1. Given the region bounded by y=0 , y=5-x , x=1 and x=2. Find the volume of the solid formed by revolving the region about:

A. X-axis
B. Y-axis
C. Line y=8

Evaluate: A + B + C

2. Clark Griswold is leaning his 17-foot ladder against his home in order to hang his Christmas lights. The house and ground are perpendicular. Clark leans the ladder at a point 15 feet above ground. Once he begins to hang the lights, the ladder starts sliding down the side of the house at a rate of 2 feet per second.

A. Find the distance that the ladder is from the house horizontally when Clark initially leans it against the house.
B. Find the secant of the angle of elevation the ladder makes with the ground when Clark initially leans it against the house.
C. Find the rate at which the ladder moves away from the house in feet per minute at the instant the ladder begins to move.

Evaluate: AB/C

3. A particle's velocity is given by $\mathrm{v(t)} = 6\mathrm{t}^3 - 15\mathrm{t} + 8$.

A. Find the displacement traveled by the particle from time t = 0 to t = 3
B. Find the acceleration at time t = 2.5
C. If the initial position at time t = 0 is 2, find the position when t = 4

Evaluate A + B - C

4. Clark Griswold is ready to wrap some birthday presents. He is starting with a flat piece of cardboard that he is going to use to fold and create an open-top box to gift a puppy to his daughter. The original dimensions of the cardboard are 16 cm x 28 cm. Four congruent squares, one from each corner, will be cut to make the box. Determine the perimeter of one square cut that would result in the maximum volume for the puppy box.

5. Given $f(x) = 4x^3 - 10x^2 + 8x - 3$

A. Find the average value on [-1,3]
B. Find the absolute maximum value on the interval [-2 , 5]
C. Find the relative minimum value on the interval [-3,7]
D. Find the average rate of change on the interval [0, 4]

Evaluate (A+B+C)D

6. A = $\int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \sin^2 x\, dx$ B = $\int_{\frac{\pi}{2}}^{\frac{3\pi}{4}} \cos^2 x\, dx$ C = $\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} \csc^2 x\, dx$

Evaluate A + B + C

7. Find the volume of the solid formed by revolving the quadrilateral with vertices given around the line y = -4.

Vertices: (-1, 2) (4, 5) (-1, -3) (4, -3)

8. Over what intervals is the graph of the given equation both decreasing and concave down? $y = -3x^5 + 4x^4 - 2x^3 + \frac{1}{8}$

9. Find the rate of change of the perimeter of an equilateral triangle in cm/sec when the area is $72\sqrt{3}\ cm^2$ and changing at a rate of $2m^2/min$.

10. A relation has the equation $2x^2y - 6y + x = -4$.

Find each value:

A = The derivative of the relation when x = -1

B = The slope of the normal line to the relation when x = 2.

Evaluate: A + B

11. Find the exact area of the largest rectangle that can be formed with lower base on the x-axis and upper vertices on the graph of: $y = 32 - 4x^2$.

12. $f(x) = 3x^2 - 8x^3 + 12x$ $g(x) = \mathrm{x}^2 \cos\left(\frac{x}{2}\right)$

A = $f''(-2)$ C = $g''(\pi)$

B = $f'''(4)$ D = $g'(0)$

Evaluate: A+B+C+D

13. A man who is 75 inches tall is walking directly away from a 15 foot tall light post at 4 feet per second. At what rate is the length of his shadow increasing when he is 24 feet away from the pole in feet per second?

14. $h(x) = \frac{8x^2-3x+12}{16-5x+4x^2}$

A = $\lim_{x \to 0} h(x)$ B = $\lim_{x \to -1} h(x)$ C = $\lim_{x \to \infty} h(x)$

Evaluate A + B + C

15. Given $f(x) = 4x^2 - 9x$, find the average value of f (x) on [1, 5]