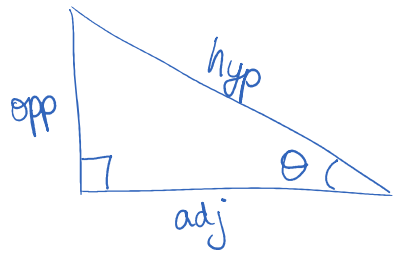
Notes: More Basic Skills

Trig Functions (right angle Δs)

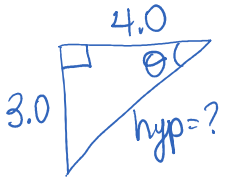


$\sin\theta = \frac{opp}{hyp}$ $\quad \tan\theta = \frac{opp}{adj}$

$\cos\theta = \frac{adj}{hyp}$

pythag: $a^2 + b^2 = c^2$

ex



$hyp^2 = 3^2 + 4^2$

$hyp = \sqrt{9+16}$

$= \sqrt{25}$

$= 5.0$

$\tan\theta = \frac{opp}{adj}$

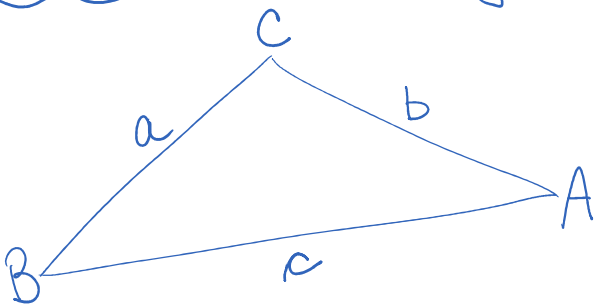
$\tan\theta = \frac{3}{4}$

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

$= 36.8698$

$= 37°$

Sine and Cosine Laws (non-right angle Δs)



Sine Law

finding side: $\frac{a}{\sin A} = \frac{b}{\sin B}$

finding angle: $\frac{\sin A}{a} = \frac{\sin B}{b}$

- sine law always gives acute angle, if need obtuse the subtract "180° − acute <"

180 − 30 − 24.624

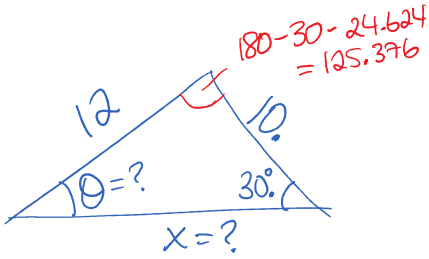
Cosine Law

whichever side or angle you are looking for sandwiches the formula

$a^2 = b^2 + c^2 - 2bc\cos A$

"180 − acute −

ex



θ: $\frac{\sin\theta}{10} = \frac{\sin 30}{12}$

$\sin\theta = \frac{10(0.5)}{12}$

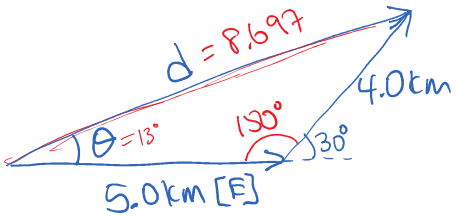
$\theta = 24.624^\circ = 25^\circ$

X: $X = \sqrt{12^2 + 10^2 - 2(12)(10)\cos 125.376}$

$= 19.56899$

$= 20.$

ex



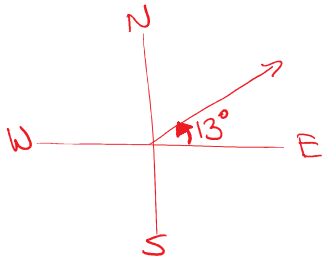
(d = 8.7 km, θ = 13° N of E)

$d = \sqrt{5^2 + 4^2 - 2(5)(4)\cos 150^\circ}$

$= 8.697 \text{ km} = 8.7 \text{ km}$

$\frac{\sin\theta}{4} = \frac{\sin 150^\circ}{8.697}$

$\theta = 13^\circ$



$\vec{d} = 8.7\text{km}\ [13^\circ \text{ N of E}]$

Sig Figs

add/subtract – keep least # of decimal places

ex $2.2 + 15.358 = 17.558 \Rightarrow 17.6$ (round)

multiply/divide – keep the least # of sig figs.

ex $2.1 \times 15.358 = 32.2518 = 32$

2.1: 2 sig figs; 15.358: 5 sig figs; use this.; 32: 2 sig figs

answer to carry on with a question

Zeros

ex	# of sig figs
1.0	2
10	1
10.	2
sci. not. → 1.00×10^1	3
327000	3
307000	3
307000.0	7

ex	# of sig figs
0.50	2
0.05	1
0.0050	2
5.0×10^{-3}	2

0.0050: placeholders; ↑ accuracy

5.0×10^{-3} → 0.0050