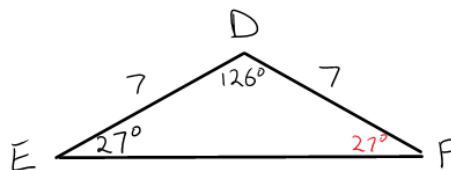


1. In $\triangle EDF$, $m\angle E$ is 27° , $f=7$, $e=7$. Find $m\angle D$.
 $180^\circ - 2(27^\circ) = 126^\circ$

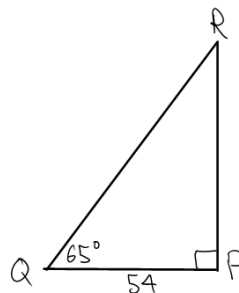


2. In $\triangle PQR$, $r=54$, $m\angle P = 90^\circ$, $m\angle Q = 65^\circ$. Find p .

$$\cos(65^\circ) = \frac{54}{p}$$

$$p = \frac{54}{\cos(65^\circ)}$$

$$p \approx 127.8$$

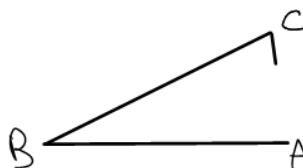


3. In $\triangle ABC$, $m\angle B = 29^\circ$, $b=1$, $a=9$. Find $m\angle A$.

$$\sin(29^\circ) \cdot 9 \approx 4.4$$

$$\sin(29^\circ) \cdot 9 > 1$$

$\therefore$ no triangle



4. In $\triangle DBF$, $f=9$, $m\angle D = 80^\circ$, $b=4$. Find d .

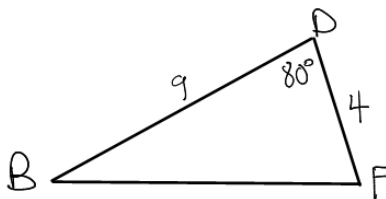
$$d^2 = b^2 + f^2 - 2bf \cos D$$

$$d^2 = 4^2 + 9^2 - 2 \cdot 4 \cdot 9 \cos(80^\circ)$$

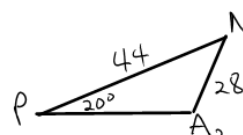
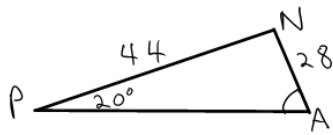
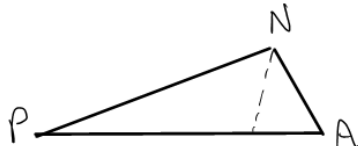
$$d^2 = 97 - 72 \cos(80^\circ)$$

$$d = \sqrt{97 - 72 \cos(80^\circ)}$$

$$d \approx 9.2$$



5. In $\triangle NPA$, $p=28$, $m\angle P=20^\circ$, $a=44$. Find $m\angle A$.



$$\frac{\sin A}{44} = \frac{\sin(20^\circ)}{28}$$

$$A = \sin^{-1}\left(\frac{44 \sin 20^\circ}{28}\right)$$

$$A_1 \approx 32.5^\circ$$

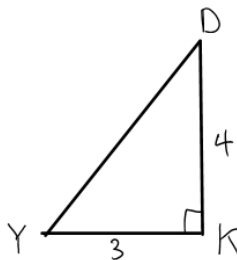
$$A_2 = 180^\circ - A_1 \approx 147.5^\circ$$

6. In $\triangle KYD$, $m\angle K$ is 90° , $d=3$, $y=4$. Find $m\angle D$.

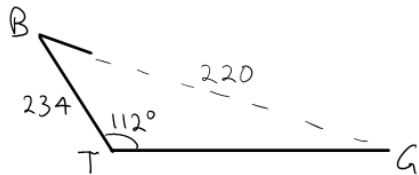
$$\tan D = \frac{3}{4}$$

$$D = \tan^{-1}\left(\frac{3}{4}\right)$$

$$D \approx 36.9$$



7. In $\triangle GTB$, $g=234$, $m\angle T = 112^\circ$, $t=220$. Find $m\angle G$.

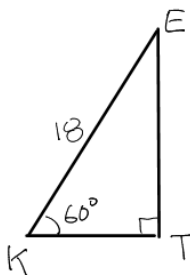


8. In $\triangle TEK$, $e=9$, $m\angle K = 60^\circ$, $t=18$. Find $m\angle E$.

$$\sin(60^\circ) \cdot 18 = 9$$

$$T = 90^\circ$$

$$E = 90^\circ$$



9. In $\triangle RFH$, $r=7$, $f=9$, $h=4$. Find $m\angle F$.

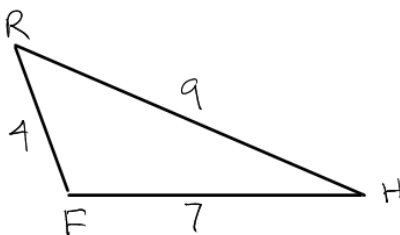
$$f^2 = h^2 + r^2 - 2 \cdot h \cdot r \cdot \cos F$$

$$9^2 = 4^2 + 7^2 - 2 \cdot 4 \cdot 7 \cdot \cos F$$

$$16 = -56 \cdot \cos F$$

$$\cos F = \frac{16}{-56}$$

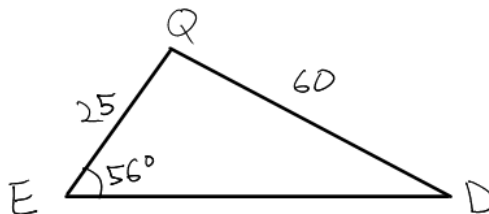
$$F = \cos^{-1}\left(\frac{16}{-56}\right) \approx 106.6^\circ$$



10. In $\triangle QED$, $e=60$, $d=25$, $m\angle E = 56^\circ$. Find $m\angle D$.

$$\frac{\sin D}{25} = \frac{\sin(56^\circ)}{60}$$

$$D = \sin^{-1}\left(\frac{25 \cdot \sin(56^\circ)}{60}\right) \approx 20.2^\circ$$



11. In $\triangle RAT$, $m\angle A = 148^\circ$, $t=14$, $a=60$. Find $m\angle T$.

$$\frac{\sin T}{14} = \frac{\sin(148^\circ)}{60}$$

$$T = \sin^{-1}\left(\frac{14 \cdot \sin(148^\circ)}{60}\right) \approx 7.1^\circ$$

