Exercise no 5

New commands: MOVE, ERASE, TRIM, BREAK, OFFSET, ARRAY, MIRROR, COPY, BOUNDARY, AREA

Object modification sequence:

- Choose a command and subsequently designate objects to be modified;

- Designate objects to be modified and subsequently choose a command;

- Designate objects to be modified and enter the quick modification sequence using object grips.

Object selection methods – chosen methods

- PICK object clicked upon with left mouse button.

- BOX all objects inside or crossing a rectangle specified by two opposite vertices (single click with left mouse button). If the vertices are specified from right to left, it selects objects within and crossing the rectangle. Otherwise, it selects all objects completely contained within the rectangle.

- POLYGON works similarly to BOX with the difference that while holding down the left mouse button a polygon is drawn instead of a rectangle.

- FENCE all objects crossing a selection fence.

Other methods of selecting objects are described in the Autocad help for the SELECT command.

5.1. Block

Open the file named *elements.dwg.* Using MOVE command move block components to obtain the assembled drawing. Using ERASE command remove the pieces no longer needed. Apply the TRIM and BREAK commands to remove parts of the pulley covered by support, using the support edges as cutting lines. Apply the ARC command (START, CENTER, END) to redraw the hidden part of pulley using dashed line.
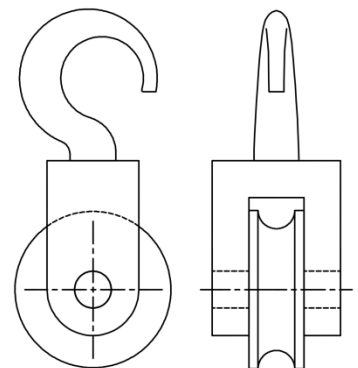
5.2. Olympic symbols

1. Draw CIRCLE with radius 100

2. Using OFFSET command with distance 15 draw circle inside.

3. Using ARRAY (ARRAYRECT) command with option NON ASSOCIATIVE copy circles: 3 in -columns and 2 in rows at intervals of 220 (between columns) and 100 (between rows). The lower circles move to the right by 110 and delate the last ones.

4. Using TRIM command delete unnecessary edges.

5. Using HATCH command with SOLID pattern color the rings.
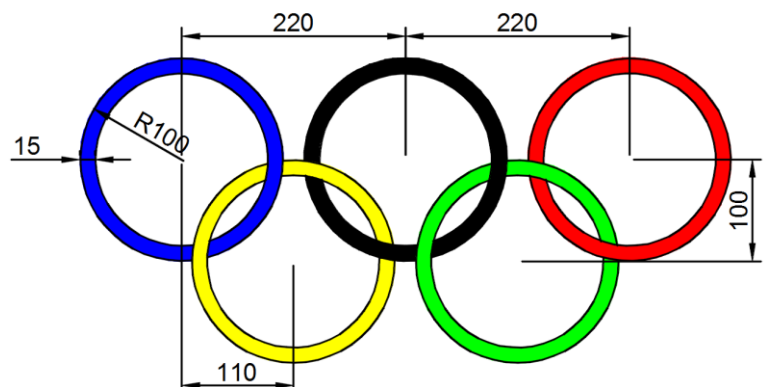
5.3. Card colors

Draw a circle with a radius of 100 units. Copy this circle 4 times in POLAR ARRAY (ARRAYPOLAR) with CENTER POINT OF ARRAY defined 300 units to the right from the center of the drawn circle. Angle between items set as 60 degrees and set NON ASSOCIATIVE array. Inside each circle draw a proper card suit.

- Diamond – using Quadrants points draw 4 arcs with radius 250 units

- Heart – draw horizontal and vertical diameters. In the upper left quadrant draw circle with option TAN, TAN, TAN. Draw the line from the bottom end of vertical diameter to point tangent to left part of small circle. Trim and delete unnecessary lines. Figure MIRROR along the vertical axis of symmetry

- Spade – copy Heart and ROTATE figure 180 degree (or MIRROR along horizontal diameter). Draw a line starting at crossed arcs at angle 15 degree from vertical diameter. Trim and delete unnecessary lines.

- Club – draw horizontal and vertical diameters and next rotate them 45 degrees around circle center. In the upper and left quadrants draw circles with option TAN, TAN, TAN. Draw a line from the center of big circle at angle 15 degree from vertical diameter. Using FILLET command with radius 5 unit round the connection between drawn line and the diagonal one. Mirror some part of the figure along the vertical axis of symmetry. Trim and delete unnecessary lines.

Using HATCH command with SOLID pattern color the symbols.
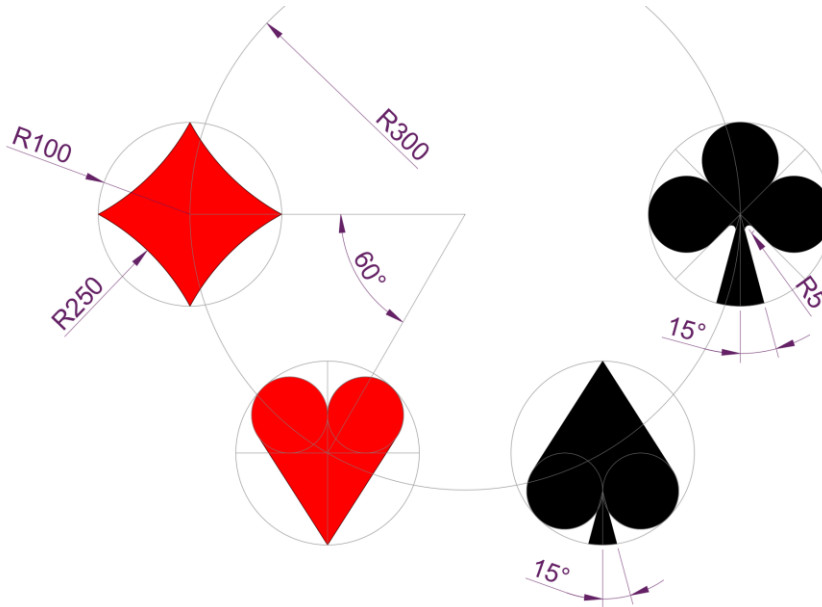
5.4. Ellipse

Draw the ellipse and all the elements within (excluding dimensions). Draw inside croissant shaped object beginning with drawing the center polyline. Then, with the OFFSET command, copy it down and up with an offset of 10 units. Draw arcs at the ends of the newly copied polylines. Draw a circle. Copy the objects inside the ellipse using the MIRROR command twice - horizontally and vertically along the axes of the ellipse. Draw the hexagon in the middle. Apply the BOUNDARY command with REGION modifier. Determine the geometrical characteristics of drawn ellipse with internal regions as cutouts using AREA or MEASUREGEOM commands.