Task 2

Step 1: Find the midpoints A=(0,0) B=(1,4) C=(5,3) D=(7,1)

midptAB = (0.5,2) = P midptBC = (3,3.5) = Q midptCD = (6,2) = R midptDA = (3.5,0.5) = S   ①

Step 2: Find the length of the sides

$$PQ = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)} = \sqrt{((3-0.5)^2 + (3.5-2)^2)} = 2.9 units$$

$$QR = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)} = \sqrt{((6-3)^2 + (2-3.5)^2)} = 3.4 units$$

$$RS = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)} = \sqrt{((3.5-6)^2 + (0.5-2)^2)} = 2.9 units$$

$$SP = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)} = \sqrt{((0.5-3.5)^2 + (2-0.5)^2)} = 3.4 units$$

Step 3: Find the gradients

$$m(PQ) = \frac{\Delta y}{\Delta x} = \frac{3.5-2}{3-0.5} = \frac{1.5}{2.5} = 0.6 \qquad m(SP) = \frac{\Delta y}{\Delta x} = \frac{2-0.5}{0.5-3.5} = \frac{1.5}{-3} = -0.5$$

$$m(QR) = \frac{\Delta y}{\Delta x} = \frac{2-3.5}{6-3} = \frac{-1.5}{3} = -0.5 \qquad m(RS) = \frac{\Delta y}{\Delta x} = \frac{0.5-2}{3.5-6} = \frac{-1.5}{-2.5} = 0.6$$

②

These gradients show they are the same as the opposite. This means this shape is a parallelogram. PQRS is a parallelogram since opposite sides are parallel.

A(0,0) B(a,b) C(c,d) D(e,f)

Midpoints

$$P = (\frac{0+a}{2}, \frac{0+b}{2}) = (\frac{a}{2}, \frac{b}{2}) \qquad R = (\frac{c+e}{2}, \frac{d+f}{2})$$

$$Q = (\frac{a+c}{2}, \frac{b+d}{2}) \qquad S = (\frac{e}{2}, \frac{f}{2})$$

③