

Work by Integration

Define the force at a general displacement or slice, multiply by distance moved, and evaluate with physical units.

1. A spring has constant 44 N/m. Set up a definite integral for the work to stretch it from 0.2 m to 0.5 m.

2. A full rectangular tank has horizontal area 5 m^2 and depth 3 m. Pump water to the top (weight density 9800 N/m^3). Find the work.

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3. A 5 m cable weighs 2 N/m and hangs vertically. Set up a definite integral for the work to lift all of it to the top.

4. A 7 m cable weighs 3 N/m and hangs vertically. Find the work to lift all of it to the top.

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Define the force at a general displacement or slice, multiply by distance moved, and evaluate with physical units.

5. A spring has constant 53 N/m. Set up a definite integral for the work to stretch it from 0.2 m to 0.5 m.

6. A full rectangular tank has horizontal area 3 m^2 and depth 2 m. Pump water to the top (weight density 9800 N/m^3). Find the work.