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

True or false:

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

2) The indefinite integral $\int e^{x^2} dx$ can be done by substitution letting $u = x^2$

3) For the washer method of determining volume of a figure of revolution about the x-axis $dV = \pi([f(x)]^2 - [g(x)]^2)dx$

4) For the shell method of determining volume of a figure of revolution about the y-axis $dV = 2\pi x[f(x)]dy$

5) Carrying a five pound brick ten feet across a room requires fifty ft-lbs of work

6) Climbing down a ladder results in you doing positive work against gravity

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

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

9) Work done by a spring with spring constant k being stretched x units beyond neutral length is $\frac{1}{2}kx^2$

10) The weighted average of a function over $[a,b]$ is $\frac{1}{2}(f(a) - f(b))$

11) Torque is the same thing as rotational work

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

13) Work and energy are the same thing

14) All torques applied to an object must balance for the object to not rotate

15) The centroid and center-of-gravity are identical for all objects

16) The center of gravity for an object would be the same on Earth as on the Moon.

17) The indefinite integral $\int \frac{dx}{x \ln x}$ cannot be done by substitution

18) To calculate the moment of a point mass m located at (x,y) about the y-axis you would calculate my

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

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

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

22) The weighted average of a function over $[a,b]$ is $\int_a^b \frac{f(x)}{a-b} dx$

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

24) Mass density could be given in grams per centimeter

25) Weight in the metric system is measured in kilograms