Lesson 6-6 Applications of Integration to Physics and Engineering

1- A force of 10 pounds stretches a spring 2 inches. Find the work done in stretching this spring 3 inches beyond its natural length.

A- 1.875 foot-pounds

B- 1.875 foot

C- 1.875 pounds

D- 15 foot-pounds

2- (a) A water tower is spherical in shape with radius 50 feet, extending from 200 feet to 300 feet above ground. Compute the work done in filling the tank from the ground. (b) Compute the work done in filling the tank halfway.

A- (a) 8168140899 ft-lb....(b)compute the work done in filling the tank halfway

B- (a) 8168140 ft-lb.... (b)compute the work done in filling the tank halfway

C- (a) 8168899 ft-lb.... (b)compute the work done in filling the tank halfway

LIVEWORKSHEETS

3- A 40 feet chain weighs 1000 pounds and is hauled up to the deck of a boat. The chain is oriented vertically and the top of the chain starts in the water 30 feet below the deck. Compute the work done.

A- 2250 foot-pounds

B- 22500 foot-pounds

C- 22050 foot-pounds

D-225 foot-pounds

4- A force of 5 pounds stretches a spring 4 inches. Find the work done in stretching this spring 6 inches beyond its natural length.

A- 18.75 foot-pounds
B- 1875 foot-pounds
C- 2.875 foot-pounds
D- 1.875 foot-pounds

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5- A wrestler lifts his 300 pounds opponent overhead, a height of 6 feet. Find the work done (as measured in foot-pounds).

A- 270000500 ft-lb
B- 270000000 ft-lb
C- 270050000 ft-lb
D- 275000000 ft-lb

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6- Suppose that a rocket weighs 8000 pounds at launch and loses 1 pound of fuel for every 10 feet of altitude gained. Find the work needed to raise the rocket to a height of 10,000 ft.

A- 68000000 ft-lb
B- 60800500 ft-lb
C- 60800000 ft-lb
D- 60850000 ft-lb

LIVEWORKSHEETS

7- A bucket is lifted a distance of 80 feet at the rate of 4 ft/s.The bucket initially contains 100 pounds of sand but leaks at a rate of 2 lb/s. Compute the work done.

A- 6040 ft-lb
B- 6440 ft-lb
C- 6400 ft-lb
D- 6400 lb-ft

8- A water tank is in the shape of a right circular cone of altitude 10 feet and base radius 5 feet, with its vertex at the ground. (Think of an ice cream cone with its point facing down.) If the tank is full, find the work done in pumping all of the water out the top of the tank.

A- 40841 foot-pounds
B- 40841 pounds
C- 40841 foot
D- 40841 pounds- foot

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9- A force of 5 pounds stretches a spring 4 inches. Find the work done in stretching this spring 6 inches beyond its natural length.

$A.\quad w = \frac{4}{5}\int_0^6 x\,dx$

$B.\quad w = \frac{5}{4}\int_0^6 x\,dx$

$C.\quad w = \frac{4}{5}\int_0^6 kx\,dx$

$D.\quad w = \frac{5}{4}\int_0^3 x\,dx$

LIVEWORKSHEETS

10- A rocket weighs 8000 pounds at launch and loses 1 pound of fuel for every 3 feet of altitude gained. Find the work needed to raise the rocket to a height of 3,000 ft

$A.\quad w = \int_0^{3000} (\frac{1}{3}x - 8000)\, dx$

$B.\quad w = \int_0^{3000} (\frac{1}{3}x + 8000)\, dx$

$C.\quad w = \int_0^{3000} (\frac{-1}{3}x + 8000)\, dx$

$D.\quad w = \int_0^{3000} -(\frac{1}{3}x + 8000)\, dx$

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