1

During the medieval ages, when defending a castle, rocks were thrown from the top of the castle at invaders.

Fig. 1.1 shows the path of a rock thrown horizontally from a height of 30 m, at a target, positioned on the edge of a 10 m high ridge, 50 m away.

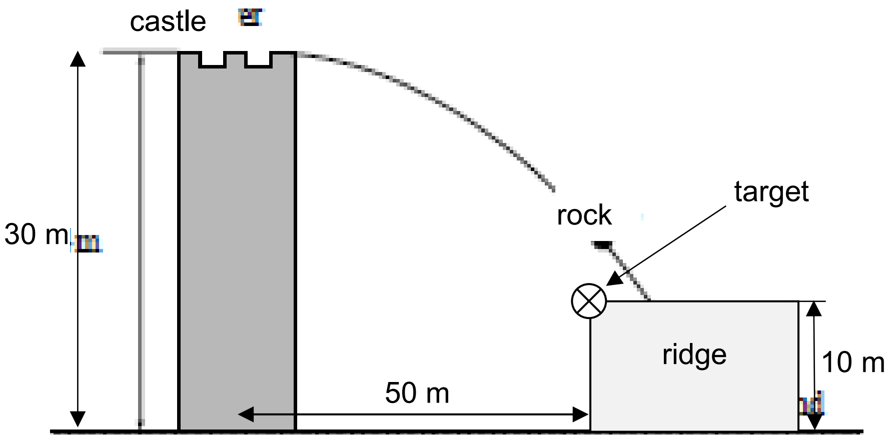

Fig. 1.1

(a)

Calculate the time *t* taken from when the rock is thrown to when it hits the target. Assume air resistance is negligible.

t = ………………… s

[2]

(b)

The target is an invading soldier.

Suggest and explain if the rock is likely to have a direct hit on the soldier.

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[2]

(c)

Determine the magnitude and direction of the velocity of the rock when it just hits the target.

magnitude = ………………… m s^{-1}

direction = ……………………………………………..

[4]