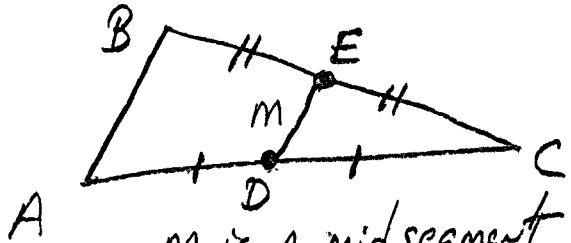
Geometry | Monday 4-29-13 | Class Notes

Ch. 5-4 The Triangle Midsegment Theorem

midsegment of a triangle — A line segment that connects the midpoints of two sides of the △.

(Ex)



M is a midsegment

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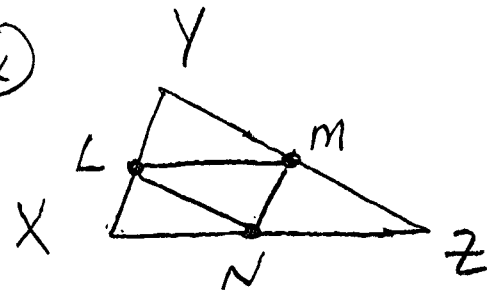
2 properties:

① $\overline{DE} \parallel \overline{AB}$

② $\overline{DE} = \frac{1}{2}\overline{AB}$

(Ex)

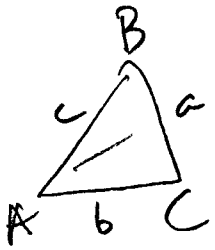


Solving a triangle — finding all its sides/angles

if 90° triangle ⇒ PT or SOHCAHTOA or both!

Solving Triangles

Type of △	Tools
Right	• P.T. $\Rightarrow c^2 = a^2 + b^2$ • SOH CAH TOA
NOT RIGHT ASA or AAS	• LOS $\Rightarrow$ use two ratios: $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ (NEED TO KNOW "2 OF 3")
NOT RIGHT SAS or SSS	• LOC $\Rightarrow$ $a^2 = b^2 + c^2 - 2bc\cos A$ $b^2 = a^2 + c^2 - 2ac\cos B$ $c^2 = a^2 + b^2 - 2ab\cos C$
NOT RIGHT SSA	• LOS $\Rightarrow$ Memorize conditions for 0, 1, 2 possible △ • LOC $\Rightarrow$ solve quadratic equation for 0, 1, 2 possible △



Special △

$ax^2 + bx + c = 0$

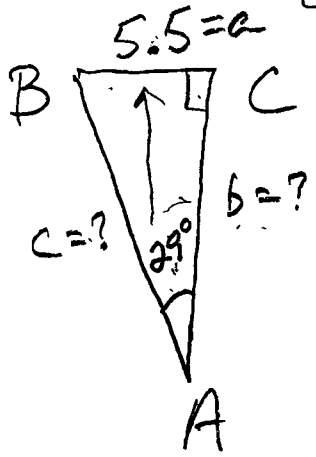
$a =$ ☁ $\quad b^2 - 4ac = d$

$b =$ ☁ $\quad (\ )^2 - 4(\ )(\ ) = d$

$c =$ ☁ $\quad$ ☁ $= d$

$$\text{Side(s)} = \frac{-b \pm \sqrt{d}}{2a}$$

WORKSHEET PRACTICE

① 

$a = 5.5$ $\quad A = 29°$

$b = 9.9$ $\quad B = 61°$

$C = 11.3$ $\quad C = 90°$

$B = 90 - 29 = \underline{61°}$

$\sin 29° = \frac{5.5}{c}$

$\frac{c \sin 29°}{\sin 29°} = \frac{5.5}{\sin 29}$

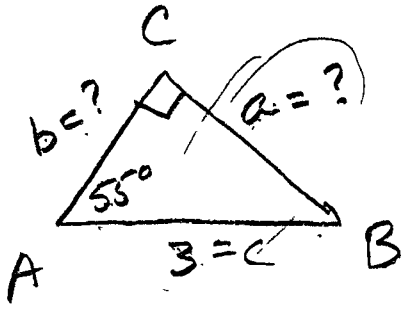
$c = \frac{5.5}{(.4848)} = \underline{11.345}$ ↓

$\tan 29 = \frac{5.5}{b}$

$b = \frac{5.5}{\tan 29°}$

$b = \frac{5.5}{(.5543)} = 9.922$ ↓

③



$a = 2.5$ $\quad A = 55°$

$b = 5.2$ $\quad B = 35°$

$c = 3$ $\quad C = 90°$

$3 \sin 55° = \frac{a}{3} \cdot 3$

$3(.8192) = a$

$2.4576 = a$

$b \cos 55° = \frac{3}{b} \cdot b$

$b = \frac{3}{\cos 55°} = \frac{3}{(.5736)}$

$b = 5.230$

$B = 90 - 55 = 35°$

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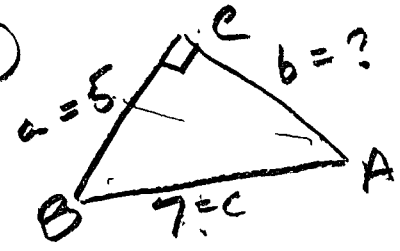
⑨



$a = 5$ $\quad A = 46°$

$b = 4.9$ $\quad B = 44°$

$c = 7$ $\quad C = 90°$

$7^2 = 5^2 + b^2$

$49 = 25 + b^2$

$24 = b^2$

$\therefore b = \sqrt{24} = 2\sqrt{6}$

$\sqrt{4 \cdot 6} \approx 4.898$

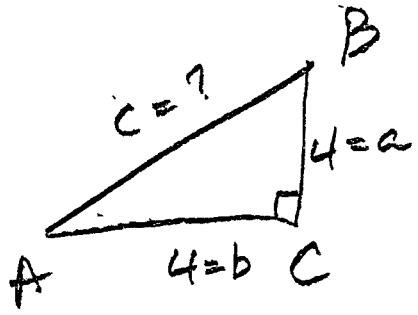
$\sin^{-1}\left(\frac{5}{7}\right) = A$

$\sin^{-1}(.7143) = A \approx 46°$

$\therefore B = 90 - 46$

$B = 44°$

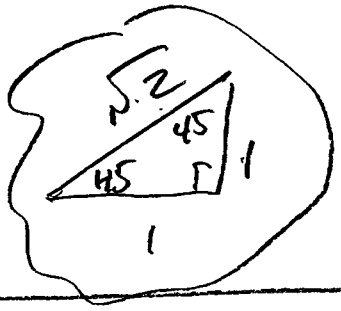
(2)



$a = 4$ $\quad$ $A = 45°$

$b = 4$ $\quad$ $B = 45°$

$c = 4\sqrt{2}$ $\quad$ $C = 90°$



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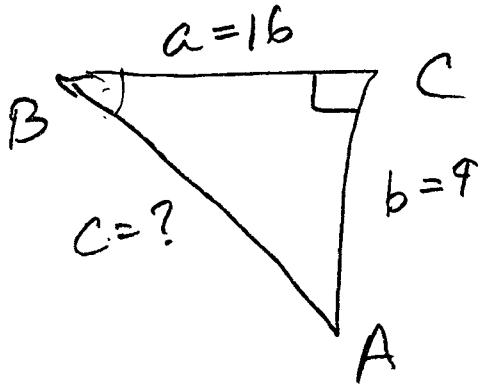
(6)



$a = 16$ $\quad$ $A = 60.6°$

$b = 9$ $\quad$ $B = 29.4°$

$c = 18.4$ $\quad$ $C = 90°$

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

$c^2 = 16^2 + 9^2 = 256 + 81 = 337$

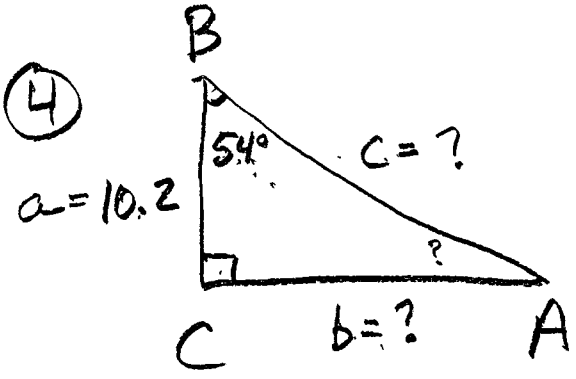
$c = \sqrt{337} = 18.357$

$\tan^{-1}\left(\frac{9}{16}\right) = B =$

$\tan^{-1}(.5625) = B = 29.357$

$A = 90 - 29.4 = 60.6°$

(4)



$a = 10.2$ | $A = 36°$

$b = 14.0$ | $B = 54°$

$c = 17.4$ | $C = 90°$

$$A = 90 - 54 = \underline{36°}$$

$$\tan 54° = \frac{b}{10.2} \cdot 10.2$$

$$10.2 \tan 54° = b$$

$$10.2(1.3764) = b$$

$$14.039 = b$$

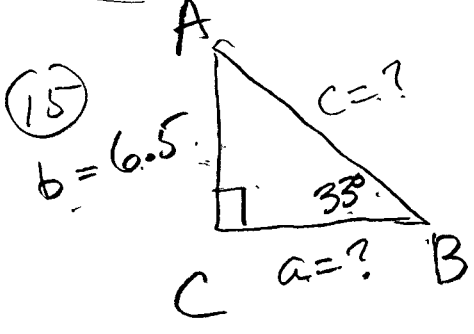
$$\cos 54° = \frac{10.2}{c} \cdot c$$

$$\frac{c(\cos 54°)}{\cos 54°} = \frac{10.2}{\cos 54}$$

$$c = \frac{10.2}{(.5878)}$$

$$c = 17.352$$

(15)



$a = 10.0$ | $A = 57°$

$b = 6.5$ | $B = 33°$

$c = 11.9$ | $C = 90°$

$$A = 90 - 33 = \underline{57°}$$

$$\tan 33° = \frac{6.5}{a}$$

$$a = \frac{6.5}{(.6494)}$$

$$a = \underline{10.009}$$

$$\sin 33° = \frac{6.5}{c}$$

$$\frac{c \sin 33}{\sin 33} = \frac{6.5}{\sin 33}$$

$$c = \frac{6.5}{(.5446)} = 11.935$$