HW. p 128 2, 7.

2) Prove: $AB = \dfrac{2K\cos y}{\cos x}$ → Δ ABD → Δ ADC

In Δ ABD:

$$\frac{AB}{\sin D} = \frac{AD}{\sin y}, \quad AD = BD \ (\text{Given}) \Rightarrow \hat{A} = y = \hat{B}$$

$$AB = \frac{AD \times \sin(180° - 2y)}{\sin y} \quad (AD = BD, \text{given})$$

$$= \frac{AD \cdot \sin 2y}{\sin y} \quad \text{--- (1)}$$

In Δ ADC:

$$\frac{K}{AD} = \cos x$$

$$\therefore AD = \frac{K}{\cos x} \quad \text{--- (2)}$$

Replace (2) in (1):

$$AB = \frac{K}{\cos x} \times \frac{2\cancel{\sin y}\cos y}{\cancel{\sin y}}$$

$$= \frac{2K\cos y}{\cos x}$$

3) 1) Need SAS for sin area rule.

$$\text{Area } \Delta ADC = \tfrac{1}{2}(AD)(CD)\sin 2\theta$$
$$= \tfrac{1}{2}(2p)(p)\,2\sin\theta\cos\theta$$
$$= 2p^2 \sin\theta\cos\theta$$

2) $\sqrt{}$ $\Rightarrow$ cos rule?

for cos rule need SAS ✓

$\therefore$ In ΔADC:

$$AC^2 = AD^2 + CD^2 - 2(AD)(CD)\cos 2\theta$$
$$= 4p^2 + p^2 - 2(2p)(p)(2\cos^2\theta - 1)$$
$$= 5p^2 - 4p^2(2\cos^2\theta - 1)$$
$$= 5p^2 - 8p^2\cos^2\theta + 4p^2$$
$$= 9p^2 - 8p^2\cos^2\theta$$
$$= p^2(9 - 8\cos^2\theta)$$
$$AC = p\sqrt{9 - 8\cos^2\theta}$$

compound

3) In ΔABC

$$\frac{AB}{AC} = \cancel{\cos\theta}\,\sin\theta$$

$$AB = AC \cdot \sin\theta$$
$$= p\sqrt{9 - 8\cos^2\theta} \cdot \sin\theta$$
$$= p\sin\theta\sqrt{9 - 8\cos^2\theta}$$

7) 1) In ΔTPQ

$$TQ^2 = TP^2 + PQ^2$$
$$= 5^2 + 200$$
$$= 225$$
$$TQ = 15$$

> Get 3 sides in ΔTQV and use pyth. Then use cos rule to det. $\angle$

In ΔQRV:

$$QV^2 = QR^2 + RV^2$$
$$= 12^2 + 5^2$$
$$= 169$$
$$QV = 13$$

In ΔTVW:

$$TV^2 = TW^2 + VW^2$$
$$= 12^2 + 200$$
$$= 344$$
$$TV = 2\sqrt{86} \,/\, \sqrt{344}$$

In ΔTQV

$$TV^2 = TQ^2 + QV^2 - 2(TQ)(QV)\cos T\hat{Q}V$$
$$\frac{TV^2 - TQ^2 - QV^2}{-2(TQ)(QV)} = \cos T\hat{Q}V$$
$$\frac{344 - 225 - 169}{-2(15)(13)} = \cos T\hat{Q}V$$
$$\frac{5}{39} = \cos T\hat{Q}V$$
$$\therefore T\hat{Q}V = 82{,}63^\circ$$

2) Area rule: Need SAS in ΔQTV

$$\text{Area } \Delta QTV = \tfrac{1}{2}(QT)(QV)\sin T\hat{Q}V$$
$$= \tfrac{1}{2}(15)(13)\sin 82{,}63^\circ$$
$$= 96{,}695 \text{ cm}^2$$