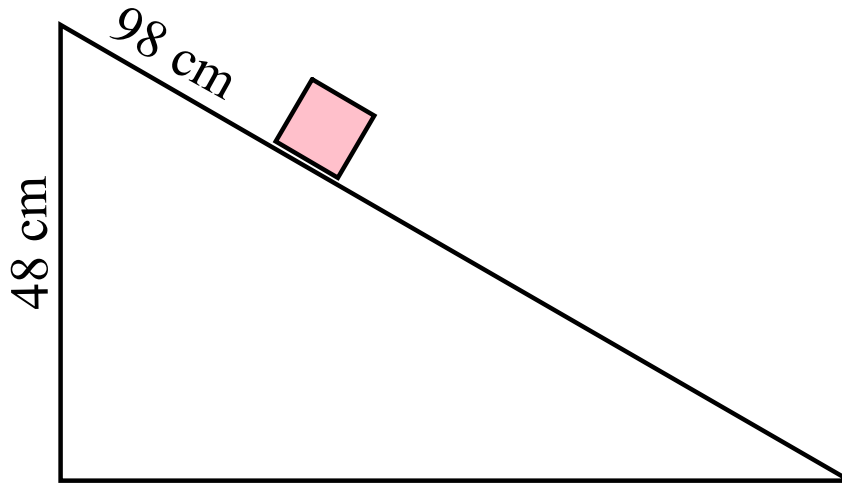


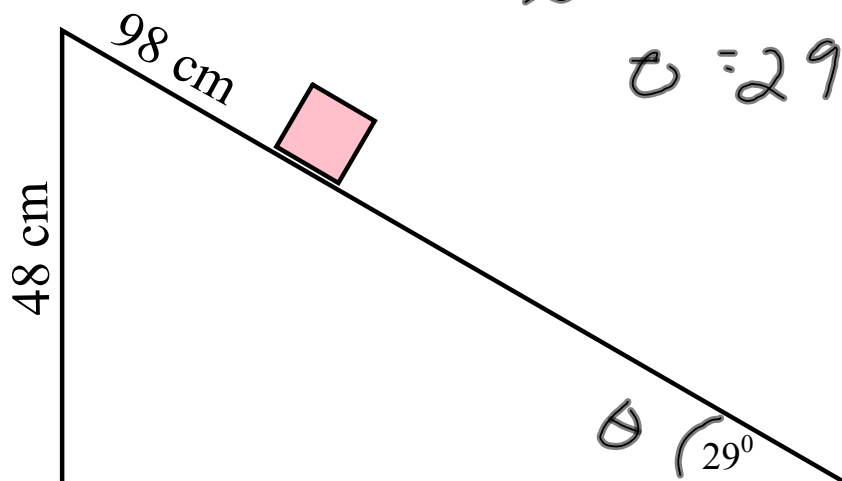
A box is on a frictionless ramp. What is the acceleration of the box down the ramp?



Nov 3-8:05 AM

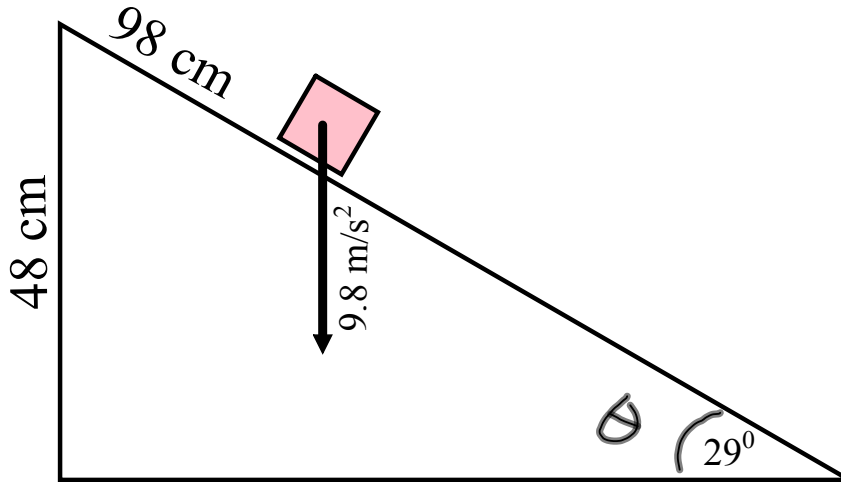
Because you know the height and length of the ramp you also know its angle!

$$\sin \tau = \frac{48 \text{ cm}}{98 \text{ cm}}$$
$$\tau = 29^\circ$$



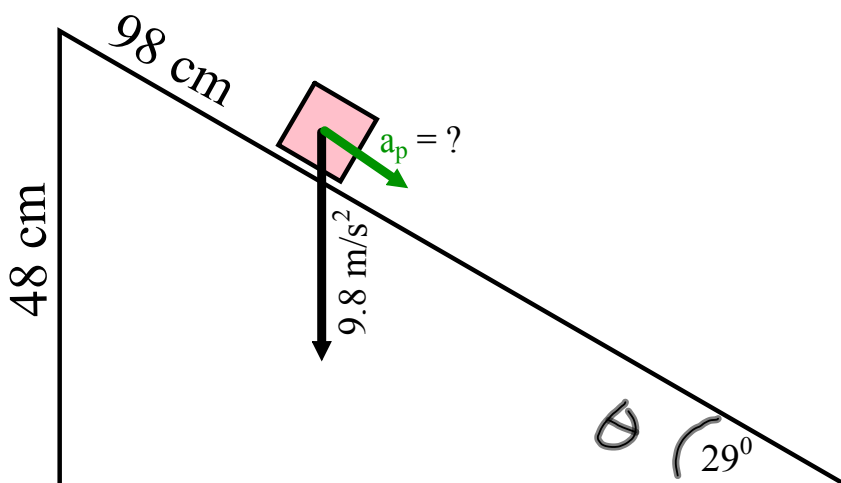
Nov 3-11:58 AM

You know acceleration due to gravity is 9.8 m/s^2 and acts straight down- we are showing it as an acceleration vector.



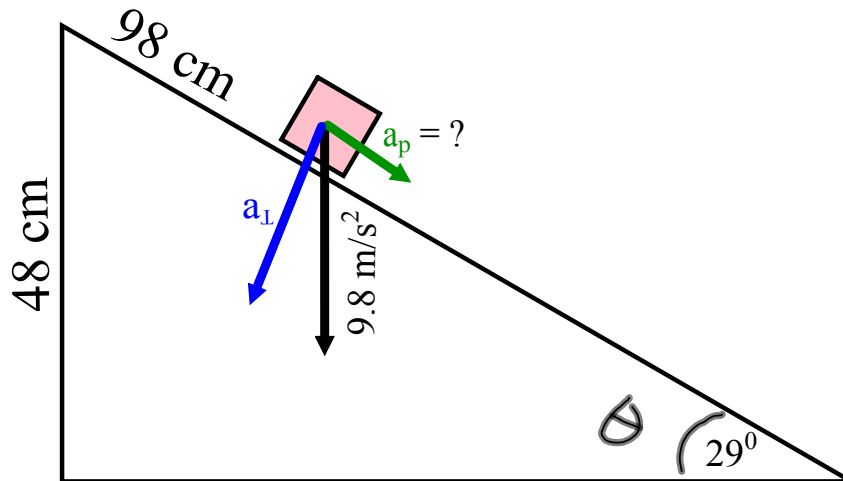
Nov 3-11:55 AM

Acceleration down the ramp is parallel to the surface of the ramp is represented by a_p



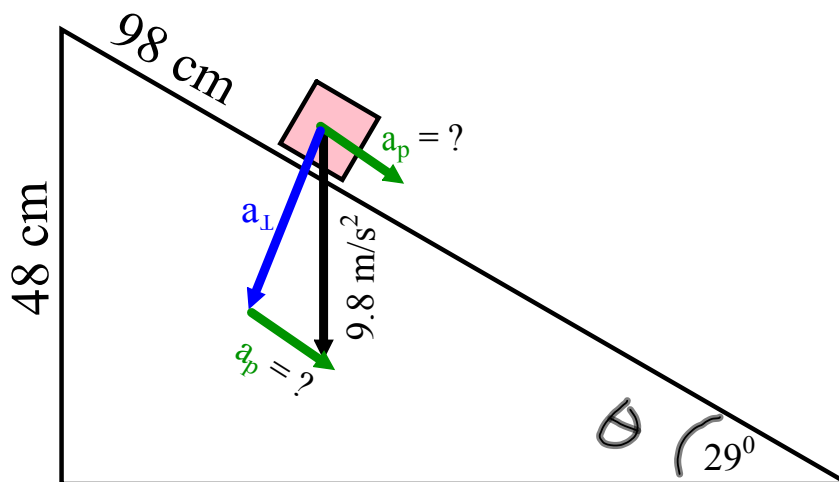
Nov 3-11:57 AM

You can add the perpendicular component (a_{\perp}) of the acceleration due to gravity and you now have two components of 9.8 m/s^2 that are at right angles- yea!



Nov 3-4:20 PM

Move a_p down to the head of a_{\perp} and you now have a vector diagram instead of a point diagram and similar triangles.



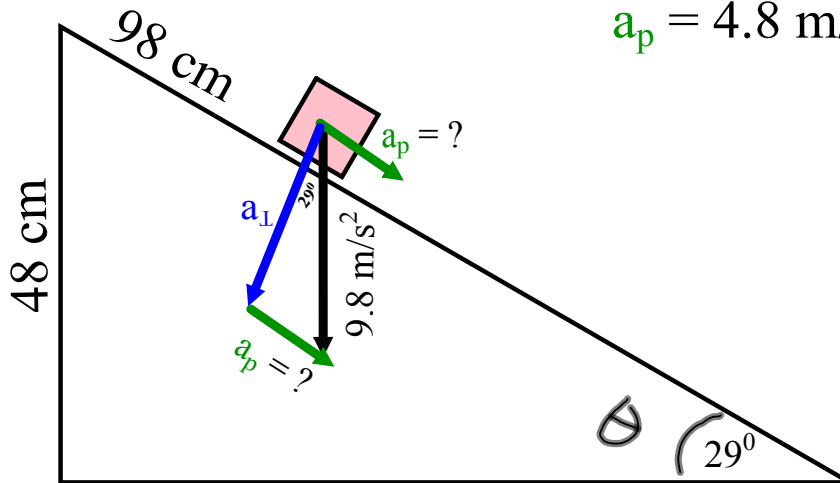
Nov 3-4:22 PM

You now know the angle between the components of gravity and can solve for a_p

$$\sin 29^\circ = a_p / 9.8 \text{ m/s}^2$$

$$a_p = \sin 29^\circ (9.8 \text{ m/s}^2)$$

$$a_p = 4.8 \text{ m/s}^2$$



Nov 3-4:23 PM

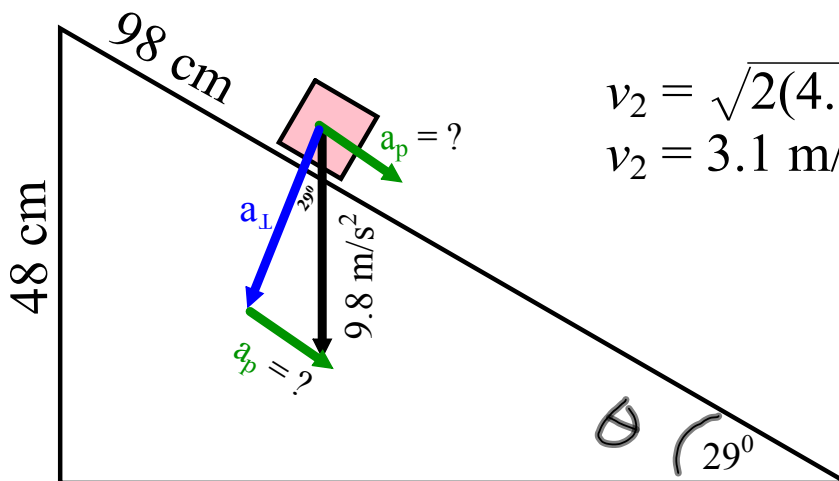
What velocity does the box hit the bottom of the ramp at if it starts at the top? ...remember, the ramp is frictionless!

$$v_1 = 0$$

$$d = 98 \text{ cm}$$

$$v_2 = \sqrt{2(4.8 \text{ m/s}^2)(.98\text{m})}$$

$$v_2 = 3.1 \text{ m/s}$$



Nov 3-4:27 PM