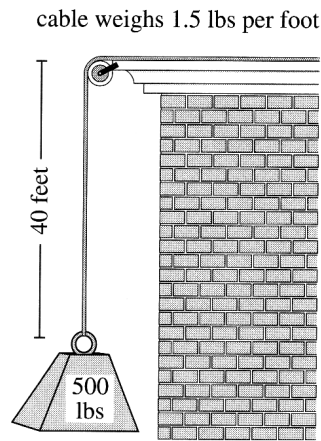


1. A 40 foot cable weighting 60 pounds hangs vertically from the top of a building. A 500 pound weight is attached at the end of the cable as shown in the picture.

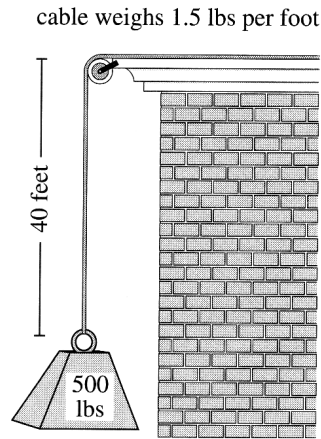


- (a) How much work is done to pull the weight to the top of the building? (Ignore the cable.)
- (b) How much work is done to pull the cable to the top of the building? (Ignore the 500 pound weight.)
2. (a) *Without using a calculator*, sketch a *large* graph of $y = 3 \cos^2(2x)$ for $x \in [0, \pi]$ on your whiteboard.
- (b) Using a different color marker and a ruler, add the line $y = 3$ for $x \in [0, \pi]$ to your sketch.
- (c) Using *just* your drawing, a little bit of trig, and some thought evaluate:

$$\int_0^{\pi} 3 \cos^2(2x) dx$$

3. Water weighs 62.5 pounds per cubic foot. Sketch a cylinder with a radius of 10 feet, and a height of 8 feet. Now imagine it is filled with 5 feet of water, and you have a hose with a pump coming in from the top of the cylinder. How much work is required to pump out 2 feet of water?

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