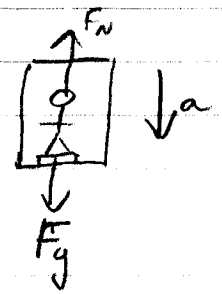
1. (a) Weight $= F_g = mg = (100)(9.8) = 980\ N$

(b) Weight $= F_g = mg = (100)(1.63) = 163\ N$

2.



$F_{net} = ma$

$F_N - F_g = -ma$

$F_N - mg = -ma$

$F_N - (70)(9.8) = -(70)(5)$

$F_N - 686 = -350$

$F_N = 336\ N$

3. $v_i = 0$

$v_f = ?$

$a = -9.8\ m/s^2$

$d = -100\ m$

$t = ?$

① $v_f = v_i + at$

$v_f = -9.8t$

substitute into ②

② $d = \left(\frac{v_i + v_f}{2}\right) t$

$-100 = \left(\frac{-9.8t}{2}\right) t$

$-200 = -9.8t^2$

$20.4 = t^2$

$4.5_s = t$

$v_f = -9.8(4.5)$

$= -44.1\ m/s$

∴ Velocity just before it hits the ground $= 44.1\ m/s$ down

time to fall $= 4.5\ s$

4. $v_i = 5\ m/s$

$v_f = 0$

$a = -9.8\ m/s^2$

$d = ?$

$v_f = v_i + at$

$0 = 5 - 9.8t$

$-5 = -9.8t$

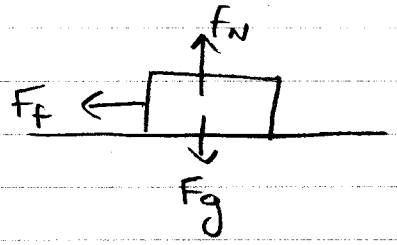
$t = 0.51_s$

$d = \left(\frac{v_i + v_f}{2}\right) t$

$= \left(\frac{5}{2}\right)(.51)$

$d = \underline{1.3\ m}$

5. (a)



$m = 1200\,kg$
$v_i = 20\,m/s$
$v_f = 0$

$F_{net} = ma$
$-F_f = ma$
$-\mu F_N = ma$
$-\mu mg = ma$
$-(0.6)(9.8) = a$
$-5.88\,m/s^2 = a$

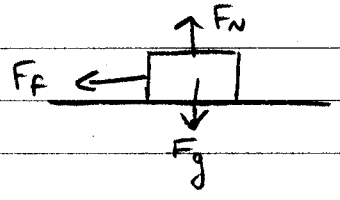
$v_f = v_i + at$
$0 = 20 - 5.88(t)$
$-20 = -5.88\,t$
$t = 3.4\,s$

(b) $d = \left(\frac{v_i + v_f}{2}\right)t$

$= \left(\frac{20}{2}\right)(3.4)$

$d = 34\,m$

6.



$m = 200g = 0.2\,kg$
$v_i = 2\,m/s$
$v_f = 0\,m/s$
$d = 1.5\,m$

$d = \left(\frac{v_i + v_f}{2}\right)t$

$1.5 = \left(\frac{2}{2}\right)t$

$t = 1.5s$

$v_f = v_i + at$
$0 = 2 + a(1.5)$
$a = -1.33\,m/s^2$

$F_{net} = ma$
$-F_f = ma$
$-F_f = (.2)(-1.33)$
$F_f = 0.266$

$F_f = \mu F_N$
$F_f = \mu mg$
$0.266 = \mu(.2)(9.8)$
$0.266 = \mu(1.96)$
$\mu = 0.14$

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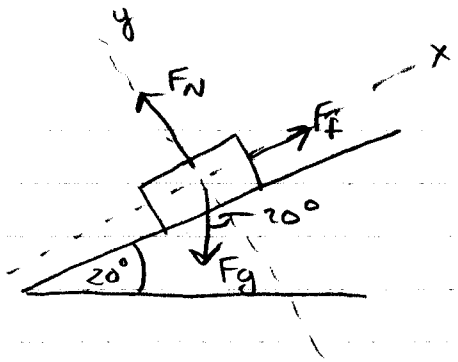
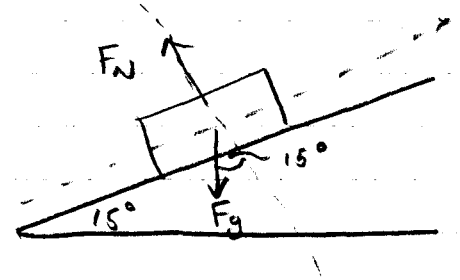
7.



x	y
$F_{net} = 0$	$F_{net} = 0$
$F_f - F_g \sin 20 = 0$	$F_N - F_g \cos 20 = 0$
$F_f - mg \sin 20 = 0$	$F_N - mg \cos 20 = 0$
$\mu F_N - mg \sin 20 = 0$	$F_N - (3)(9.8) \cos 20 = 0$
$\mu(27.6) - (3)(9.8) \sin 20 = 0$	$F_N - 27.6 = 0$
$\mu(27.6) - 10.06 = 0$	$F_N = 27.6\ N$
$\mu(27.6) = 10.06$	
$\mu = 0.36$	

8. (a)



x

$F_{net} = ma$

$-F_g \sin 15 = ma$

$-mg \sin 15 = ma$

$-(9.8) \sin 15 = a$

$a = 2.54\ m/s^2$ down the plane

(b) F_f would have to equal the force causing the block to slide down the plane.

so... $F_f = ma = (2)(2.54) = 5.08\ N$