

# Transcomputation - Answers 5

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## 1 Calculate Rotations

- 1.1 Polar point  $(1, 0)$  rotated by 0 radians is  $(1, 0)(1, 0) = (1 \times 1, 0 + 0) = (1, 0)$ .
- 1.2 Polar point  $(1, 0)$  rotated by  $\pi/2$  radians is  $(1, 0)(1, \pi/2) = (1 \times 1, 0 + \pi/2) = (1, \pi/2)$ .
- 1.3 Polar point  $(1, \pi/2)$  rotated by  $-\pi/2$  radians is  $(1, \pi/2)(1, -\pi/2) = (1 \times 1, \pi/2 + (-\pi/2)) = (1, \pi/2 - \pi/2) = (1, 0)$ .
- 1.4 Polar point  $(1, 2)$  rotated by  $\infty$  radians is  $(1, 2)(1, \infty) = (1 \times 1, 2 + \infty) = (1, \infty) = (1, \Phi)$ .
- 1.5 The polar points corresponding to a square with Cartesian co-ordinates  $(0, 0)$ ,  $(1, 0)$ ,  $(1, 1)$ ,  $(0, 1)$  are, respectively,  $(0, 0)$ ,  $(1, 0)$ ,  $(\sqrt{2}, \pi/4)$ ,  $(1, \pi/2)$ .
- 1.6 Rotation of the square in part (1.5) immediately above by  $\pi/4$  radians gives the corresponding points:  $(0, 0)(1, \pi/4) = (0 \times 1, 0 + \pi/4) = (0, \pi/4) = (0, 0)$ ,  $(1, 0)(1, \pi/4) = (1 \times 1, 0 + \pi/4) = (1, \pi/4)$ ,  $(\sqrt{2}, \pi/4)(1, \pi/4) = (\sqrt{2} \times 1, \pi/4 + \pi/4) = (\sqrt{2}, \pi/2)$ ,  $(1, \pi/2)(1, \pi/4) = (1 \times 1, \pi/2 + \pi/4) = (1, 3\pi/4)$ .

## 2 Sketching

The following will be presented in the exercise class. You might like to prepare sketches for your portfolio.

- 2.1 Sketch the rotation of the point in part (1.1) above.
- 2.2 Sketch the rotation of the point in part (1.2) above.
- 2.3 Sketch the rotation of the point in part (1.3) above.
- 2.4 Sketch the rotation of the point in part (1.4) above.
- 2.5 Sketch the rotation of the square in part (1.6) above.