SPRING 2025 - CALCULUS 2 - TEST #1A - Solutions

F 1) If $0 \le f(x) \le g(x)$ on $[a,b]$, then the volume of the figure of revolution of $f(x)$ about the x-axis is greater than that for $g(x)$ $\le$

T 2) Any problem that can be done with the method of shells can also be done with the method of washers

T 3) For the washer method the differential volume could be $dV = \pi([f(x)]^2 - [g(x)]^2)dx$

F 4) For the shell method the differential volume could be $dV = 2\pi x[f(x)]dy$ dx

F 5) Compressing a spring to 90% of its neutral (unstretched) length requires more work than stretching it to 110% of its neutral length.

F 6) Climbing down a vertical ladder results in you doing work against gravity gravity does work on you

F 7) The area of the surface of revolution generated by $y = f(x)$ from $x = a$ to $x = b$ is $2\pi \int_a^b f(x)\sqrt{1 + f'(x)}\,dx$ $f'(x)$ squared

F 8) Differential work by a pump can be written as weight density of the fluid times differential height lifted need volume

F 9) Work done by a spring with spring constant k being stretched x units beyond neutral length is kx^2 half this

T 10) Moving an object against friction results in work being done

F 11) A force aligned perpendicular to displacement results in negative work no work done

F 12) For the disk method of determining volume of a figure of revolution about the x-axis, $dV = \pi[f(x)]dx$ $f(x)$ squared

T 13) Work and energy are the same thing

T 14) All forces applied to an object must balance for the object to not have work done on it

T 15) Pressure at a given depth depends on the mass density of a liquid

F 16) Pressure at a given depth in a moving fluid is constant in all directions or it would not move

F 17) The volume of a pyramid with a triangular base can be found with the method of shells not round

T 18) Power is the time rate of change of doing work

T 19) The length of the curve $y = g(x)$ from $x = a$ to $x = b$ could be $\int_a^b \sqrt{\left(\frac{dy}{dx}\right)^2 + 1}\,dx$

T 20) For a fluid at rest in a tank, the pressure at any depth is the same in every direction

T 21) The method of disks only works for objects that have rotational symmetry

T 22) Buoyancy is due to pressure differences in a liquid

F 23) A force applied to a moving object always does work on it displacement?

F 24) Mass density could be given in grams per centimeter cubic cm

F 25) Weight in the metric system is measured in kilograms newtons