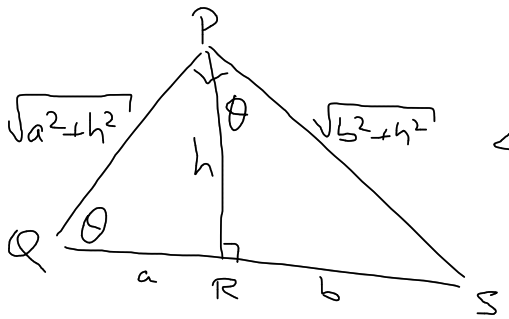
3b)

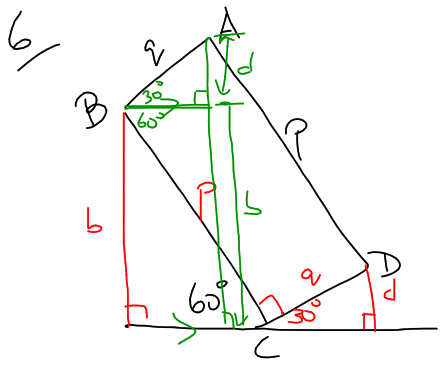


$\triangle PRQ$ $\quad \frac{h}{a} = \tan\theta$

$\triangle PQS$ $\quad \tan\theta = \frac{\sqrt{b^2+h^2}}{\sqrt{a^2+h^2}}$

$\triangle PRS$ $\quad \tan\theta = \frac{b}{h}$.

6/



$\frac{d}{q} = \sin 30°$

$d = q \sin 30°$

$d = \frac{q}{2}$

$\frac{b}{p} = \sin 60°$

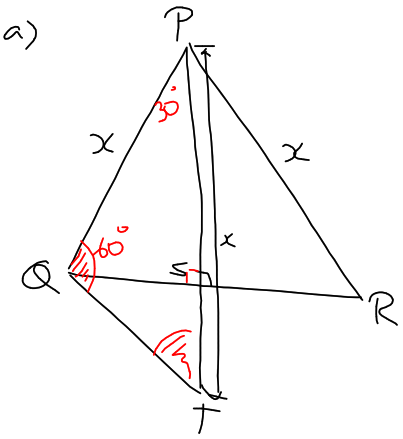
$b = p \sin 60°$

$b = \frac{\sqrt{3}p}{2}$

$a = d + b$

$a = \frac{\sqrt{3}p + q}{2}$

7a)



$\angle PQT = 75°$
$\angle SQT = 15°$

$\angle PQR = 60°$ ($\angle$ in equilateral $\triangle$)

$\angle PSQ = 90°$ (given)

$\angle SPQ + \angle PSQ + \angle PQR = 180°$ ($\angle$ sum $\triangle$)

$\angle SPQ + 90 + 60 = 180$

$\angle SPQ = 30$

$\triangle PQT$ is isosceles ($PQ = PT = x$, given)

$\therefore \angle PQT = \angle PTQ$ ($=\angle$'s in isosceles $\triangle$)

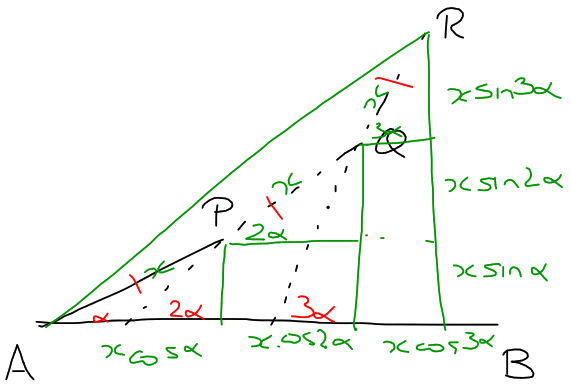
$\angle PQT + \angle PTQ + \angle SPQ = 180$ ($\angle$ sum $\triangle$)

$2\angle PQT + 30 = 180$

$2\angle PQT = 150$

$\angle PQT = 75°$

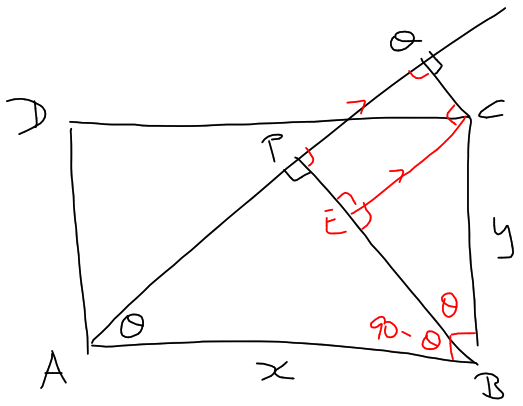
9



$$\tan \angle PAB = \frac{x(\sin\alpha + \sin 2\alpha + \sin 3\alpha)}{x(\cos\alpha + \cos 2\alpha + \cos 3\alpha)}$$

$$= \frac{\sin\alpha + \sin 2\alpha + \sin 3\alpha}{\cos\alpha + \cos 2\alpha + \cos 3\alpha}$$

10/



$AQ = x\cos\theta + y\sin\theta$

$\frac{AP}{x} = \cos\theta$

$AP = x\cos\theta$

$\frac{CE}{y} = \sin\theta$

$CE = y\sin\theta$

But $CE = PQ$.

$\therefore PQ = y\sin\theta$

$AQ = AP + PQ$

$= x\cos\theta + y\sin\theta$