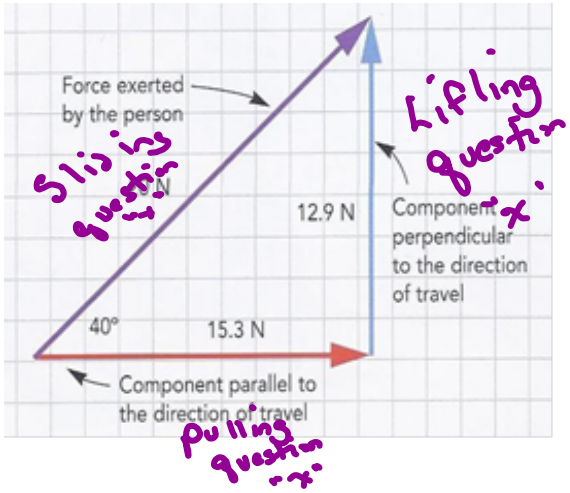
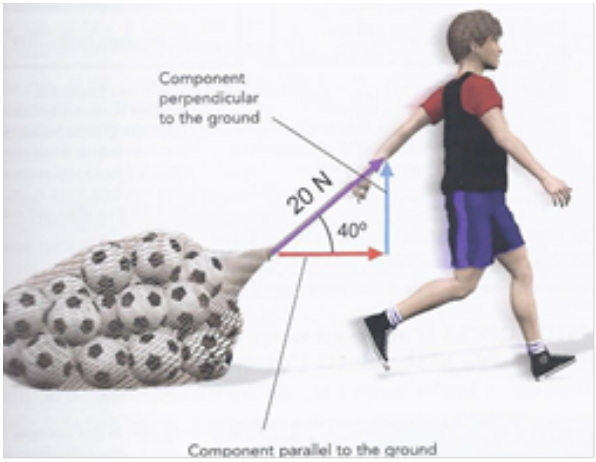
# Effective Force Notes

**def: *direction* in which the movement of an object or person is moving.**



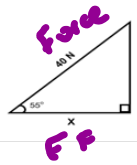
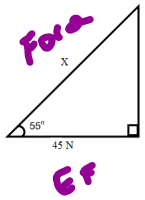
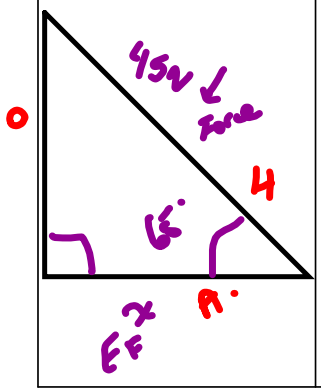
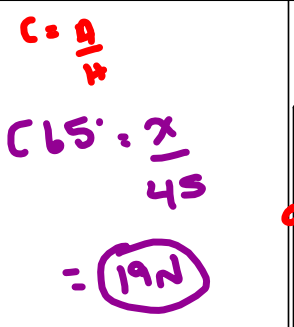
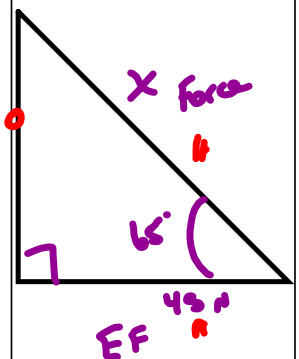
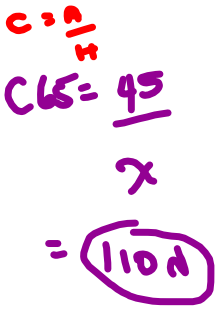




- Any time a weight is given in kg, it must be converted to N, therefore you x by 9.8 N/kg

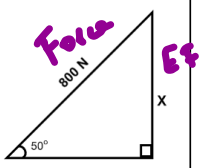
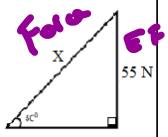
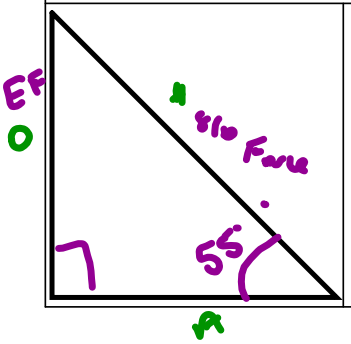
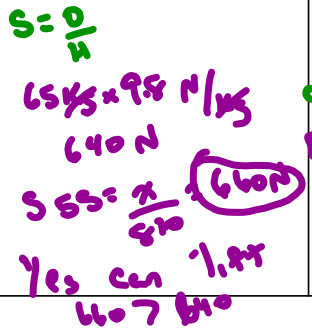
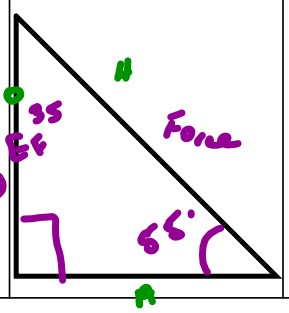
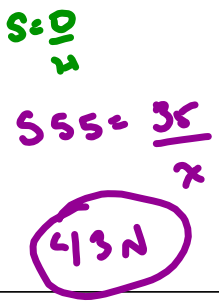
- There are 4 types of questions which can be asked, trigonometry is used to solve for the unknown. **Cos and Sin used, never Tan.**

- **Force** and **effective force are not** the same thing. Force is the effort being put or exerted by the person, effective force is the direction of the movement.

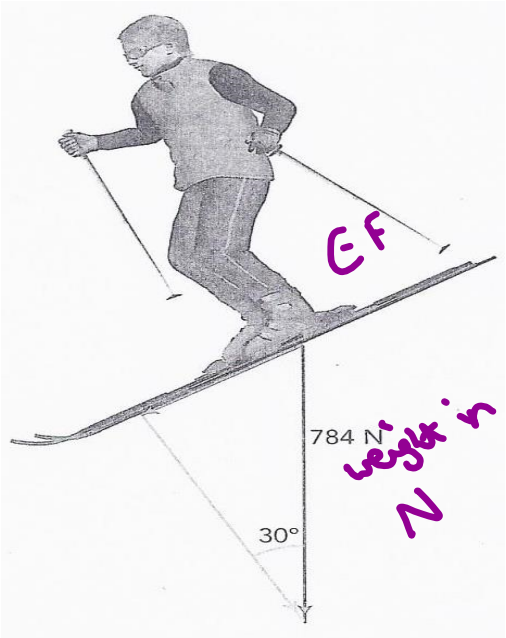
# Type 1- pulling questions

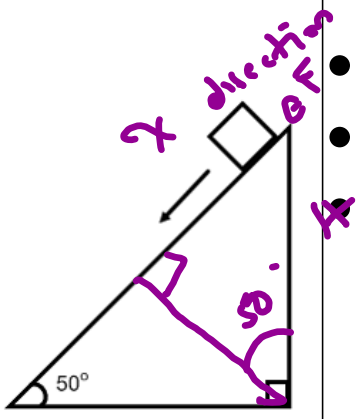
| Looking for effective force,force is given | | Looking for force, effective force is given | |
|---|---|---|---|
|  | • finding the horizontal line of travel<br>• cos always used |  | • Looking for hypotenuse - Force<br>• cos always used |
| What is the effective force when a man pulls a box with a force of 45 N at an 65° angle? | | What is the force used when the effective force of pulling a bag is 45 N with a 65 angle? | |
|  |  |  |  |

# Type 2 - Lifting an object

| Looking for effective force, force is given given | | Looking for force, effective force is given | |
|---|---|---|---|
|   | • finding perpendic-ular to line of travel.<br>• sin always used |   | • Looking for hypotenuse-Force<br>• sin always used |
| Could a man lift his son off the ground if he is using 810 N of force at a 55°angle and the boy weighs 65 kg? | | What is the force used by a man when he lifted a bag with an effective force of 35 N at a 55° angle? | |
|   |   |   |   |

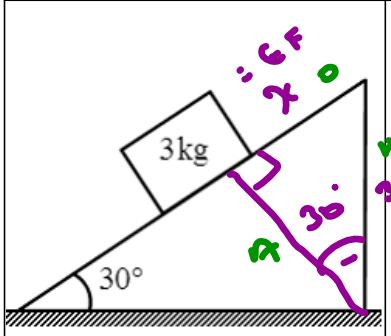
# Type 3- Sliding questions



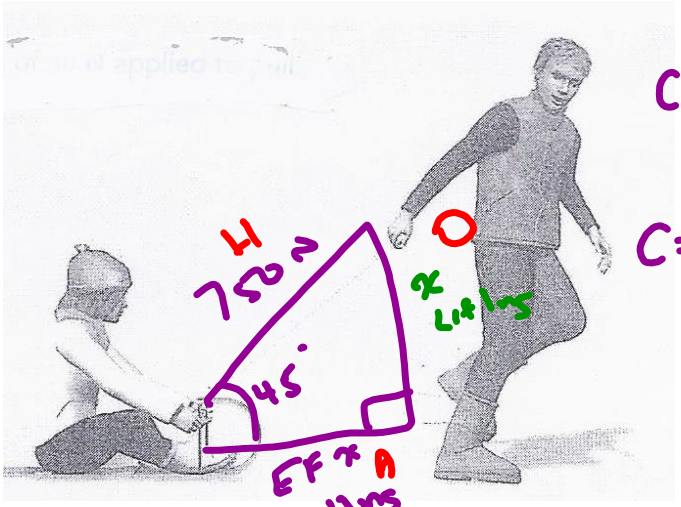

- Finding effective force
- **Use slide - split - sin**
- Weight of person put on **hypotenuse. (force of gravity perp. to the line of travel)**

What is the effective force of a box weighing 3 kg going down a ramp at a 30° angle?



# Combination question of pulling and lifting

A- What is the effective force when a man pulls his daughter on a sled with a force of 750 N at a 45° angle?




B- If the sled and his daughter weighed 33 kg, could they be lifted off the ground?

$33 \times 9.8 = 320\,N$

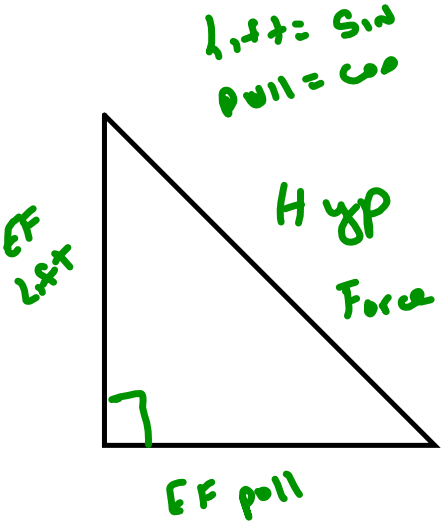
$S = \frac{O}{H}$ $\quad S45° = \frac{x}{750}$ : 530 N

Yes can lift

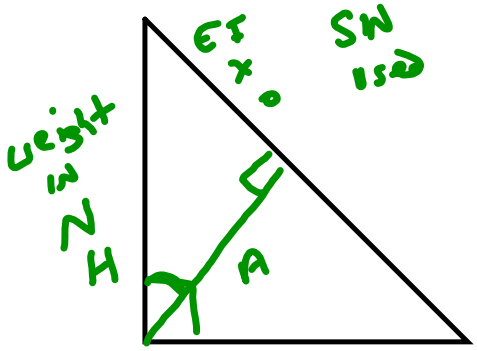
$530 > 320$

# Recap

## pulling and lifting




## Sliding



# Past exam question

1. Mr. Logan is pulling his son James on a sled at a constant velocity. Mr. Logan is exerting a force of 50.0 N at an angle of 40.0° to the horizontal as shown in Figure 3.


Calculate the effective force Mr. Logan is doing.

$\cos 40.0 = \frac{x}{50.0} \therefore 38.3\ \text{N}$