

CALCULUS 2 - FALL 26 - EXAM 1A - Solutions

T 1) If $f(x) \leq g(x)$ on $[a, b]$, then the area between the curves could be written $\int_a^b |f(x) - g(x)| dx$
 $|f(x) - g(x)| \geq 0$

F 2) For the disk method of determining volume of a figure of revolution about the y-axis

$$dV = \pi [f(x)]^2 dy \quad f(y)$$

F 3) For the washer method of determining volume of a figure of revolution about the x-axis

$$dV = \pi ([f(x)]^2 - [g(x)]^2) dx$$

T 4) If you climb a ladder you have done work against gravity and increased your potential energy

F 5) For the shell method of determining volume of a figure of revolution about the x-axis

$$dV = 2\pi f(x) dx \quad \text{chk dimension}$$

T 6) The formula for differential surface area of a figure of revolution about the x-axis could

$$\text{be } dA = 2\pi y \sqrt{1 + \left(\frac{dy}{dx}\right)^2} dx$$

T 7) If a compressed spring is allowed to expand, it does positive work and loses elastic PE

F 8) The volume of the figure of revolution generated by $y = f(x)$ from $x = a$ to $x = b$ could

$$\text{be } 2\pi \int_a^b [f(x)]^2 dx \quad \pi$$

F 9) The metric unit for moment is joule N-m

T 10) Work done on a spring with spring constant k being stretched x units over neutral length is $\frac{1}{2} kx^2$

F 11) Volume divided by weight density is force times

T 12) Pressure due to a fluid with mass density ρ at depth x would be ρgx g accounted for

T 13) The area of the surface of revolution generated by $y = f(x)$ from $x = a$ to $x = b$ could

$$\text{be } 2\pi \int_a^b f(x) \sqrt{1 + \left(\frac{dy}{dx}\right)^2} dx$$

T 14) The weighted average of $f(x)$ over the interval $[a, b]$ is $\frac{1}{a-b} \int_a^b f(x) dx$ limits reversed, too

T 15) The centroid of a planar figure always lies on every axis of symmetry of the figure

F 16) The center of gravity of an arbitrary plane figure always lies on an axis of symmetry
 chk density

T 17) The center of gravity and centroid of a thin plate are the same if the density of the plate material is constant

F 18) The center of mass and the center of gravity of a thin plate can be different

F 19) The center of gravity of a thin plate is always located on the plate horseshoe

T 20) The total force on one side of a submerged flat plate is the plate area times the pressure at the centroid

T 21) A thin plate could be balanced by applying a force equal to its weight at its center of gravity

F 22) Pressure in a liquid at a given depth is less upwards than it is downwards
 Archimedes says no

T 23) Pressure in a fluid at depth x is the weight of a column of fluid with constant cross-section A and height x divided by A

T 24) Pappus' Area Formula involves the distance travelled by the centroid of a cross section

T25) The rate of doing work is power power is work per second