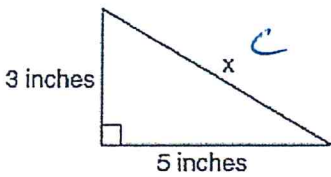Name _Schlansky_
Mr. Schlansky

Date _____
Geometry

Right Triangles Review Sheet
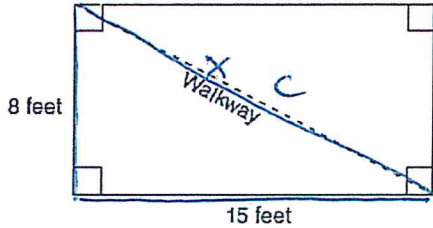
1. What is the value of x, in inches, in the right triangle below?

3 inches

5 inches

x c

$3^2 + 5^2 = x^2$
$9 + 25 = x^2$
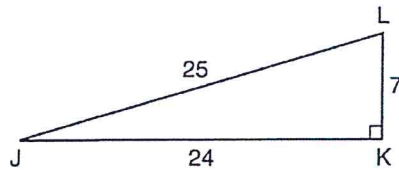$\sqrt{34} = \sqrt{x^2}$
$\boxed{\sqrt{34} = x}$

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

2. Nancy's rectangular garden is represented in the diagram below. If a diagonal walkway crosses her garden, what is its length, in feet?

8 feet

Walkway x c

15 feet

$a^2 + b^2 = c^2$
$8^2 + 15^2 = x^2$
$64 + 225 = x^2$
$\sqrt{289} = \sqrt{x^2}$
$\sqrt{289} = x$
$\boxed{x = 17}$

3. In right triangle JKL in the diagram below, $KL = 7$, $JK = 24$, $JL = 25$, and $\angle K = 90°$. Which statement is *not* true?

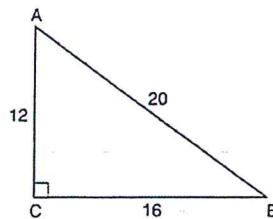1) $\tan L = \dfrac{24}{7}$ $\dfrac{O}{A}$ ✓

2) $\cos L = \dfrac{24}{25}$ $\dfrac{A}{H}$ $\dfrac{7}{25}$ ✗

3) $\tan J = \dfrac{7}{24}$ $\dfrac{O}{A}$ ✓

4) $\sin J = \dfrac{7}{25}$ $\dfrac{O}{H}$ ✓

L

25

J   24   K

7
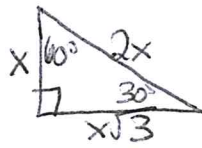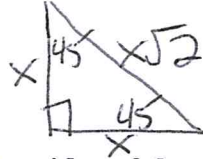
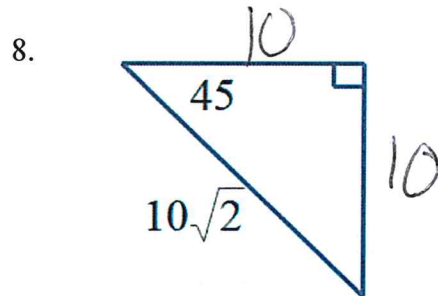4. In right triangle ABC shown below, $AC = 12$, $BC = 16$, and $AB = 20$.
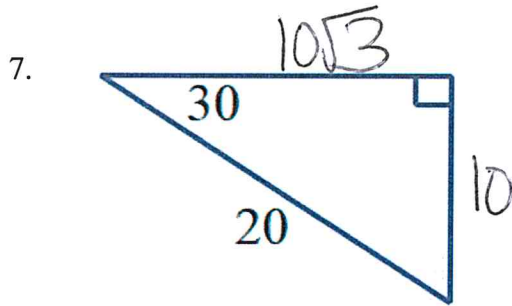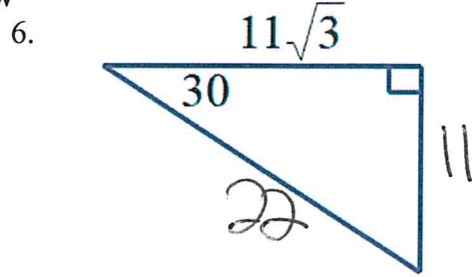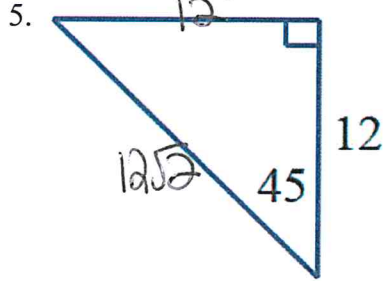
Which equation is *not* correct?

1) $\cos A = \dfrac{12}{20}$ $\dfrac{A}{H}$ ✓

2) $\tan A = \dfrac{16}{12}$ $\dfrac{O}{A}$ ✓

3) $\sin B = \dfrac{12}{20}$ $\dfrac{O}{H}$ ✓

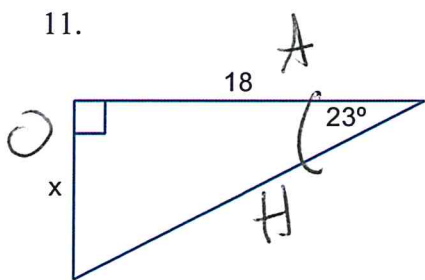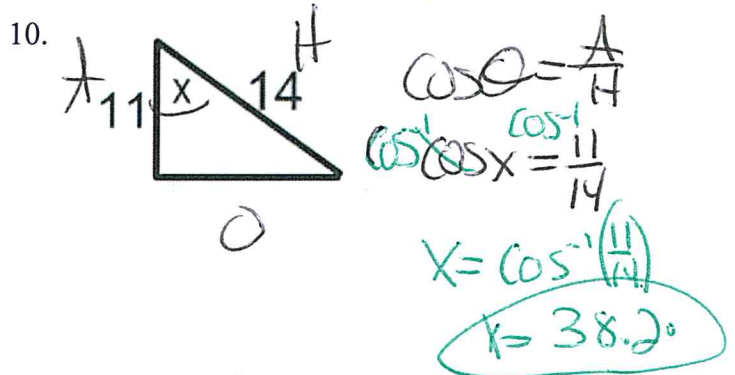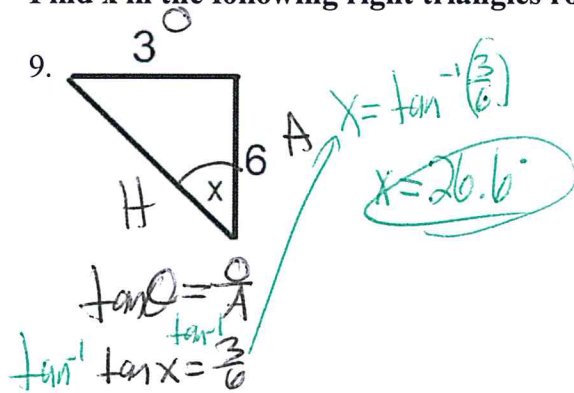4) $\tan B = \dfrac{16}{20}$ $\dfrac{O}{A}$ $\dfrac{12}{16}$ ✗

A

12   20

C   16   B

At top (reference triangles):

x 45 $x\sqrt{2}$
45
x

x $60°$ $2x$
$30°$
$x\sqrt{3}$

Find the missing sides of the right triangles below

5.
12
12
$12\sqrt{2}$
45

6.
$11\sqrt{3}$
30
22
11

7.
$10\sqrt{3}$
30
10
20

8.
10
45
10
$10\sqrt{2}$

Find x in the following right triangles rounded to the *nearest tenth*.

$S\frac{O}{H}$ $C\frac{A}{H}$ $T\frac{O}{A}$

9.
3 O
6 A
H
x

$X = \tan^{-1}\left(\frac{3}{6}\right)$
$X = 26.6°$

$\tan\theta = \frac{O}{A}$
$\tan^{-1}\tan x = \frac{3}{6}$

10.
A 11 x 14 H
O

$\cos\theta = \frac{A}{H}$
$\cos^{-1}\cos x = \frac{11}{14}$
$X = \cos^{-1}\left(\frac{11}{14}\right)$
$X = 38.2°$

11.
A
18
$23°$
O
x
H

$\tan\theta = \frac{O}{A}$
$\tan 23 = \frac{x}{18}$
$X = 18\tan 23$
$X = 7.6$

12.
A
x
$18°$
17
O
H
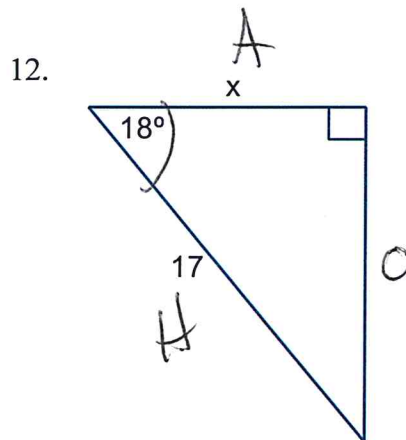
$\cos\theta = \frac{A}{H}$
$\cos 18 = \frac{x}{17}$
$X = 17\cos 18$
$X = 16.2$

13. A 28-foot ladder is leaning against a house. The bottom of the ladder is 6 feet from the base of the house. Find the measure of the angle formed by the ladder and the ground, to the *nearest degree*.
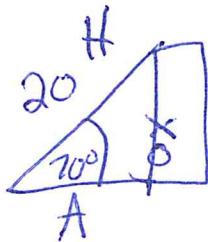
$$\cos\theta = \frac{A}{H}$$
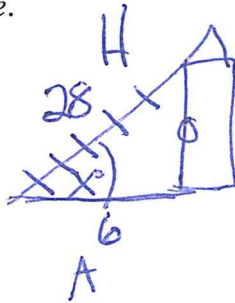
$$\cos^{-1}\cos x = \cos^{-1}\frac{6}{28}$$

$$x = \cos^{-1}\left(\frac{6}{28}\right)$$

$$x = 78°$$

14. A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?
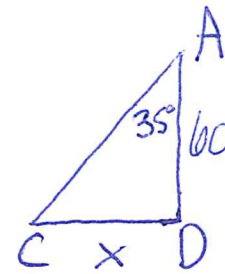
$$\sin\theta = \frac{O}{H}$$

$$\sin 70 = \frac{x}{20}$$

$$x = 20\sin 70$$

$$x = 18.8$$

15. In the diagram below, $m\angle CAD = 35$, $m\angle ABD = 42$, and $m\overline{AD} = 60$. Find to the nearest tenth, $m\overline{BC}$.

Subtraction
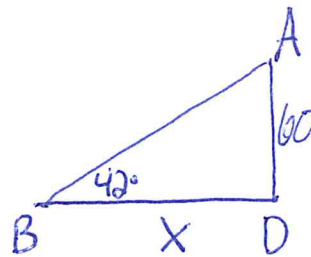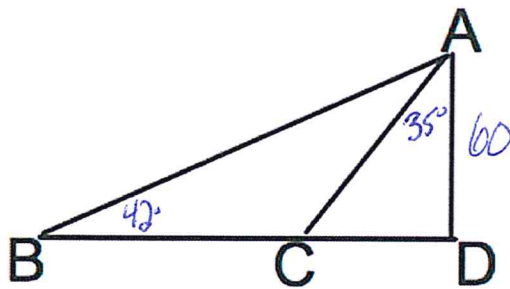
$$\tan 42 = \frac{60}{x}$$

$$\frac{x\tan 42}{\tan 42} = \frac{60}{\tan 42}$$

$$x = 66.6$$

$$\tan 35 = \frac{x}{60}$$

$$x = 60\tan 35$$

$$x = 42$$

$$\begin{array}{r} 66.6 \\ -42 \\ \hline 24.6 \end{array}$$

16. Nick wanted to determine the length of one blade of the windmill pictured below. He stood at a point on the ground 440 feet from the windmill's base. Using surveyor's tools, Nick measured the angle between the ground and the highest point reached by the top blade and found it was 38.8°. He also measured the angle between the ground and the lowest point of the top blade, and found it was 30°. Determine and state a blade's length, x, to the *nearest foot*.

subtract
353 ... - 254
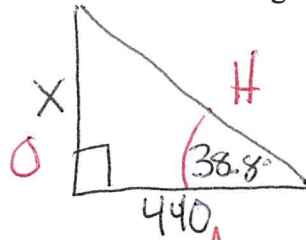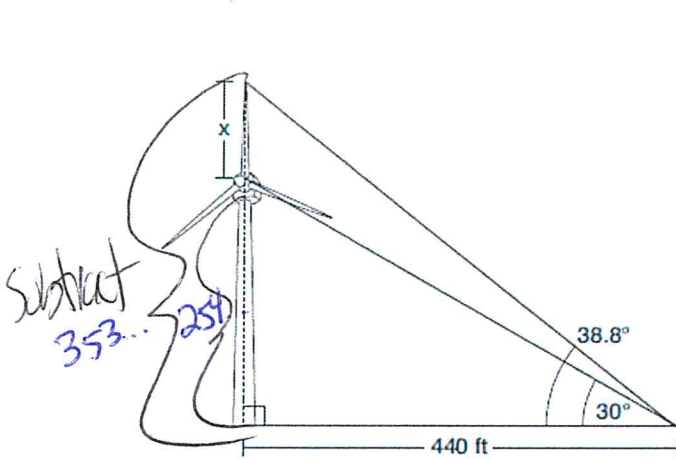
$$\tan 38.8 = \frac{x}{440}$$
$$x = 440 \tan 38.8$$
$$x = 353 ...$$
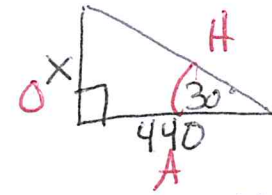
$$\tan 30 = \frac{x}{440}$$
$$x = 440 \tan 30$$
$$x = 254 ...$$

$$353 ... - 254 ... = 100$$

17. If $\sin(x + 15) = \cos(45)$, determine the value of x.

$\sin A = \cos B$

$A + B = 90$
$x + 15 + 45 = 90$
$x + 60 = 90$
$-60 \quad -60$
$x = 30$

18. If $\sin(2x + 7)° = \cos(4x - 7)°$, what is the value of x?

$\sin A = \cos B$

$A + B = 90$
$2x + 7 + 4x - 7 = 90$
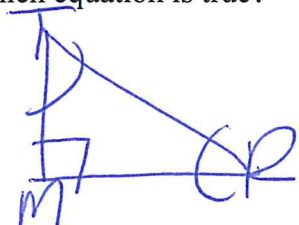$\frac{6x = 90}{6 \quad 6}$
$x = 15$

19. Right triangle *TMR* is a scalene triangle with the right angle at *M.* Which equation is true?
1) ~~sin M = cos T~~
2) ~~sin R = cos R~~
3) sin T = cos R
4) ~~sin T = cos M~~

20. In right triangle *DAN*, m∠A = 90°. Which statement must always be true?
1) ~~cos D = cos N~~
2) cos D = sin N
3) ~~sin A = cos N~~
4) ~~cos A = tan N~~

$\sin A = \cos B$

(handwritten at top, diagrams of triangles with labels L, A, S, and right angle marks)

21. In right triangle *RST* below, altitude $\overline{SV}$ is drawn to hypotenuse $\overline{RT}$. If *RV* = 4.1 and *TV* = 10.2, what is the length of $\overline{ST}$, to the *nearest tenth*?

(handwritten work)

HLS
SAAS

$\dfrac{H}{L} = \dfrac{L}{S}$

$\dfrac{14.3}{x} = \dfrac{x}{10.2}$

$x^2 = \sqrt{145.86}$

$x = 12.1$

(diagram of triangle RST with S at top, R and T at base, V on base between them, altitude x from S to V; RV = 4.1, VT = 10.2, base total 14.3)
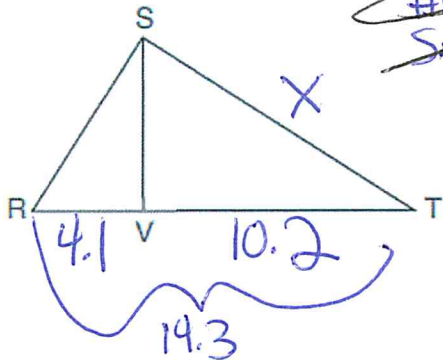
22. In right triangle *PRT*, $m\angle P = 90°$, altitude $\overline{PQ}$ is drawn to hypotenuse $\overline{RT}$, *RT* = 17, and *PR* = 15. Determine and state, to the *nearest tenth*, the length of $\overline{RQ}$.

(diagram of triangle PRT with P at top, T and R at base, Q on base, PR = 15, base = 17)

(handwritten work)
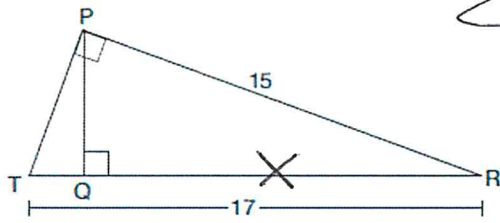
HLS
SAAS

$\dfrac{17}{15} = \dfrac{15}{x}$

$17x = 225$

$\dfrac{17x}{17} = \dfrac{225}{17}$

$x = 13.2$

23. Which rotation would map a regular hexagon onto itself?
1) 45°   3) 240° 60(4)
2) 150°   4) 315°

(handwritten) 6

$\dfrac{360}{n}$ and any multiple of that

$\dfrac{360}{6} = 60$

10

24. Which rotation about its center will carry a regular decagon onto itself?
1) 54°
2) 162°
3) 198°
4) 252° 36(7)

$\dfrac{360}{10} = 36$