find the average velocity of the object in (b) between t = 2 and t = 5.

7. Find the **average value** of the function $y = x^2 - 5x$ between x = 0 and x = 5.



8. Find the **average value** of the function $y = x \cos(x^2)$ between x = 0 and x = π.