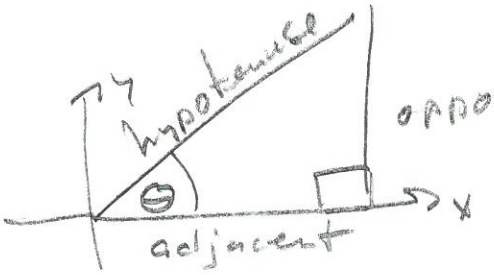
122 §1.3

(1) Match the trig func w/ its right-triangle definition.
DRAW THE TRIANGLE!

SOHCAHTOA



#1 (3pts)

(a) $\cos\theta = \frac{adj}{hyp}$ (b) $\sin\theta = \frac{opp}{hyp}$ (c) $\tan = \frac{opp}{adj}$

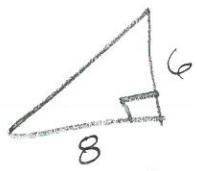
(d) $\csc = \frac{hyp}{opp}$ (e) $\sec = \frac{hyp}{adj}$ (f) $\cot = \frac{adj}{hyp}$

(2) adjacent, opposite and hypotenuse sides. (1pt)

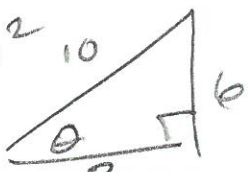
(3) cofunctions of complementary angles are equal.

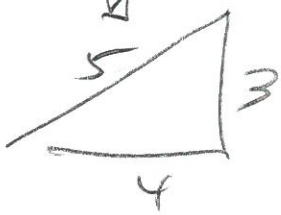
(4) elevation, depression. (1pt)

#s 5-8 find the 6 trigs for the given triangle

(5) 

$\rightarrow 6^2+8^2 = 36+64 = 100 = 10^2$





$\sin\theta = \frac{6}{10} = \frac{3}{5}$ $\csc\theta = \frac{5}{3}$

$\cos\theta = \frac{4}{5}$ $\sec\theta = \frac{5}{4}$

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

(3pts)

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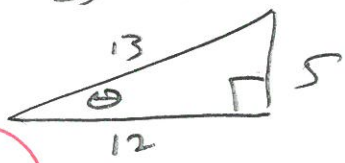
(6)

$13^2 - 5^2 = 169 - 25 = 144 = 12^2$



$\sin\theta = \frac{5}{13}$ $\quad \csc\theta = \frac{13}{5}$

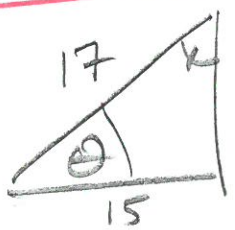
$\cos\theta = \frac{12}{13}$ $\quad \sec\theta = \frac{13}{12}$

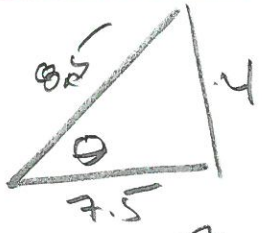
$\tan\theta = \frac{5}{12}$ $\quad \cot\theta = \frac{12}{5}$

3pts

(9) Find 6 trigs for both triangles. Explain why they're the same.

1pt EXPLAIN: They're similar triangles, so all the angles are the same, as are the ratios of the sides to one another.





$15^2 + 8^2 = 225 + 64 = 289$

$= 17^2$

$\sin\theta = \frac{8}{17}$ $\quad \csc\theta = \frac{17}{8}$

$\cos\theta = \frac{15}{17}$ $\quad \sec\theta = \frac{17}{15}$

$\tan\theta = \frac{8}{15}$ $\quad \cot\theta = \frac{15}{8}$

3pts

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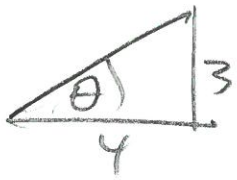
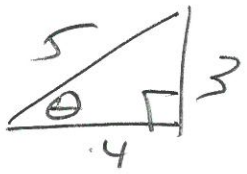
#s 13-20 Sketch the triangle. Find 6 trig's

(13) $\tan\theta = \frac{3}{4} \rightarrow$



$3^2+4^2 = 9+16 = 25 = 5^2$



$\sin\theta = \frac{3}{5}$ $\quad \csc\theta = \frac{5}{3}$

$\cos\theta = \frac{4}{5}$ $\quad \sec\theta = \frac{5}{4}$

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

3pts

(20) $\csc\theta = 9 \Rightarrow \sin\theta = \frac{1}{9}$ is easier for me.

$9^2 - 1^2 = 81-1 = 80 \rightarrow \sqrt{80} = 2\sqrt{20}$

$= 4\sqrt{5}$

1pt

$\sin\theta = \frac{1}{9}$ $\quad \csc\theta = 9$

$\cos\theta = \frac{4\sqrt{5}}{9}$ $\quad \sec\theta = \frac{9}{4\sqrt{5}}$ (or $\frac{9\sqrt{5}}{20}$)

$\tan\theta = \frac{1}{4\sqrt{5}}$ $\quad \cot\theta = 4\sqrt{5}$

(or $\frac{\sqrt{5}}{20}$)

3pts

#s 31-40 Evaluate. Round to 4 places.

(32) (a) $\tan 23.5^\circ \approx .4348$

(b) $\cot 66.5^\circ \approx .4348$

1pt

CO-CO

(35) (a) $\cos(4^\circ 50' 15'') = \cos\left(\left(4 + \frac{50}{60} + \frac{15}{3600}\right)^\circ\right)$

$= \cos(4.8375^\circ) \approx .9964$ $\quad \cancel{\approx} \cos(4^\circ 50' 15'')$

1pt

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#s 41-46 Use what's given to find the indicated trig values:

(41) GIVEN: $\sin 60° = \frac{\sqrt{3}}{2}$, $\cos 60° = \frac{1}{2}$

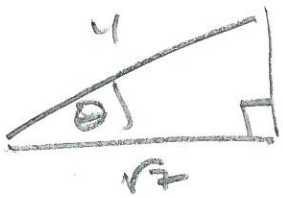
1pt (a) $\sin 30° = \cos 60° = \frac{1}{2}$ by CO-CO

1pt (b) $\cos 30° = \sin 60° = \frac{\sqrt{3}}{2}$

1pt (c) $\tan 60° = \frac{y}{x} = \frac{\frac{y}{r}}{\frac{x}{r}} = \frac{\sin 60°}{\cos 60°} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$ $\tan 60° = \sqrt{3}$

1pt (d) $\cot 60° = \frac{1}{\tan 60°} = \sqrt{3}$ Reciprocal

(46) $\cos\beta = \frac{\sqrt{7}}{4}$



$4^2 - \sqrt{7}^2 = 16 - 7 = 9$

$= 3^2$

3pts (a) $\sec\beta = \frac{4}{\sqrt{7}}$ (b) $\sin\beta = \frac{3}{4}$ (c) $\cot\beta = \frac{\sqrt{7}}{3}$

(d) $\sin(90° - \beta) = \cos\beta = \frac{\sqrt{7}}{4}$

#s 51-56 Use trig identities to transform LHS into RHS:

1pt (51) $(1+\sin\theta)(1-\sin\theta) = \cos^2\theta$:

$= 1 - \sin^2\theta = \cos^2\theta$ by Pythagorus

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(56) $\dfrac{\tan\beta + \cot\beta}{\tan\beta} = \csc^2\beta$?

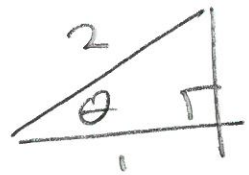
$= \dfrac{\dfrac{\sin\beta}{\cos\beta} + \dfrac{\cos\beta}{\sin\beta}}{\tan\beta}$ ... 1 pt mmm

$= \dfrac{\tan\beta}{\tan\beta} + \dfrac{\cot\beta}{\tan\beta} = 1 + \dfrac{\cot\beta}{\frac{1}{\cot\beta}} = 1 + \cot^2\beta$

$= \csc^2\theta$ by Pythagorus

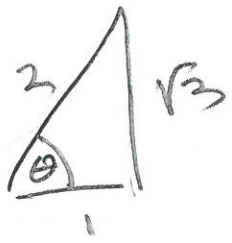
~~#~~s 59-62 Find θ w/o using a calculator.

(59) (a) $\sec\theta = 2$



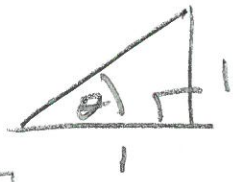
Aha! 30-60!

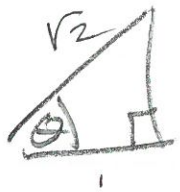
1 pt



$\Rightarrow \boxed{\theta = 60^\circ}$

(b) $\cot\theta = 1$





1 pt

$\Rightarrow \boxed{\theta = 45^\circ}$

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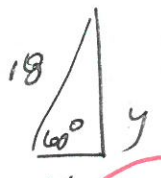
(63)



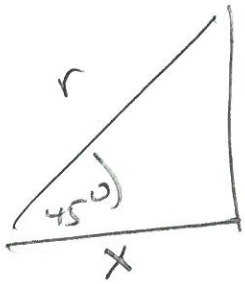
2pts

Find x & y:

$\frac{x}{18} = \cos 60^\circ = \frac{1}{2} \Rightarrow$ **$x = 9$**

$\frac{y}{18} = \sin 60^\circ = \frac{\sqrt{3}}{2} \Rightarrow$ **$y = 9\sqrt{3}$**

(66) Find x & r:



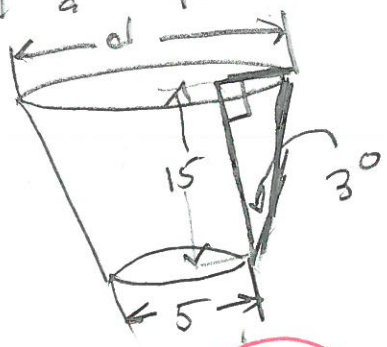
$x = 20$ by inspection

1pt

$20^2 + 20^2 = 2(20^2) = r^2 \Rightarrow$

$r = 20\sqrt{2}$

(74) A tapered shaft has small diameter 5cm & a taper of 3°



$d = 5 + 2x$

$\frac{x}{15} = \tan 3^\circ$

$\Rightarrow x = 15 \tan 3^\circ$

$\approx .7861166689 \approx x$

$\Rightarrow d = 5 + 2x$

≈ 6.572233378 cm

3pts