Lab- Hooke's Law

- Find relationship between force and displacement of three different springs.
- Whiteboard:
  - Data → 5 points → force, displacement
  - Graph → Force vs displacement
  - Function of best fit for each

$$\text{slope} = \frac{F}{\Delta x}$$

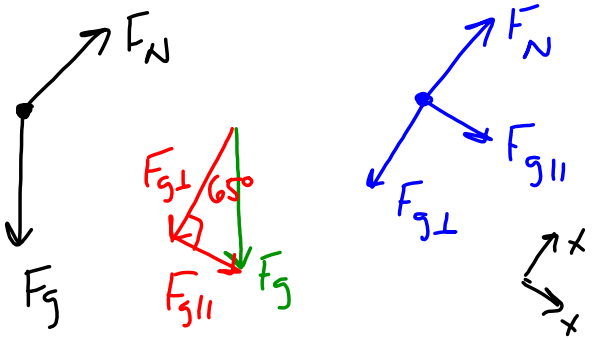
$$\text{spring constant } (k) \equiv \frac{F}{\Delta x}$$

$$\boxed{F = -k\Delta x}$$

negative because this is a "restoring force"

Worksheet 4

1)



b. $\sin 65° = \dfrac{F_{g\parallel}}{F_g}$

$F_{g\parallel} = F_g \sin 65° = m a_g \sin 65°$

$= (300\,kg)(9.8\,m/s^2)\sin 65°$

$= 2664\ N$

c. $\Sigma \bar{F}_{\parallel} = m\bar{a}_{\parallel}$

$F_{g\parallel} = m a_{\parallel}$

$a_{\parallel} = \dfrac{F_{g\parallel}}{m} = \dfrac{2664\,N}{300\,kg} = 8.88\,m/s^2$

d. $a_{\parallel} = 8.88\,m/s^2$

$\Delta x = 20\,m$

$v_i = 4\,m/s$

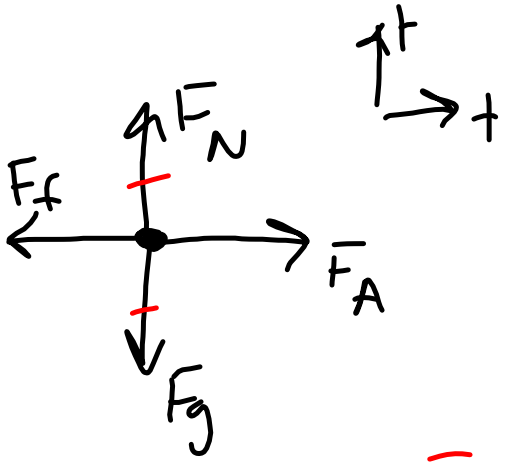
$v_f = ?$

$v_f^2 = v_i^2 + 2a_{\parallel}\Delta x$

$v_f = 19.27\,m/s$

Worksheet 5

3) a.



b. $\sum \bar{F}_x = M\bar{a}_x$

$\sum \bar{F}_y = \emptyset$

$F_N = F_g = 490\ N$

$F_A - F_f = M a_x$

0.15 ↓

$F_f = \mu F_N$

$= 73.5\ N$

$$a_x = \frac{F_A - F_f}{m}$$

$$= \frac{100\ N - 73.5\ N}{50\ kg}$$

$$= 0.53\ m/s^2$$