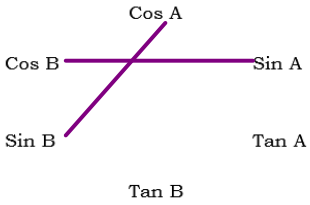
Lesson 10 Homework – Complementary Angles, Isosceles Right Triangles and Trig

1. Match the pairs of trig functions that have the same value if A and B are the two acute angles in a right triangle. Draw lines to connect the pairs.



2. Simplify the following fractions if α and θ are two acute angles of a right triangle.

$\frac{\sin\alpha}{\cos\theta} = \frac{\cos\theta}{\cos\theta}$ = 1

$\frac{\cos(90-\theta)+\sin\theta}{\cos(90-\theta)} = \frac{\sin\theta+\sin\theta}{\sin\theta} = \frac{2\sin\theta}{\sin\theta}$ = 2

3. Triangle KMH is isosceles, with $m\angle M = 90°$. What is tan(K) ?

1

4. If $\sin(35) = \frac{2a}{b}$, what is the value of $\sin(35) + \cos(55)$ in terms of a and b?

$\cos 55 = \frac{2a}{b}$ $\frac{4a}{b}$

COS A = SIN B
SIN A = COS B

5. If $\cos A = \frac{3y+1}{4}$ and $\sin(90 - A) = \frac{44-y}{5}$, find the value of y.

y = 9

$\frac{3y+1}{4} = \frac{44-y}{5}$

$5(3y+1) = 4(44-y)$

$15y+5 = 176-4y$

$+4y \quad +4y$

$19y+5 = 176$

$-5 \quad -5$

$19y = 171$

6. Find the value of m if $\sin(m) = \cos(\frac{m}{3} + 10)$.

m = 60

7. If $\sin(x^2 - 3x - 27) = \cos(x^2 - 5x - 3)$ what is the value of x?

$(x^2 - 3x - 27) + (x^2 - 5x - 3) = 90$

$2x^2 - 8x - 120 = 0$

$2(x - 10)(x + 6) = 0$

$x = 10, x = -6$

$2x^2 - 8x - 30 = 90$
$-90 \quad -90$

$2x^2 - 8x - 120 = 0$

S: 2 P

$x^2 - 4x - 60 = 0$

$(x - 10)(x + 6) = 0$

$x - 10 = 0$ | $x + 6 = 0$

$x = 10$ | $x = -6$

8. If $\cos A = \frac{x}{6}$ and $\sin(90 - A) = \frac{24}{x}$, find the positive value of x?

$x = 12$

9. If $\sin(x^2 + x - 36) = \cos(4x + 90)$ what is the value of x?

$(x^2 + x - 36) + (4x + 90) = 90$

$x^2 + 5x - 36 = 0$

$x = -9, x = 4$

P: -36

S: 5

9, -4

$(x + 9)(x - 4) = 0$

$x + 9 = 0$ | $x - 4 = 0$

$x = -9$ | $x = 4$

7. If $\sin(x^2 + 6x + 12) = \cos(3x + 36)$ what is the positive value of x?

8. If $\cos A = \frac{y+1}{4}$ and $\sin(90 - A) = \frac{3}{y-3}$, find the positive value of y.

3 is tricky!

4 is tricky (save for Monday)

14 is tricky!

Skip #16

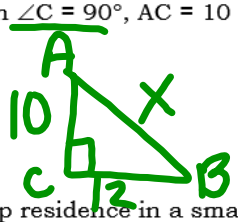
Name: _____ Period: _____
Teacher: _____ Date: _____

Unit 8 Review - Trigonometry

yes 1. Do the lengths of 2.4, 3.2, and 4 form the sides of a right triangle?

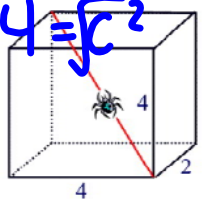
$2.4^2 + 3.2^2 = 4^2$ - $a^2+b^2=c^2$

15.6 2. ABC is a triangle with ∠C = 90°, AC = 10 and BC = 12. Find the length of AB to the nearest tenth.



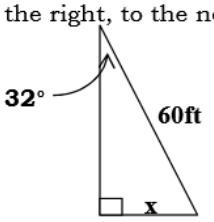
$10^2+12^2=c^2$
$100+144=c^2$
$\sqrt{244}=\sqrt{c^2}$

6 in X 3. A spider has taken up residence in a small cardboard box which measures 2 inches by 4 inches by 4 inches. What is the length, in inches, of a straight spider web that will carry the spider from the lower right front corner to the back left corner of the box?



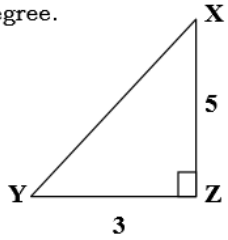
10.8 X 4. Using the Pythagorean Theorem, find the area of an equilateral triangle whose side measures 5 units. Find the area to the nearest tenth of a square unit.

32 ft 5. Find x in the triangle to the right, to the nearest foot.



vs.

31° 6. Find the m∠X to the nearest degree.



inverse keys
cos⁻¹
tan⁻¹
sin⁻¹

7. Explain how you know whether you will use the Pythagorean theorem to solve a problem or trigonometry.

If you are given two sides and asked for another side of a right triangle, then it is the Pythagorean theorem. If the problem asks you to find an angle or gives you an angle to use (~~besides the right angle~~) then you use trigonometry.

8. Evaluate the following trig functions to the nearest ten-thousandths.

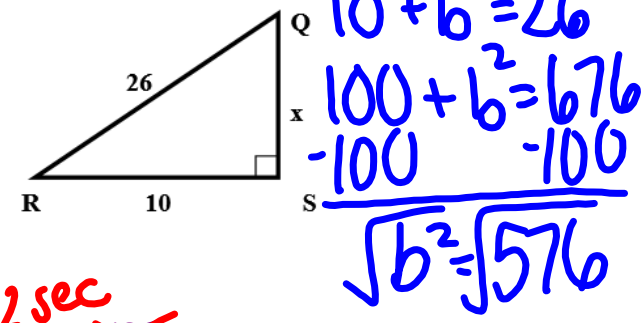
Cos 84° .1045 Sin 21° .3584

9. Find, *to the nearest degree*, the measure of angle x for which the given trig equations are true:

Tan x = 3.4137 74° $\tan^{-1}(3.4137)$

Cos x = 0.8472 32° $\cos^{-1}(.8472)$

24 10. Find the missing side in the triangle below.



$10^2+b^2=26^2$

$100+b^2=676$

$-100 \quad -100$

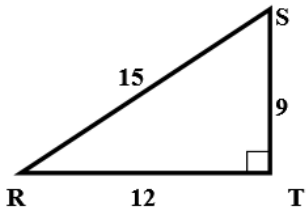
$\sqrt{b^2}=\sqrt{576}$

In Δ RST, shown below, find in simplest form:

4/5 11. Sin S

3/5 12. Cos S

3/4 13. Tan R



22 sec ~~yes~~ 14. The captain of a ship spots the top of a lighthouse at a 6° angle of elevation. The lighthouse is on the edge of the shore and is 50 ft tall. If the ship travels at an average speed of 15 *miles per hour*, how many *seconds*, to the nearest whole second, will it take to reach the shore?

$\tan 6 = \frac{50}{x}$

$x \approx 475.7182227$ ft

$\times 5280$

15 mi / hr

79200 ft / hr

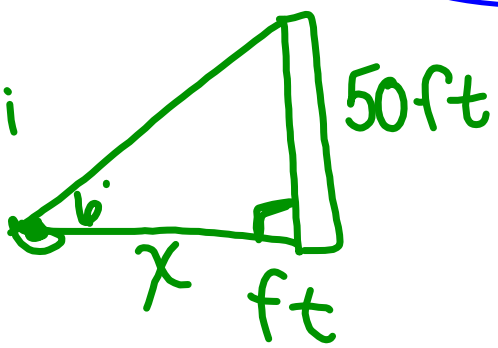
5280ft = 1mi

475.7182227 / 79200

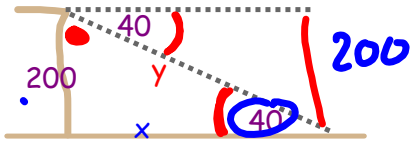
= .0060065432 hours

=.360392593 minutes

≈ 22 seconds



238 ft 15. A hiker at the top of a 200–foot cliff finds that the angle of depression to a distant farm house is 40 degrees. To the nearest foot, how far is the farmhouse from the base of the cliff.



tan 40 = 200 / x

x ≈ 238 feet

Tan 40 = 200 / x

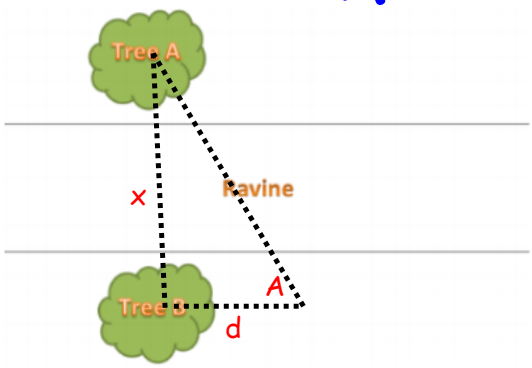
- If a bird flew from the farm house up to the top of the cliff, how far would it fly?

sin 40 = 200 / y

y ≈ 311 feet

X · Tan 40 = 200 / Tan 40 Tan 40

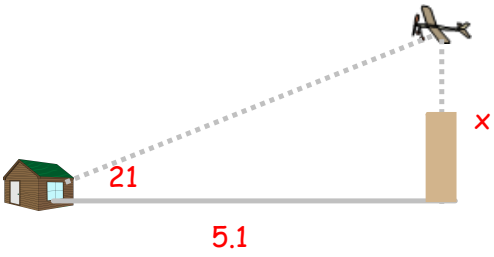
yes 16. Eric wants to hang a rope bridge over a small ravine so that it is easier to cross. To hang the bridge, he needs to know how much rope is needed to span the distance between two trees that are directly across from each other on either side of the ravine, as shown in the diagram.



Help Eric by devising a plan using trigonometry to determine the distance from Tree A to Tree B without having to cross the ravine. Explain your plan below and use the diagram to sketch your plan.

To find the needed distance, x, first stand a given distance, d, away from one tree. Then measure the angle from one tree to another, A, and use the tangent function to find x.

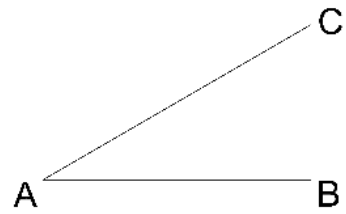
17. Suppose you live 5.1 miles from a tower. From your home, you see a plane directly above the tower. Your angle of elevation to the plane is 21°. What is the plane's altitude, to the nearest hundredth of a mile?



tan 21 = x / 5.1

x ≈ 1.96 miles

18. a) What is the relationship between cosA and sinC in the diagram to the right? Why is this true?



cos (A) = sin (C) because A and C are the acute angles in a right triangle. As a result, the adjacent side to angle A is the opposite side of angle C

b) When would tanA = tanC and Why? Can you evaluate tanA if this were true?

tanA = tan C when the opposite and adjacent sides are congruent. Therefore tan A = tan C = 1.

19. If $\sin(B) = \frac{4}{9}$, what is the value of $4\sin(B) + \cos(90 - B)$?

$\frac{20}{9}$

20. If $\sin 22 = \frac{a}{b}$, what is $\cos 68$, in terms of a and b?

$\frac{a}{b}$

21. If $\cos A = \frac{3}{x-4}$ and $\sin(90 - A) = \frac{9}{x-2}$, find the value of x.

$x = 5$

22. If $\sin(x^2 + 14x) = \cos(18)$ what is the positive value of x?

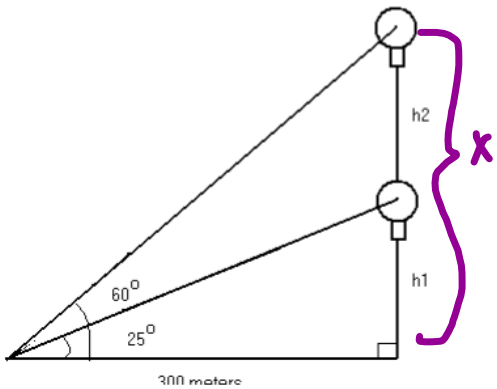
$x^2 + 14x + 18 = 90$

$x = 4$

23. In the diagram below find the length of h2.

$\tan 25 = h_1/300$ $\tan 85 = x/300$

3289 meters



Test tomorrow!

Lesson 9 Homework – Complementary Angles, Isosceles Right Triangles and Trig

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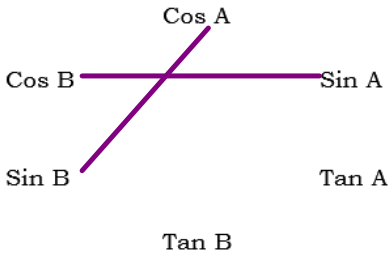

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3. Triangle KMH is isosceles, with $m\angle M = 90°$. What is tan(K) ?

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4. If sin 35 = $\frac{2a}{b}$, what is the value of *sin(35) + cos(55),* in terms of a and *b*?

$\frac{4a}{b}$

5. If cos A = $\frac{3y+1}{4}$ and sin (90 - A) = $\frac{44-y}{5}$, find the value of x.

y = 9

6. Find the value of m if sin(m) = cos($\frac{m}{3}$ + 10).

m = 60

7. If $\sin(x^2 - 3x - 27) = \cos(x^2 - 5x - 3)$ what is the value of x?

$(x^2 - 3x - 27) + (x^2 - 5x - 3) = 90$

$2x^2 - 8x - 120 = 0$

$2(x - 10)(x + 6) = 0$

$x = 10, x = -6$

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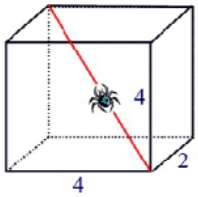

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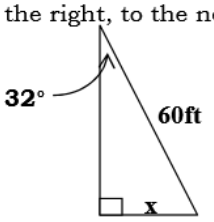

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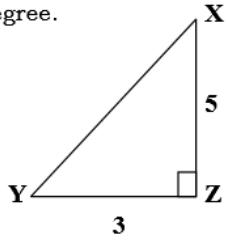

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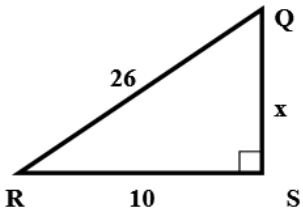

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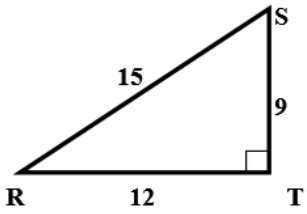

yes 14. The captain of a ship spots the top of a lighthouse at a 6° angle of elevation. The lighthouse is on the edge of the shore and is 50 ft tall. If the ship travels at an average speed of 15 *miles per hour*, how many *seconds*, to the nearest whole second, will it take to reach the shore?

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$x \approx 475.7182227$ ft

15 mi / hr

= 79200 ft / hr

475.7182227 / 79200

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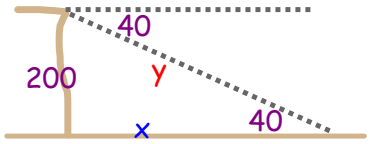

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x ≈ 238 feet

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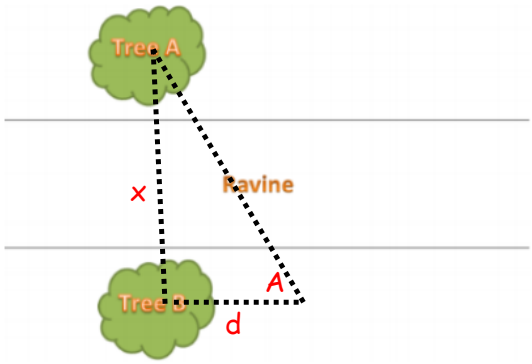

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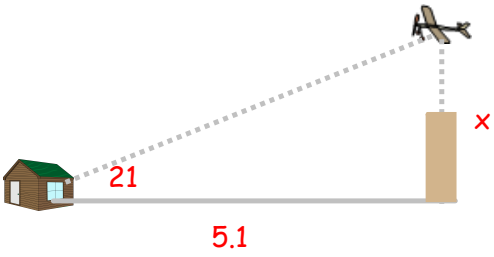

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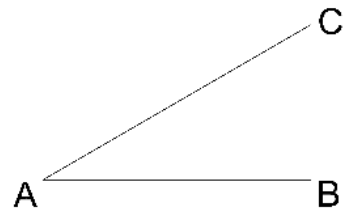

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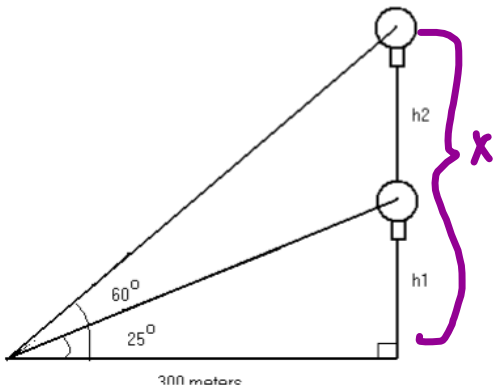
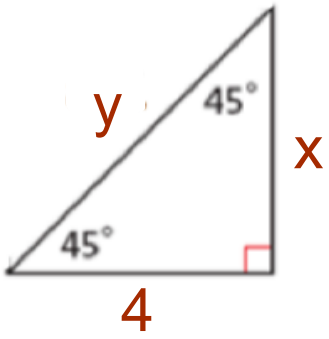
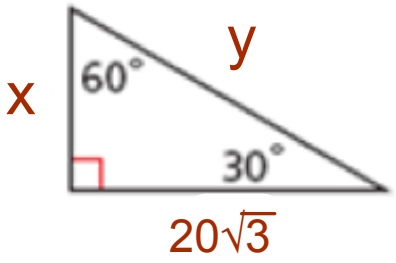


3289 meters


y
45°
x
45°
4


x
y
60°
30°
20√3