Routine Shapes and Angles Practice #1

1. 
   Angle $a = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$
   Reasons = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots
   \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots

2. 
   Angle $b = \ldots\ldots\ldots\ldots\ldots\ldots$
   Reasons = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots
   \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots

3. 
   Angle $c = \ldots\ldots\ldots\ldots\ldots\ldots$
   Reasons = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots
   \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots

4. 
   Angle $d = \ldots\ldots\ldots\ldots\ldots\ldots$
   Reasons = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots
   \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots

5.
   Calculate the size of each exterior angle of a regular nonagon. (A nonagon is a polygon with nine sides.) Show each step of your working.
Answers: Routine Shapes and Angles Practice #1

1. Angle \( a = 50^\circ \)
   Reasons = Co-interior angle = 75° (dotted)
   \[ 55 + a + 75 = 180^\circ \] (angles on a line add to 180°)
   (Alternatively: \( 55 + a = 105 \), as they are alternate on parallel lines)

2. Angle \( b = 25^\circ \)
   Reasons = Angles extending from a diameter are 90°
   Angles in triangles add up to 180°

3. Angle \( c = 60^\circ \)
   Reasons = Pentagon has interior angles adding to 540° (3 \times 180°)
   \[ 540 – 130 – 130 – 110 – 110 = 60^\circ \]

4. Angle \( d = 36^\circ \)
   Reasons = angles on a line add up to 180°
   \[ 4d + d = 180; \ so \ d = 180 ÷ 5 = 36^\circ \]

5. Calculate the size of each exterior angle of a regular nonagon. (A nonagon is a polygon with nine sides.) Show each step of your working.
   \[ 40^\circ \] (not reflex angle, exterior angle is)

**Exterior angles of polygon = 360°. It is regular, so each angle is equal. 360 ÷ 9 = 40°**

Nine sides means it can be built from 7 triangles. Each triangle adds 180°, so the total interior = 7 \times 180° = 1260°. There are 9 equal interior angles, so each is 1260 ÷ 9 = 140. If the interior angles are 140, the exterior angles must be 180 – 140 = 40°.