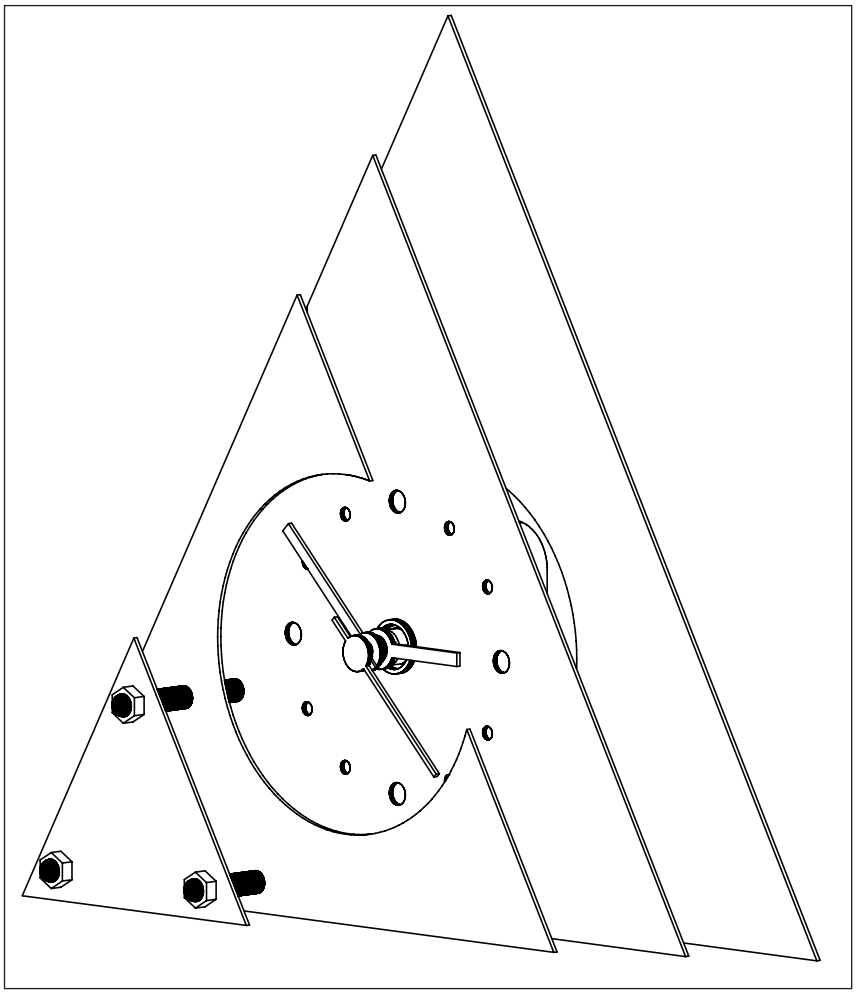
OPITEC

Hobbyfix

107.414

Premium Modern Design Clock



Please Note

The OPITEC range of projects is not primarily intended as toys for young children. It is for teaching, designing and making to ensure that pupils experience a range of tools and processes.

1. Product information

Article: Functional modern clock

Suitable for age 10 years and above;

2. Material:

2.1 Material: Aluminium (Non ferrous metal)
Non magnetic,soft

Working: Cutting; sawing; filing; drilling;

Joining: Screw fixing;

Finish: Polish

2.2 Material: Brass (Made from copper and zinc)
Hard & brittle

Working: Ready finished part

Joining: Screws

Finish: Polish

2.3 Material: Acrylic thermoplastic sheet
PMMA (Polymethymethacrylat) transparent

Working: See pine wood

Joining: Screws

Finish: No special finish needed

2.4 Material: Plywood, multi layered

Working: Plywood must be sawn,filed,drilled and sanded;

Joining: Screws;

Finish: Wax (liquid or hard)

3. Tools

Cutting: Metal cutting shears;

Files: Choose file according to grade .For all small notches use a Needle file

Note! Files only cut on the forward stroke

Sawing: Fretsaw for corners or use a hacksaw

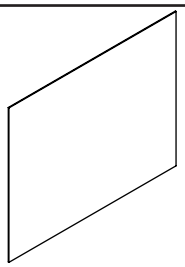
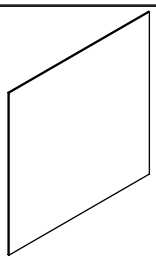
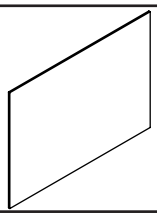
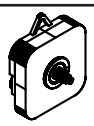
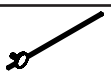
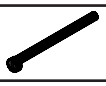
Note ! for cutting plastic use metalworking saw with a fine blade

Use a sawing board and use slow steady strokes

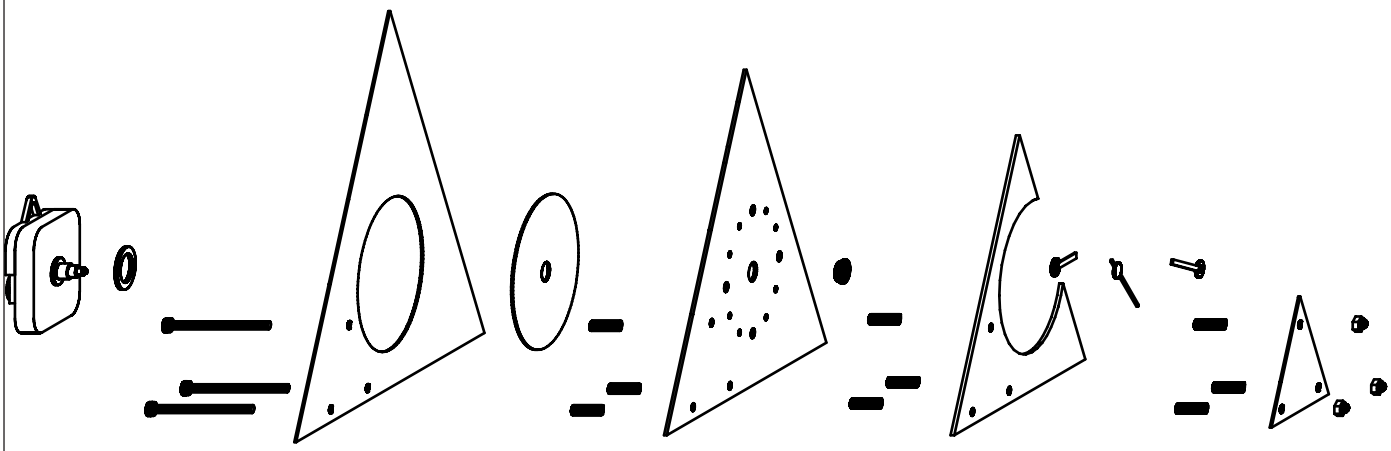
Drilling: Use a pillar drill

Note ! The safety rules when drilling (Tie all long hair back, remove rings and necklaces , where an apron, and safety glasses.
Hold the work in a machine vice.

4 Parts list:

Part	Quantity	Description	Material	Siz in mm
1	1	**Housing**	Aluminium	1,0 x 200 x 250
				
2	1	**Housing**	Plywood	1,5 x 210 x 210
				
3	1	**Housing**	Acrylic	2,0 x 150 x 210
				
4	1	**Quartz movement**	Plastic	15 x 55 x 55
				
5	1	**Spacer**	Plastic	
				
6	1	**Central nut**	Brass	
				
7	1	**Minute hand**	Painted aluminium	35
				
8	1	**Hour hand**	Painted aluminium	25
				
9	1	**Second hand**	Painted aluminium	70
				
10	3	**Machine screws**	Metal	M4 x 60
				
11	3	**Domed nuts**	Metal	M4
				
12	9	**Brass tubes**	Brass	ø5 x 0,5 x 15
				

5. Exploded drawing



6. Instructions

6.1 Cutting out the parts

6.2 Working the parts

6.3 Painting and polishing

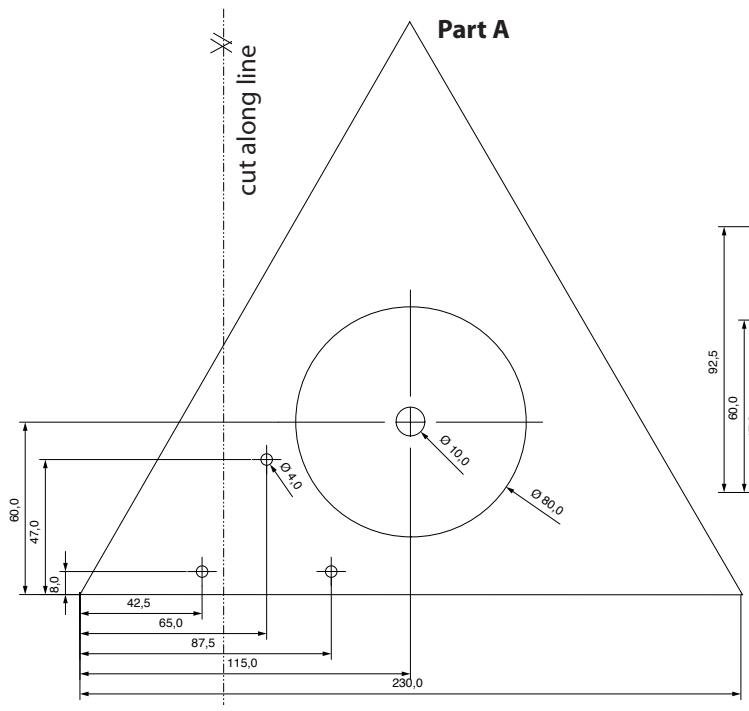
6.4 Final assembly

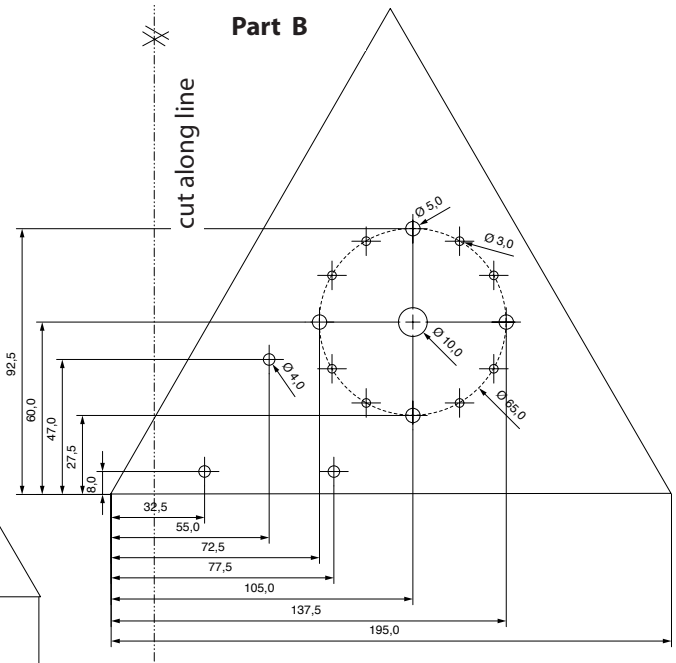
6.1 Cutting out the parts

General:
The clock housing is made up of 4 triangles

The patterns supplied are only a suggestion and can be altered to your own design
Taking into consideration the materials supplied.

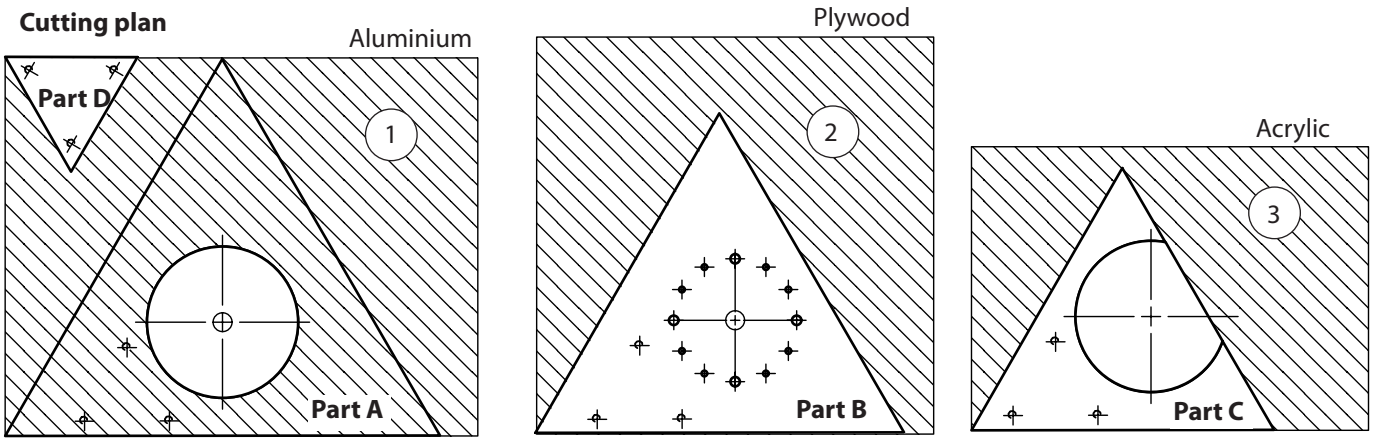
6.1.1 Glue the patterns together on the joining lines





6.1.2 Use a pencil to trace the patterns for the triangles on to the metal and plywood sheets

Note! Do not use a scriber on the metal



6.2 Making the parts for the clock housing

6.2.1 Par A+D (Aluminium)

Start by making sure that the plans for the triangular housing part A are traced on the aluminium sheet. Use a centre punch to mark the holes

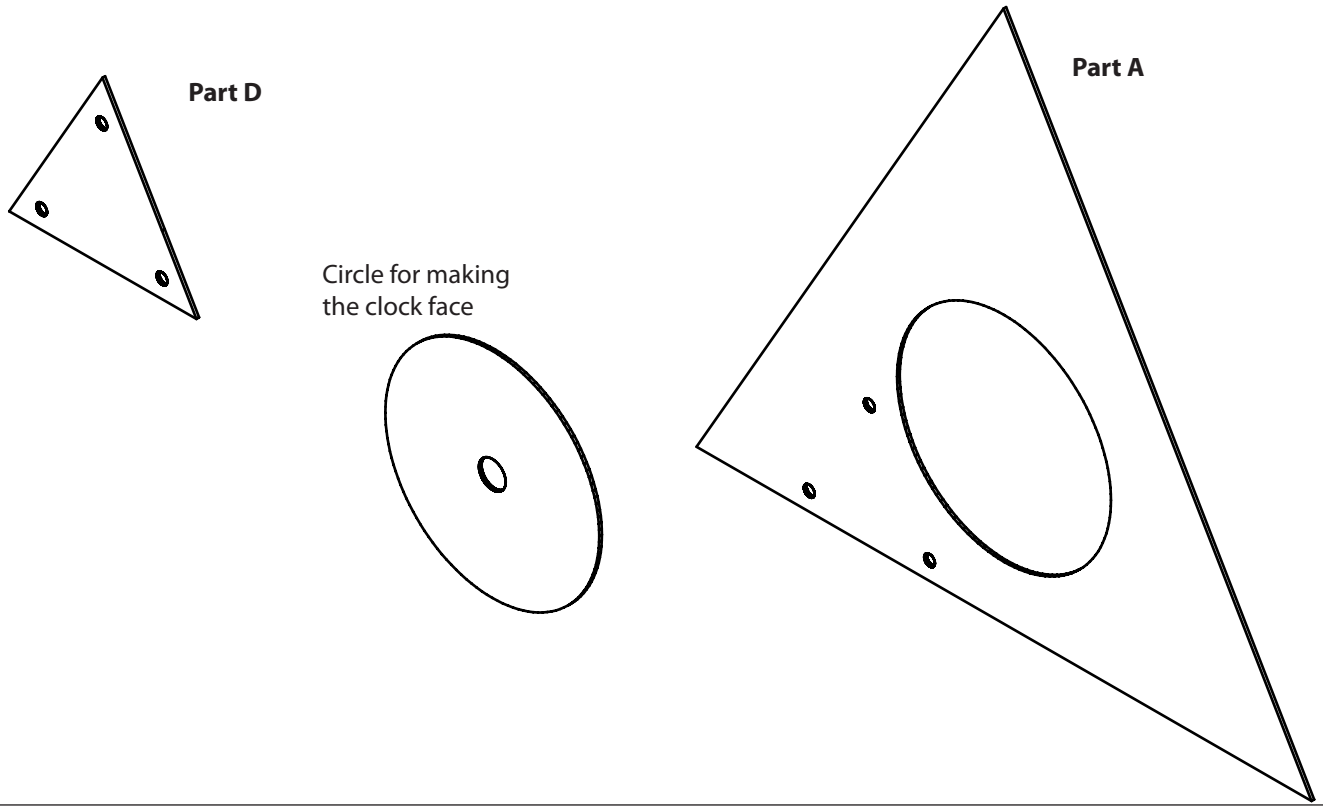
Drill the 4mm and 10mm holes and then remove any burr

Note! Lay a scrap piece of wood under the aluminium sheet so the surface is supported.
Clamp the work to the wood when drilling , wear gloves for safety
Saw the circle carefully out with a fretsaw using a fine blade for metal
This circle can be used a practice for sawing out the second circle in part C at a later stage .

Note ! The cut out circle will be used a the clock face. The technique is to drill a 2mm dia. hole on the edge of the circle. Insert the fine blade through the hole, then clamp it back in the saw frame. Saw carefully around the line

6.2.2 Cut out the shape of the triangle with a pair of metal shears or a metal guillotine

Hinweis: Mit einer Blechschere verbiegen sich die Kanten und das Blech muss nachgerichtet werden!
Beim Aussägen müssen die Sägeschnitte nachgearbeitet werden!



6.2.3 **Part B (modeling Plywood)**

General :

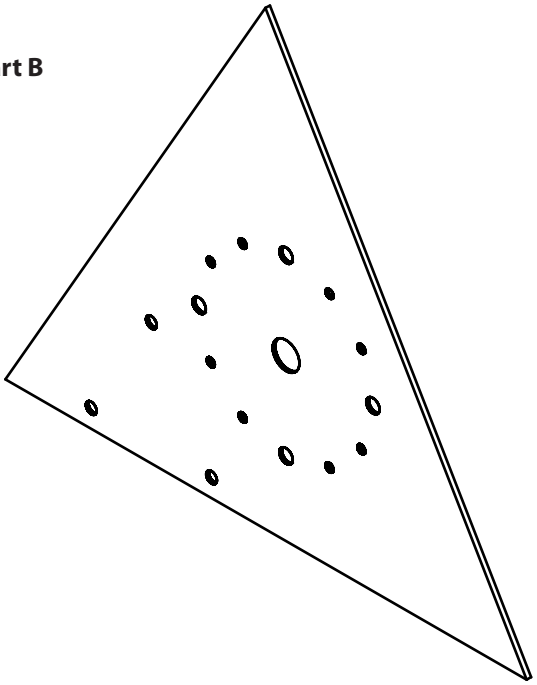
The make up of part B (Clock face) is only a suggestion and can be made to your own design if you so wish.

To drill the holes mark out them out with a pencil

Drill the 3mm,4mm,5mm and 10mm diameter holes and then use a countersink bit to lean them up .

Note! When drilling lay a piece of scrap wood under the plywood so that the holes do not split on the back

Part B



6.2.4 Saw out the triangle and sand the edges

6.2,5 (Acrylic)

Make sure the triangle pattern and holes are traced on to the acrylic.

Note! do not remove the protective paper layer until later !

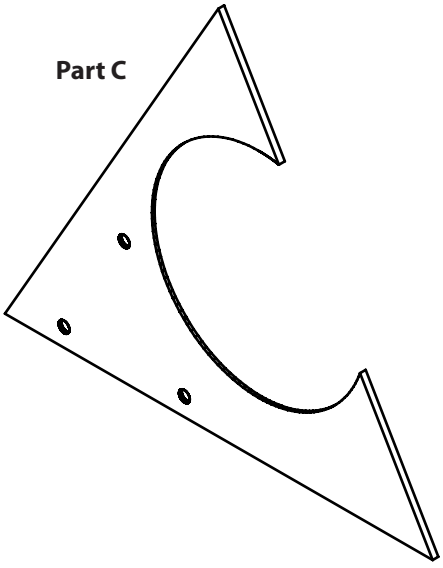
Drill the 4mm holes and lightly the countersink the holes

Note!: Place a scrap piece of wood under the acylic as support when drilling

Saw out the circle shape and the triangle. Clean up and polish the sawn up edges with wet & dry paper

Note!: Try to be as exact as possible when sawing

Part C



6.3 Colour : finishing or polishing the housing parts

General::

We recommend finishing the parts (not the acylic) with a transparent varnish.
A colour finish is also possible . For this we recommend using glass paints , these a transparent and let the structure of the basic material show through . If you use an opaque paint you will not see the see the basic material any more

6.31 Housing parts A/D and brass tubes (12/ file ends smooth)can be polished with steel wool or fine emery cloth

Note: Do not polish in a circular motion,use a backwards and forwards movement.

A larger area can be polished with emery cloth etc.

Coat the polished surface with varnish so that it doesn't oxidize

6.3.2 Housing part (B) use fine sandpaper and coat with varnish

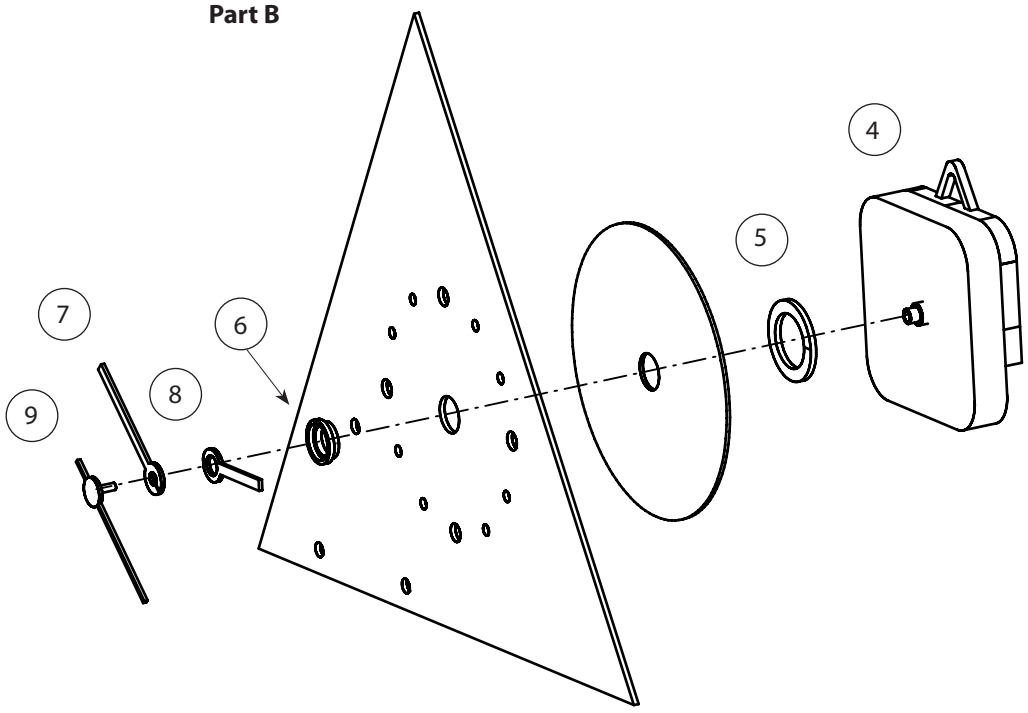
6.3.3 The circle cut out from step 2 is painted black on one side this lends a better effect
To the holes drilled in part B . Black also matches the clock hands. Of course you can choose other colour combinations

6.4 Assembling the clock

6.4.1 Quartz movement
Firstly add the plastic ring (5) and then the coloured circle clock face on to the quartz movement (4)

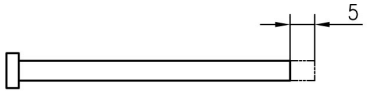
Then insert then insert it through the 10mm hole in part B (triangle) then add the central fixing nut (6)

Finally add the hands , hour hand (8) minute hand (7) and finally the shortened second hand (ca 35mm) (9) on the shaft of the clock movement

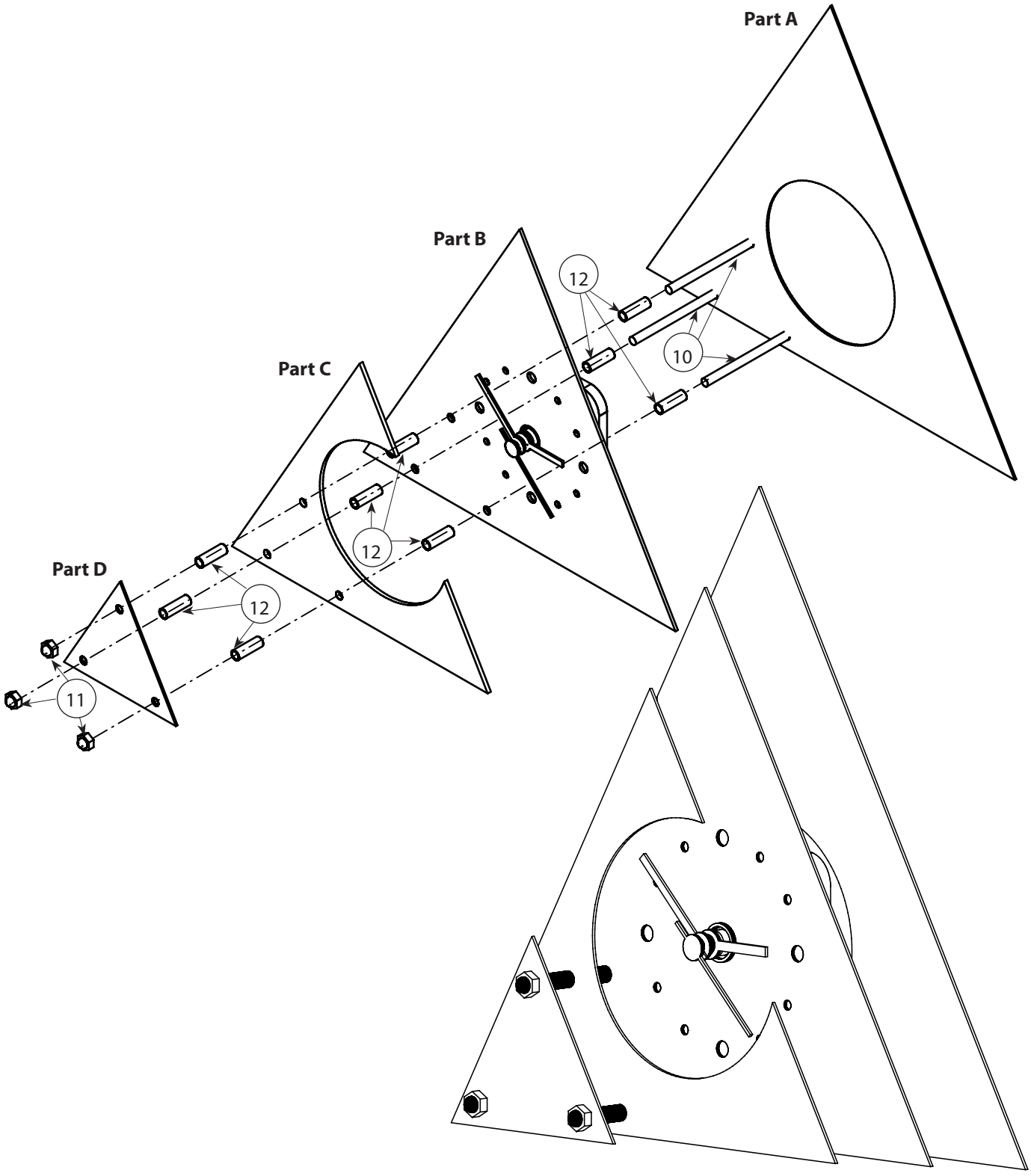


6.4.2 Shorten the thread lengths of the machine screws (10) by about 5mm, File the sawn end of the thread smooth.

Note! A good tip is to wind a nut on the thread of the M4 machine screw before sawing the end. This will act as a thread cutter and make it easier to take the nut on and off afterwards.



6.4.3 Start by inserting the M4 machine screws from behind , through the 4mm holes in part A. Then add the metal tubes (12) .Then add part B and once more a metal tube on each thread . The next piece is part C and metal tubes until finally part D is added and fixed with domed nuts.(11) . The last stage is to carefully tighten all the pieces together making sure that they are all in line



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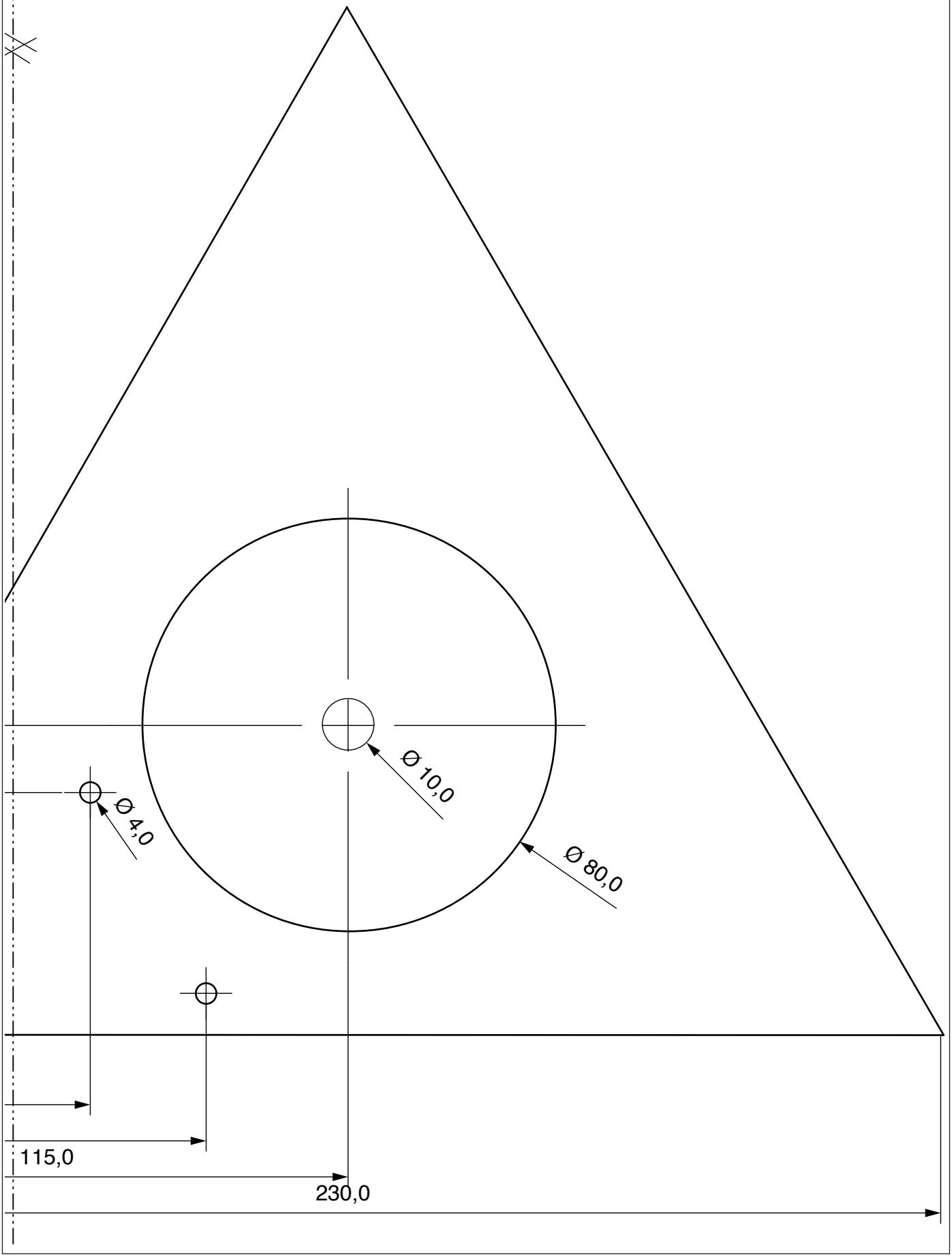
Pattern

M 1:1

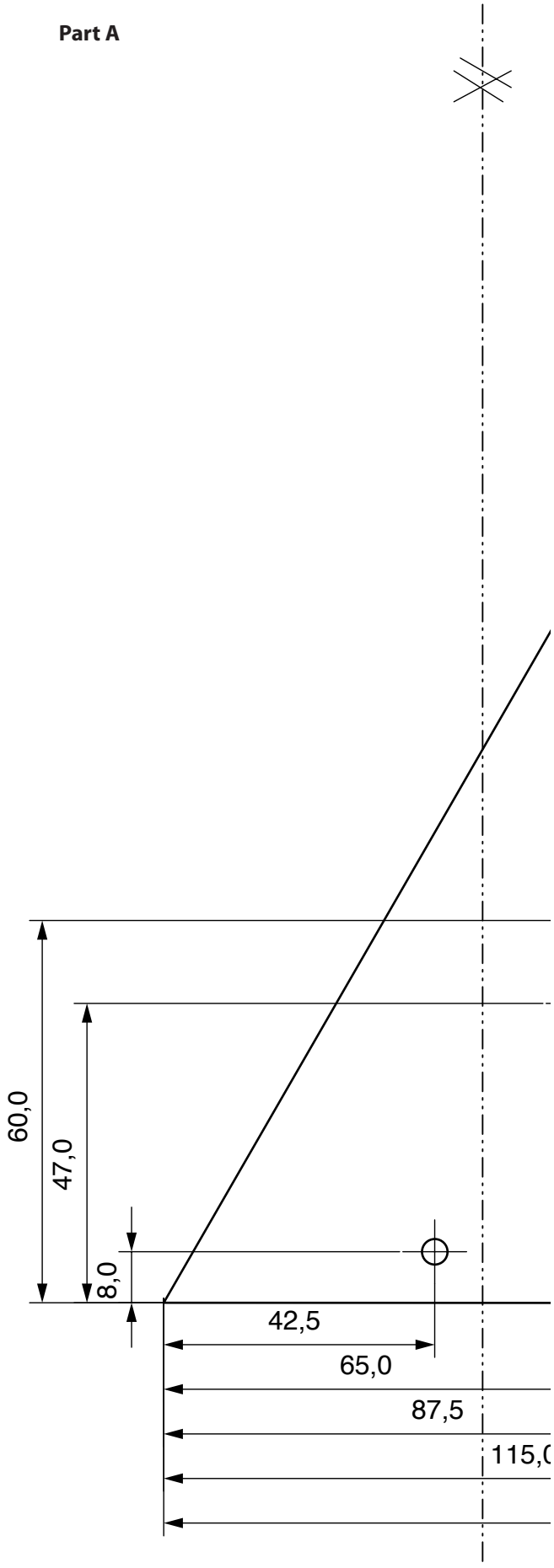
Part A



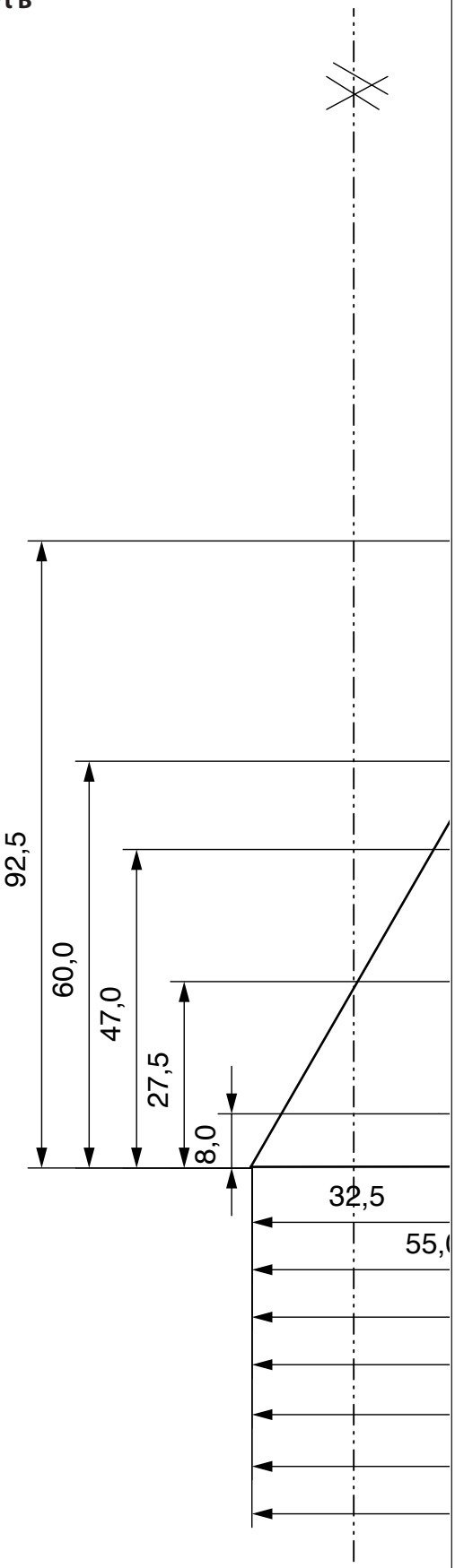
Pattern

M 1:1

Part A



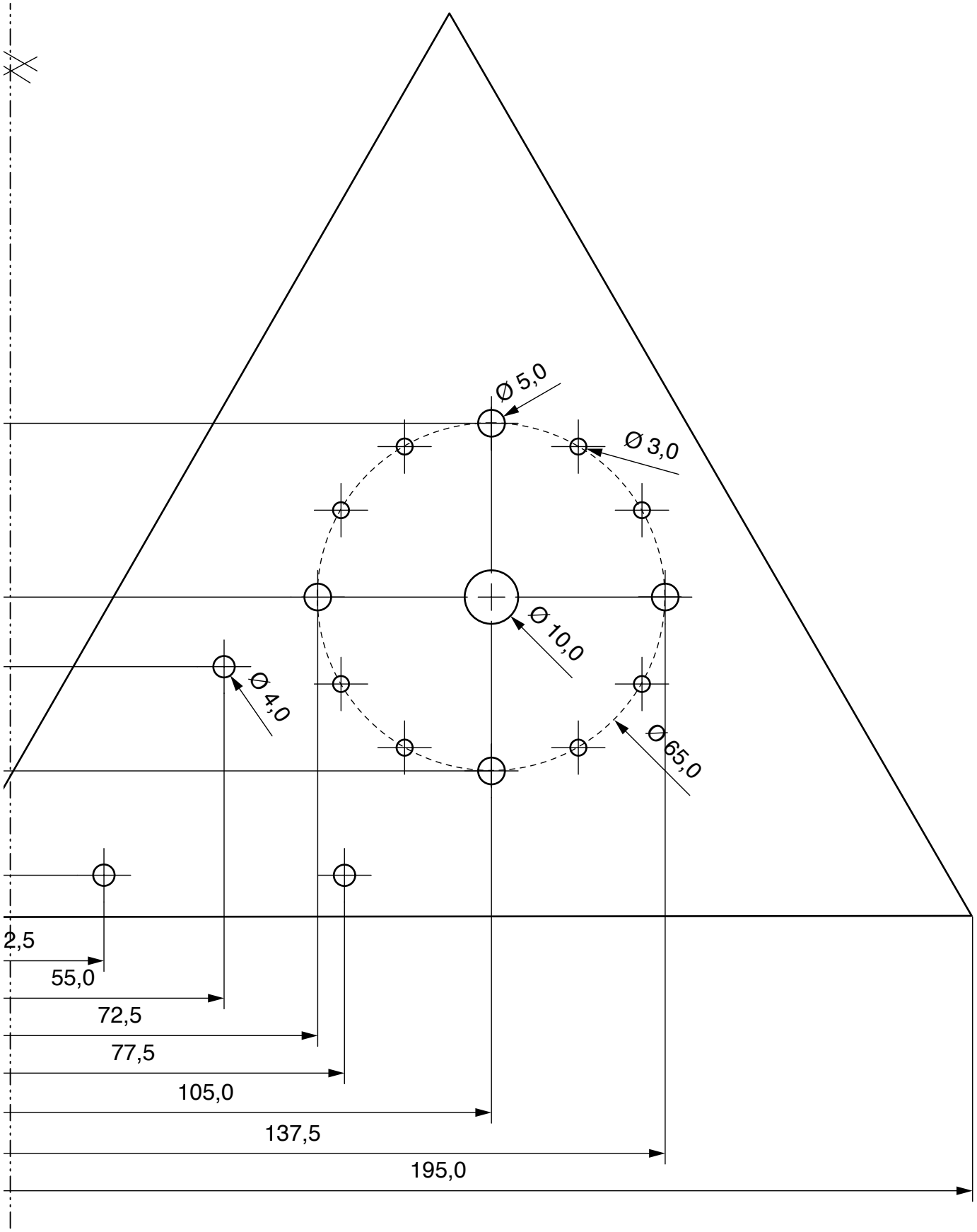
Part B



Pattern

M 1:1

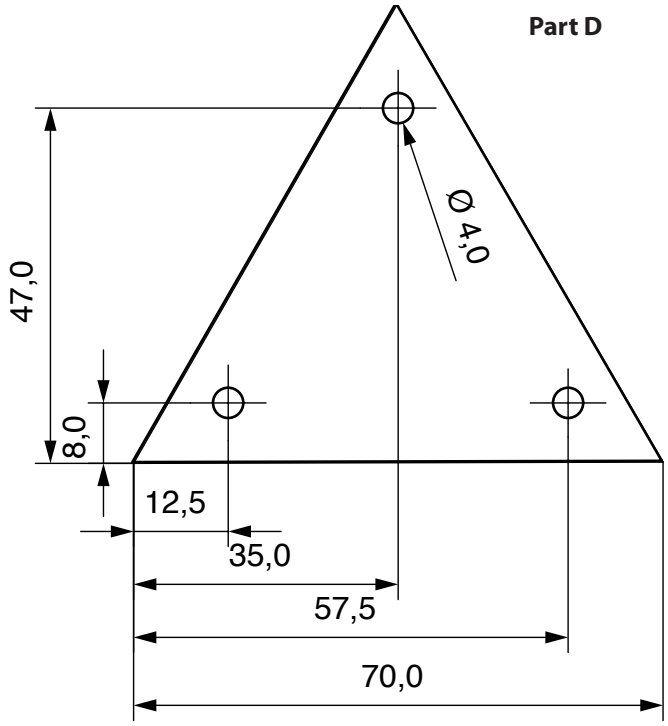
Part B



Pattern

M 1:1

Part D



Part C