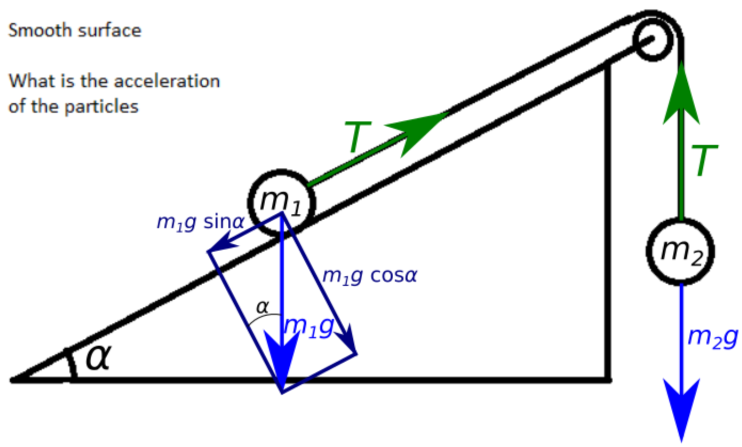

$\alpha = 30°, m_1 = 4 \text{ kg}, m_2 = 6 \text{ kg}, g = 9.8 \text{ m s}^{-2}$

Let a_1 be the acceleration of the first particle down the slope and let a_2 be the acceleration of the second particle downwards.

- $m_1 a_1 = m_1 g \sin(\alpha) - T$ (from Newton's second law)
- $m_2 a_2 = m_2 g - T$ (ditto)
- $a_1 = -a_2$ (They must move with the same speed since the cable can't get longer or shorter)

$$\therefore \frac{m_1 g \sin(\alpha) - T}{m_1} = -\frac{m_2 g - T}{m_2} \text{ (sub into last equation from first two)}$$

$$\Rightarrow g \sin(\alpha) - \frac{T}{m_1} = -g + \frac{T}{m_2}$$

$$\Rightarrow g(1 + \sin(\alpha)) = T(\frac{1}{m_1} + \frac{1}{m_2}) \text{ (group terms in } g \text{ and } T)$$

$$\Rightarrow T = \frac{g(1 + \sin(\alpha))}{\frac{1}{m_1} + \frac{1}{m_2}} \text{ (isolate } T)$$

$$\therefore a_2 = g - \frac{1}{m_2} \frac{g(1 + \sin(\alpha))}{\frac{1}{m_1} + \frac{1}{m_2}} \text{ (sub in for } T \text{ to our expression for } a_2)$$

$$\Rightarrow a_2 = g(1 - \frac{1+\sin(\alpha)}{\frac{m_2}{m_1}+1})$$ (Pull out g and multiply in m_2 under the line)

Now, we have:
$\alpha = 30° \Rightarrow \sin(\alpha) = 1/2$

And:
$m_1 = 4$ kg, $m_2 = 6$ kg $\Rightarrow \frac{m_2}{m_1} = 3/2$

$$\therefore a_2 = g(1 - \frac{1 + 1/2}{3/2 + 1}) = g(1 - \frac{3/\cancel{2}}{5/\cancel{2}}) = 2/5(g)$$

As a number this is:

$a_2 = 0.4 \times 9.8 \text{ m s}^{-2} = 3.92 \text{ m s}^{-2}$

Then a_1 is the same, just in a different direction. The overall movement is so that the more massive particle moves downwards.