Rotating a special angle around a point – not the origin

Strategy
Since the special angles being 90, 180, and 270˚ around the origin have been memorized for rotations, to find those rotations, without drawing the picture, we will translate the point of rotation back to the origin and determine the image. Then, we will translate that back to the original point of rotation.

Procedure

1. **Subtract the coordinates of the point of rotation from each vertex**
2. **Rotate as you would around the origin**
3. **Add back the point of rotation to each vertex**

Example
Rotate ΔABC 90˚ about (2, 1) if A(–4, –1), B(–3, 5) and C(–1, 3)

		Subt. (2,1)		Rotate 90˚		Image
A (–4, –1)	→	(–6, –2)	→	(2, –6)	→	A’(4, –5)
B (–3, 5)	→	(–5, 4)	→	(–4, –5)	→	B’(2, –4)
C (–1, 3)	→	(–3, 2)	→	(–2, –3)	→	C’(0, –2)

1. **Rotate the point T(4, 6) 90˚ about the point M(2, 4)**

2. **Rotate ΔXYZ 90˚ about the (1, 3) if A(6, 5), B(10, 7) and C(6, 10)**

3. **Rotate the line segment AB 270˚ about the point (4, –2) if A(2, 5) and B(3, –9)**

4. **Rotate the line segment XY 180˚ about the point (0, 5) if X(1, 3) and Y(4, 7)**