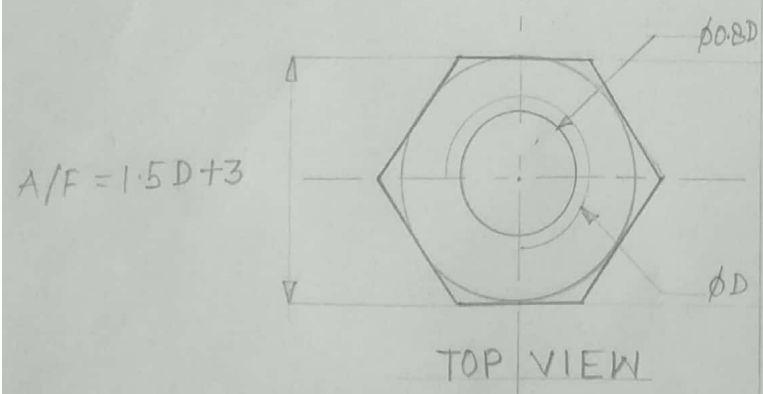
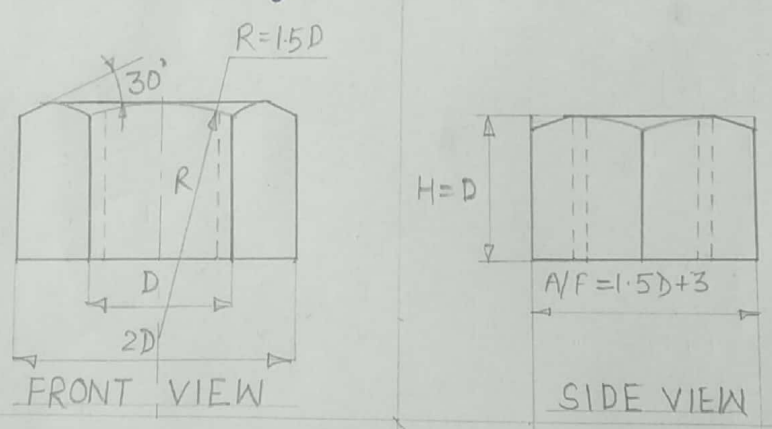


# Nuts and Bolts

Nuts: Nut is a device having internal thread and is used in combination with a bolt or stud having external thread.

Pair of nut - bolts is used for fastening temporarily together.

1. Hexagonal Nut: It is like a hexagonal prism having a central threaded hole. The width across flats actually indicates the size of the spanner used to tighten it.  
 $D = \text{Dia of clear hole or nominal dia. of the Bolt.}$

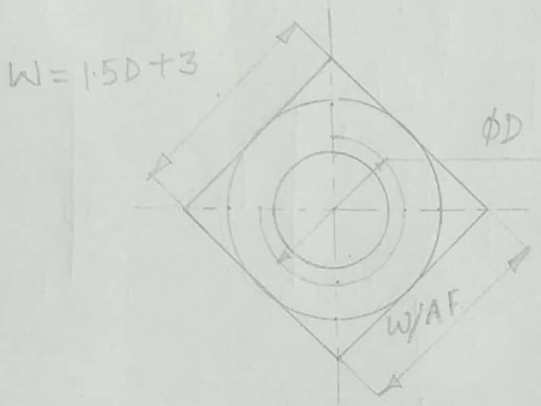


Let  $D = 20 \text{ mm}$   
 $2D = 20 \times 2 = 40$   
 $A/F = 1.5D + 3 = 1.5 \times 20 + 3 = 33$

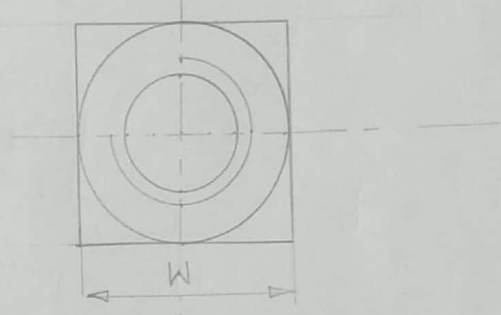
*shweta*

NOTE - All Dim. in are in mm (Shweta Negi)

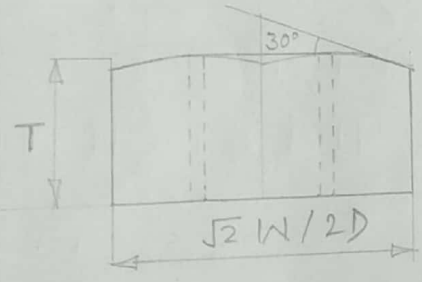
2. Square Nut: Square nuts are used when frequent tightening and loosening of nuts are expected. It consists of a square prism having a central threaded hole and chamfering at the top.



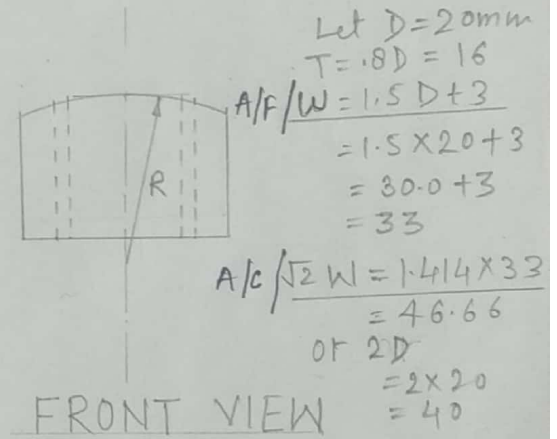
TOP VIEW



TOP VIEW



FRONT VIEW



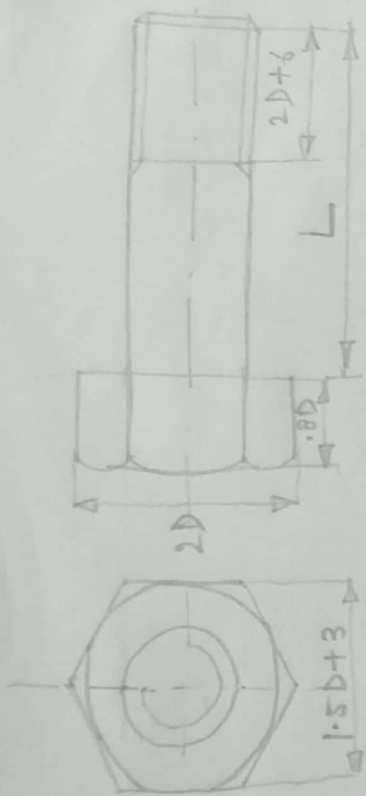
FRONT VIEW

( $T = 0.8D$  to  $D$  and  $R = 2D$ )

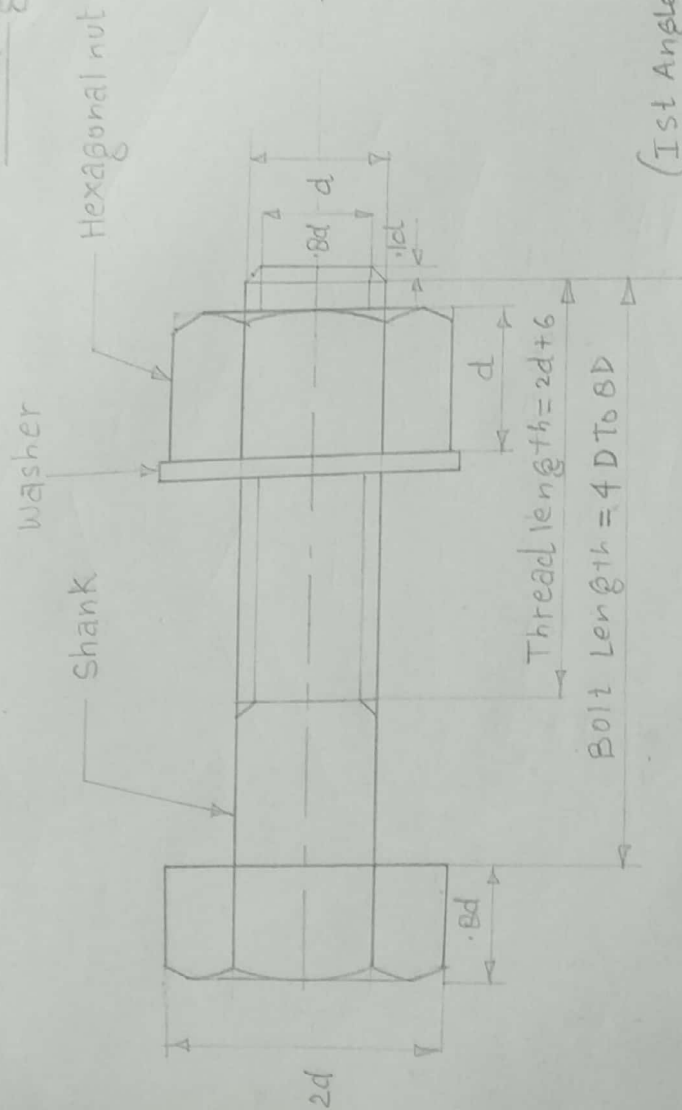
3. Washer: A washer is a cylindrical piece of metal placed below the nut to provide smooth greater area of pressure bearing surface for the nut of turn on. It spreads the pressure of the nut.

Note - All dimensions are in mm.

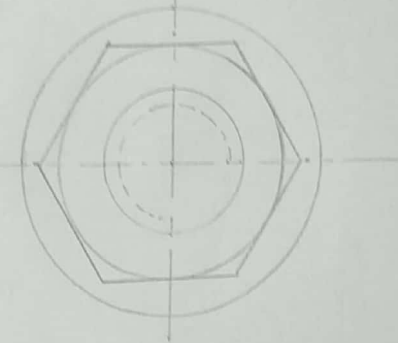
Shubert  
(Shubert Nezi)



Hexagonal Bolt



Plain Washer



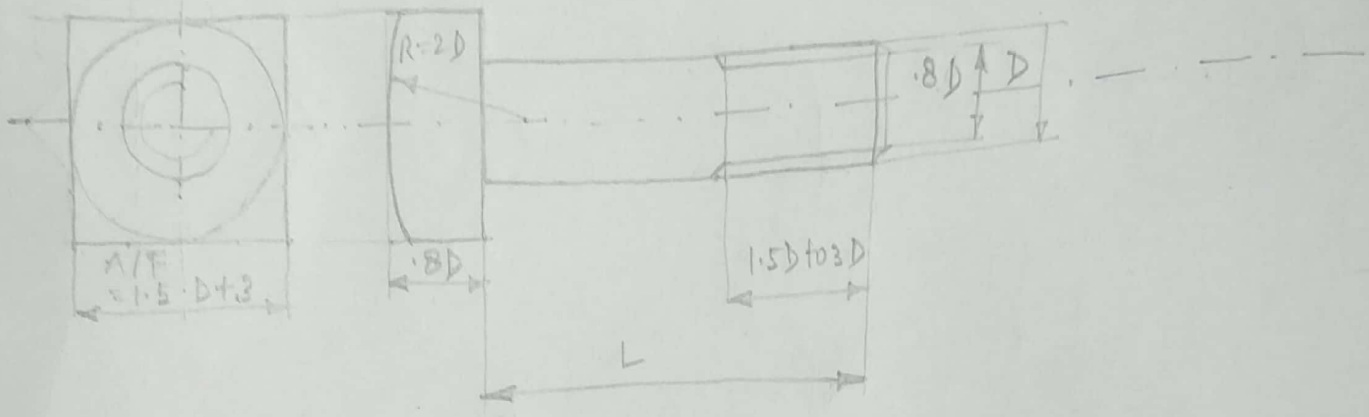
D = Nominal Dia. of Bolt

(1st Angle Projection)

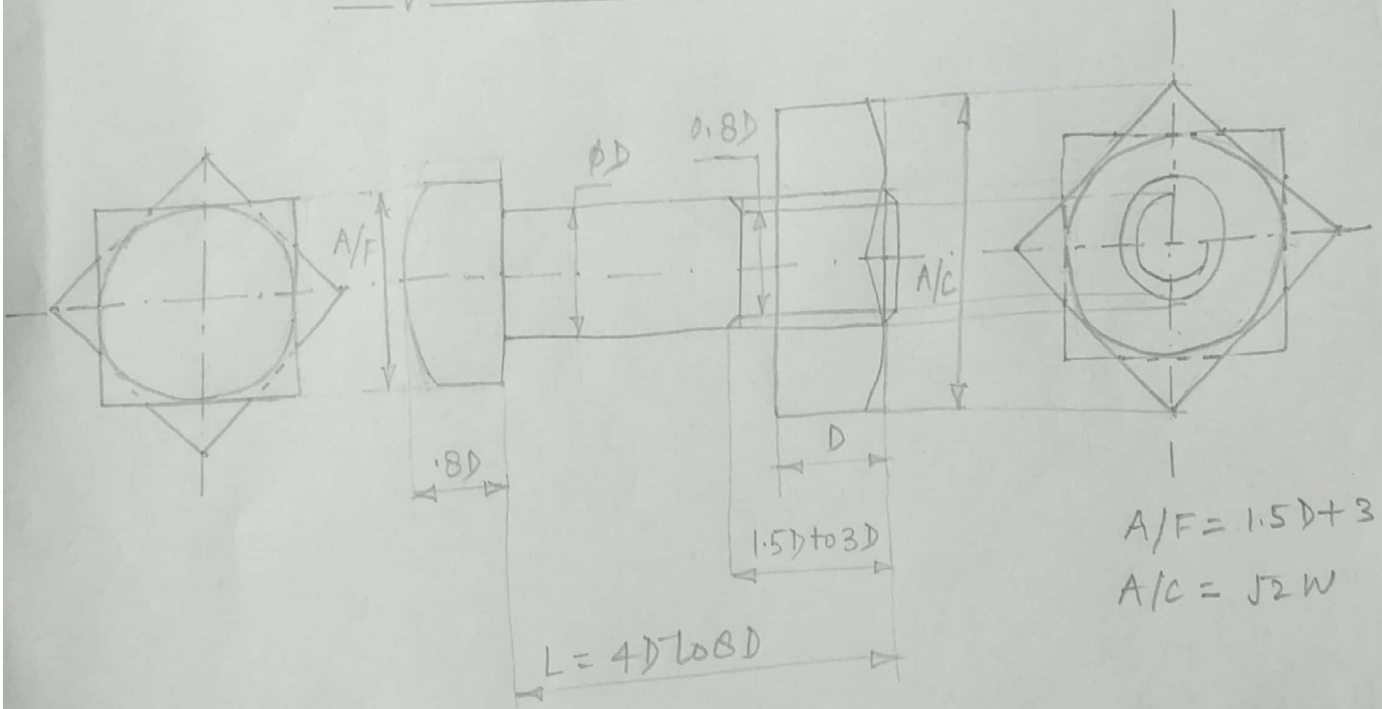
Hexagonal headed bolt with Hexagonal nut and Washer

Note: All dim. are in mm.

Shuvet  
(Shuvet Negi)



Square Headed Bolt



LEFT SIDE VIEW

RIGHT SIDE VIEW

$A/F = 1.5D + 3$   
 $A/C = \sqrt{2}W$

Assembly of square Headed Bolt and Square nut

*Shubho*  
 (Shubho Negi)