

SECTION 2.5: WORK AND MASS

1. Short tutorial on Work

2. Basic Work Examples

- (a) In the 1976 Olympics, Vasili Alexeev set a world record when lifting 562 lb from the floor to above his head (approx. 6.5 feet). The 1985 Guinness Book of World Records claimed that, in 1957, Paul Anderson used his back to lift 6270 lb of lead and automobile parts 1 cm. Who did more work? (Note: 1 cm is approximately 0.033 feet.)

- (b) Compute the work done by a force of $F(x) = \frac{1}{1+x}$ N from $x = 0$ meters to $x = 3$ meters.

3. Springs and Work

4. Basic Spring Examples: (Find k . Calculate work.)

(a) A spring has a natural length of 1 m and when stretched to 1.5 meters exerts a force of 3 N. Find the work required to stretch the spring from 1 m (its natural position) to 2 m.

(b) A spring has a natural length of 0.3 m and requires 20 J of work to stretch the spring from its natural position to 0.4 m. Find the work required to stretch the spring from 0.4 m to 0.5 m.

5. A First Look at Calculating Mass

6. Basic Examples: Calculate the densities of the objects below.

(a) A 3-ft long metal rod with density 2 lb/ft

(b) A 3-ft long metal rod with density function $\rho(x) = 4x + 1$ lb/ft (starting at $x = 0$).