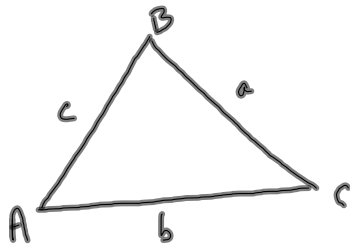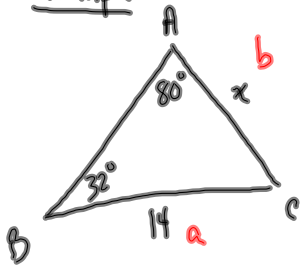## Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

The ratio of the sine of an angle and the side opposite that angle is a constant in a given triangle.

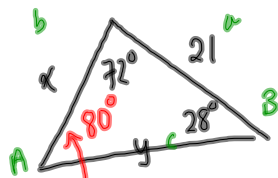### Example

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{14}{\sin 80°} = \frac{x}{\sin 32°}$$

$$\frac{14 \sin 32°}{\sin 80°} = \frac{x \sin 80°}{\sin 80°}$$

$$x = \frac{14 \sin 32°}{\sin 80°}$$

$$\boxed{x = 7.5}$$

Example

$$?? = 180° - (72° + 28°)$$
$$= 180° - 100°$$
$$= 80°$$

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{21}{\sin 80°} = \frac{x}{\sin 28°}$$

$$x \sin 80° = 21 \sin 28°$$

$$x = \frac{21 \sin 28°}{\sin 80°}$$

$$\boxed{x = 10.0}$$

To find y:

$$\frac{a}{\sin A} = \frac{c}{\sin C}$$

$$\frac{21}{\sin 80°} = \frac{y}{\sin 72°}$$

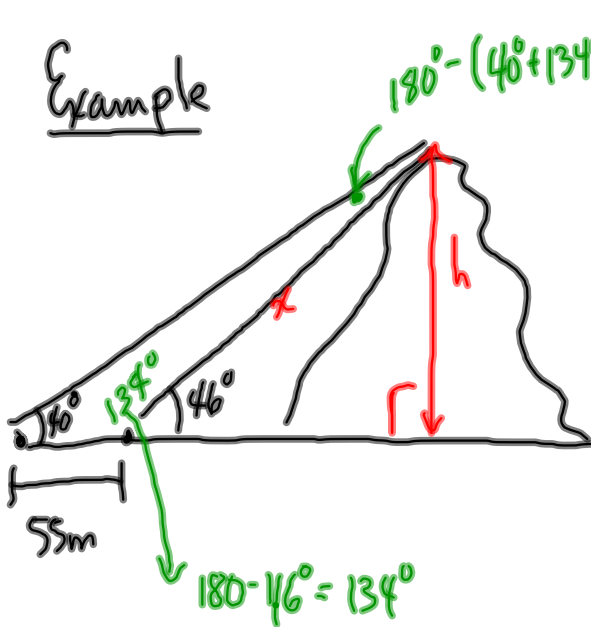$$21 \sin 72° = y \sin 80°$$

$$y = \frac{21 \sin 72°}{\sin 80°}$$

$$\boxed{y = 22.4}$$

Oct 12-11:57 AM

1

Example

$180° - (46° + 134°) = 180° - 174° = 6°$

Use Law of Sines to find x:

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{55m}{\sin 6°} = \frac{x}{\sin 40°}$$

$x \sin 6° = (55m)(\sin 40°)$

$x = \dfrac{(55m)(\sin 40°)}{\sin 6°}$

$\boxed{x \doteq 338.2m}$

$180 - 46° = 134°$

$\sin \theta = \dfrac{opp}{hyp}$

$\sin 46° = \dfrac{h}{338.2m}$

$h = (338.2m)(\sin 46°)$

$\boxed{h \doteq 243.3m}$ ← height of mountain

To DO:

① a)

x 63°

x 32°

14

AAS

b)

x

27°

112° 6.8

AAS

c)

34

56°

81° x
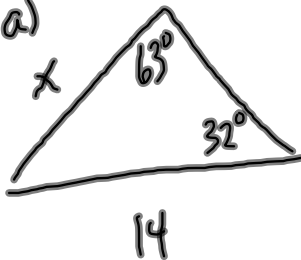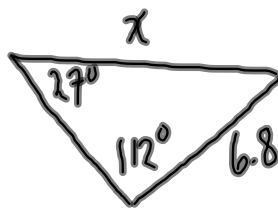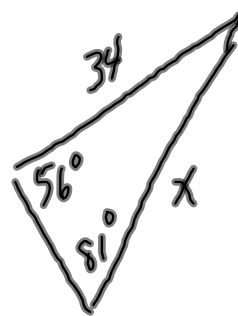
AAS

② Draw a triangle: $\angle A = 42°$, $AB = 24$ cm, $BC = 18$ cm

Is there only one?

③ TEXT: p254/17 (azimuth + area)

p257/3-5 (Law of Sines)

Answers- Azimuth Sheet

27. a) $80°$　　　i) $90°$

　　b) $50°$　　　j) $40°$

　　c) $100°$　　　k) $90°$

　　(d) $130°$　　　(l) $70°$

　　e) $140°$　　　m) $110°$

　　f) $120°$　　　n) $100°$

　　g) $116°$　　　o) $77°$

　　(h) $114°$　　　p) $117°$

d)

$280°$　　θ　　$50°$

$230°$

$\theta = 360° - 230°$

$\theta = 130°$

h) $332°$　θ　$86°$

$360° - 290° = 70°$

$332° - 86° = 246°$

$\theta = 360° - 246°$

$\theta = 114°$

l) $320°$　θ　$30°$

$140°$　$320° - 30° = 290°$