

1. a) $PD = \frac{4}{5}PR$ ΔDCR is similar to ΔPAR

$$\frac{PD}{PR} = \frac{4}{5}$$

$$PA = \frac{5}{6}PQ$$

$$\frac{PA}{PQ} = \frac{5}{6} \quad M1$$

$$\frac{DC}{PA} = \frac{DR}{PR}$$

$$\frac{DC}{5} = \frac{1}{5}$$

$$DC = 1 \quad M1$$

$$\frac{DC}{PQ} = \frac{1}{6}$$

$$\therefore DC = \frac{1}{6}PQ \quad (\text{shown})$$

b) $\angle AQB = \angle DCB$
 $\angle AQB = \angle DCB$ (alt. \angle s, $AQ \parallel DC$)
 $\angle BAQ = \angle BCD$ (alt. \angle s, $AQ \parallel DC$)
 $\therefore \triangle ABQ \cong \triangle DCB$ (ASA) M2
A1

2a) $\angle PQR = \angle XSY$ (alt. \angle s, $PQ \parallel SY$)
 $\angle PRQ = \angle SXY$ (vert. opp. \angle s)
 $\angle RPQ = \angle XYS$ (alt. \angle s, $PQ \parallel SY$) M2

$\therefore \triangle PQR$ is similar to $\triangle XSY$ (AAA similarity). A1

b) $\frac{PR}{XY} = \frac{RQ}{XS}$

$$\frac{PR}{16} = \frac{4}{8}$$

$$PR = 8 \text{ cm} \quad M1$$

$\triangle XSY$ is similar to $\triangle RST$

$$\frac{RT}{XY} = \frac{SR}{SX}$$

$$\frac{RT}{16} = \frac{10}{8}$$

$$RT = 20 \text{ cm} \quad M1$$

$$PT = 8 + 20$$

$$= 28 \text{ cm} \quad A1$$

2e)

$$(i) \frac{QR}{SR} = \frac{4}{10}$$
$$= \frac{2}{5} \quad \text{A1}$$

$$(ii) \frac{\text{Area of } \triangle PQR}{\text{Area of } \triangle TSR} = \left(\frac{2}{5}\right)^2$$
$$= \frac{4}{25} \quad \text{A1}$$

$$(d) \frac{\text{Area of } \triangle PQR}{\text{Area of } \triangle TSR} = \frac{4}{25}$$

$$\frac{24}{\text{Area of } \triangle TSR} = \frac{4}{25}$$

$$\text{Area of } \triangle TSR = \frac{25}{4} \times 24$$

$$= 150 \text{ cm}^2 \quad \text{A1}$$