answers / solutions

> work & energy:

1) *b* 2) *b*

3) $P = {}^{W}/_{t} =$ **22.5 W**

4) a) $W = Fd = (12.5 \text{ kg})(9.8 \text{ m/s}^2)(2 \text{ m}) =$ **245 J**

[Remember that (kg) is a unit of mass, not force. Multiply the mass times gravity for force.]

5) *c*

6) a) $W = Fd = (880 \text{ N} + 395 \text{ N})(12 \text{ m}) =$ **15,300 J**

b) $P = {}^{W}/_{t} = {}^{15{,}300 \text{ J}}/_{14 \text{ s}} =$ **1,093 J/s (*or* W)**

7) *c* 8) *a*

9) a) $PE = mgh = (3 \text{ kg})(9.8 \text{ m/s}^2)(6 \text{ m}) =$ **176.4 J**

b) According to "conservation of energy," the loss in PE = gain in KE.

Therefore KE which $= {}^{1}/_{2}\ mv^2$ will then = 176.4 J

Solving for (v); v = **10.8 m/s**

10. W = KE What is the KE of this truck?

$KE = {}^{1}/_{2}\ mv^2 = (0.5)(3{,}000 \text{ kg})(14 \text{ m/s})^2 =$ **294,000 J** [This is the amount of work needed.]

11. W = KE What is the KE of this person and the ball?

$KE = {}^{1}/_{2}\ mv^2 = (0.5)(113 \text{ kg} + 0.5 \text{ kg})(6.5 \text{ m/s})^2 =$ **2,398 J** [This is the amount of work needed.]