1. A block is pulled at 10° for 5 meters on a frictionless surface.
   a. How much work is done on the box?
   b. How fast is the box moving

   15kg

   a) $F \cdot d = W$
   $49.2 \cdot 5 = 246 J$

   $W = KE = \frac{1}{2}mv^2$
   $246 = \frac{1}{2}(15)v^2$   $\boxed{V = 5.7 m/s}$
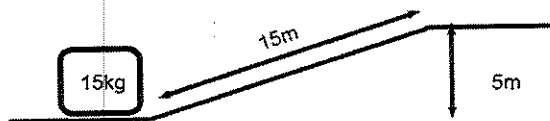
   50N
   10°

   $\frac{50}{10}$
   $Cos 10 (50) = 49.2N$

2. A15 box is pushed with a 50N force in line with movement on a frictionless surface.
   a. How much $U_{gravity}$ does the box have at the top?
   b. How fast is the box moving at the top?

   a) $PE = mgh$   $15 \cdot 10 \cdot 5 = 750 J$

   b) $W = PE + KE$
   $50 \cdot 15 = 750$   $750 = 750 = \frac{1}{2}mv^2$   $\boxed{V = 0}$

   15m
   15kg
   5m

3. A ball is thrown up with a velocity of $V_i$. Derive a formula, using energy, for the maximum height?

   $P.E = KE$
   $mgh = \frac{mv^2}{2}$
   $2gh = v^2$

   $\sqrt{2gh} = V$

4. A ball is thrown up at 50m/s.

   Student hypothesis: The ball will be halfway to its maximum height when it is at 25m/s? Justify or nullify the student hypothesis.
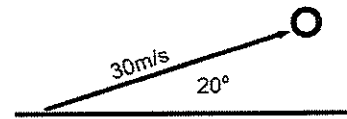
   $V = \sqrt{2gh}$   Not Linear

5. A ball is thrown at 30m/s at a 20° angle, how fast is the ball moving at the top? How high?

   $\rightarrow$ X component Constant $Cos 20 (30)$
   $= 28.1 m/s$

   $KE = PE + KE$

   $\frac{1}{2}mv^2 = mgh + \frac{1}{2}mv^2$
   $\frac{v^2}{2} = gh + \frac{mv^2}{2}$
   $\frac{30^2}{2} = 10h + \frac{28.1^2}{2}$

   $450 = 10h + 394$
   $\boxed{5.6m = h}$

   30m/s
   20°

6. Student hypothesis: A box is pushed at Velocity V causing it to slide to point X. If you slide a box at 2V it will slide to point 2X. Justify or nullify.

   Push

   $KE = TE$
   $\frac{1}{2}mv^2 = mg\mu d$
   $xv = 4x$   Energy $= 4 \times d$

   by doubling the friction
   same $V_i$
   $\frac{1}{2}$ length