

SCORE: ____ / 30 POINTS

NO CALCULATORS ALLOWED

**SHOW PROPER ALGEBRAIC WORK
USE PROPER NOTATION & SIMPLIFY ALL ANSWERS WHERE REASONABLE**

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER

SCORE: ____ / 3 POINTS

A 5 foot long chain weighing 12 pounds hangs from a hook in the ceiling of an 11 foot tall room. (So, the bottom of the chain is 6 feet from the floor.) How many foot-pounds of work are done lifting the bottom loop of the chain to the ceiling so that it touches the top loop ?

(HINT: Draw "before" and "after" diagrams.)

- [a] 25 [b] 10 [c] 20 [d] 30 [e] 15

A 50 foot chain weighing 4 pounds per foot hangs over the edge of a 50 foot tall building. The chain is used to lift a 25 pound tabletop from ground level to a window 20 feet above ground.

SCORE: ____ / 6 POINTS

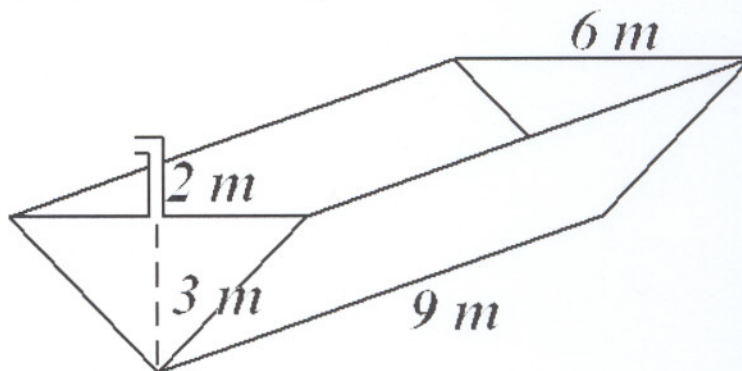
Write, **BUT DO NOT EVALUATE**, an expression involving an integral (or sum of integrals) for the work done.

SEE 7:30 VERSION 8

A tank in the shape of the triangular prism shown on the right is filled with water.

SCORE: ____ / 6 POINTS

Write, **BUT DO NOT EVALUATE**, an integral for the work required to pump the water out of the spout.



SEE 7:30 VERSION 7

The region bounded by $x = 1$, $y = \ln x$ and $y = 1$ is revolved around the y -axis.
Find the volume of the solid.

SCORE: ____ / 6 POINTS

SEE 7:30 VERSION 8

The region bounded by $y = -2$, $y = \frac{1}{2}x - 1$ and $y = x - 2$ is revolved around the line $y = 1$.

SCORE: ____ / 9 POINTS

[a] Write, **BUT DO NOT EVALUATE**, an integral (or sum of integrals) for the volume of the solid using the shell method.

SEE 7:30 VERSION 8

[b] Write, **BUT DO NOT EVALUATE**, an integral (or sum of integrals) for the volume of the solid using the washer method.

SEE 7:30 VERSION 8

[c] Find the volume of the solid by evaluating the appropriate integral(s) from either [a] or [b].

SEE 7:30 VERSION 8