Mathematics 10D

8.5 Solving Acute Δ Problems

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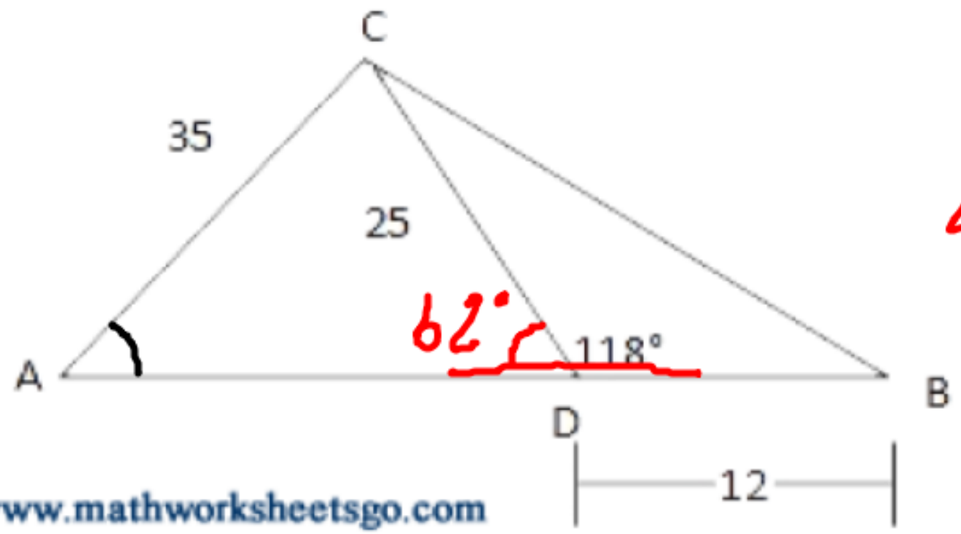
17. Find the $m\angle A$ to the nearest whole degree.



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Supplementary angle:

$180° = 118° + \angle CDA$

$\angle CDA = 62°$

Sine Law: $\frac{25}{\sin(A)} = \frac{35}{\sin(62)}$

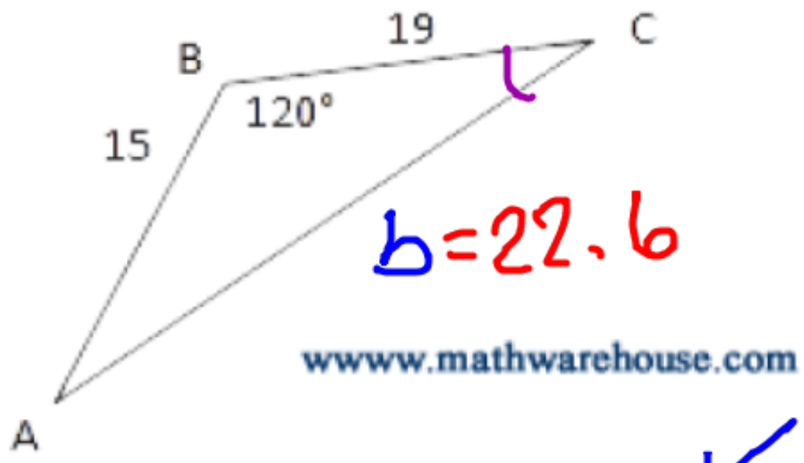
$\frac{\sin(62)}{35}(25) = \left(\frac{35\sin(A)}{\sin(62)}\right)\frac{\sin 62}{35}$

$\sin^{-1}\left(\frac{25\sin(62)}{35}\right) = \sin^{-1}(\sin(A))$

$39° = \angle A$

* Many Ways to solve

12. Find the $m\angle C$ to the nearest whole degree.



b=22.6

✓Sine Law

$\frac{\text{opposite side}}{\sin(\angle)}$

✓Cosine

- side length using 2 side and the angle between them
- angle using 3 sides.

$\frac{15}{\sin(C)} = \frac{22.6}{\sin(120°)}$

$\frac{15\sin(120°)}{22.6} = \frac{22.6\sin(C)}{22.6}$

$\sin^{-1}\left(\frac{15\sin(120)}{22.6}\right) = \sin^{-1}(\sin(C))$

$35° = \angle C$

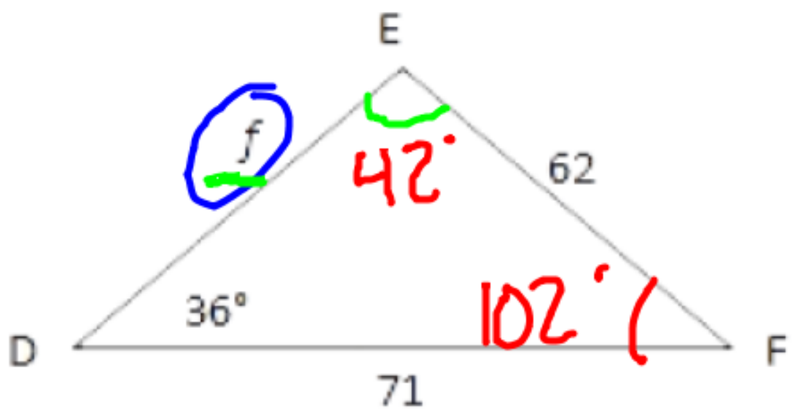
$b^2 = 15^2 + 19^2 - 2(15)(19)\cos(120)$

$b = \sqrt{225 - 570(\cos(120))}$

$b = \sqrt{225 + 285}$

$b \approx 22.6$

14. Find the f to the nearest whole number.



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Sine

Cosine

② $\frac{f}{\sin(\angle F)} = \frac{62}{\sin(36°)}$

① $f^2 = 62^2 + 71^2 - 2(62)(71)\cos(\angle F)$

Need $\angle F$: solve $\angle E$

Sine law:

$\frac{62}{\sin(36)} = \frac{71}{\sin(E)}$

$62\sin(E) = 71\sin(36)$

$\sin^{-1}(\sin(E)) = \sin^{-1}\left(\frac{71\sin 36}{62}\right)$

$\angle E = \sin^{-1}\left(\frac{71\sin 36}{62}\right)$

$\angle E = 42°$

$\angle F = 180° - 42° - 36°$

$\angle F = 180° - 78$

$\angle F = 102°$

Cosine Law:

$$f^2 = 62^2 + 71^2 - 2(62)(71)\cos(102^\circ)$$

$$f = \sqrt{8885 - 8804\cos(102)}$$

$$f = \sqrt{10715.45\overline{45}}$$

$$f \approx 103.5$$

$\therefore f \approx 103$

Sine Law:

$$\frac{f}{\sin(102)} = \frac{62}{\sin(36)}$$

$$f = \frac{62\sin(102)}{\sin(36)} \approx 103.2$$