

ALGEBRA II Exam G Review

KEY

Use the properties of special right triangles ($30^\circ-60^\circ-90^\circ$ and $45^\circ-45^\circ-90^\circ$) to solve problems

1) If $b = 5$, then the exact value of c is...

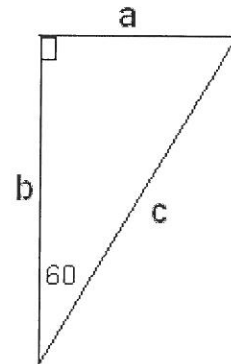
- a) 5 b) $5\sqrt{2}$ c) $5\sqrt{3}$ d) 10

2) If $a = 2\sqrt{3}$, then the exact value of b is...

- a) 2 b) 6 c) $4\sqrt{3}$ d) 12

3) If $a = 7$, then the value of b to the nearest tenth is...

- a) 4.0 b) 3.5 c) 4.9 d) 5



4) If $b = 7$, then the value of c to the nearest tenth is...

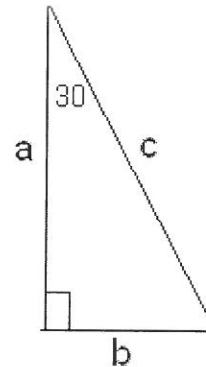
- a) 8.5 b) 9.9 c) 12.1 d) 14.0

5) If $b = 7$, then the value of a to the nearest tenth is...

- a) 8.5 b) 9.9 c) 12.1 d) 14.0

6) If $c = 12$, then the value of b to the nearest tenth is...

- a) 6.0 b) 4.2 c) 4.0 d) 3.5



7) If $b = 7$, then the value of c to the nearest tenth is...

- a) 9.9 b) 10.5 c) 12.1 d) 7

8) If $b = 2\sqrt{6}$, then the value of a to the nearest tenth is...

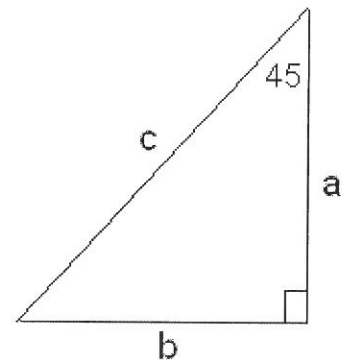
- a) 10.5 b) 9.8 c) 6.9 d) 4.9

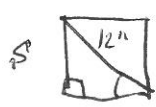

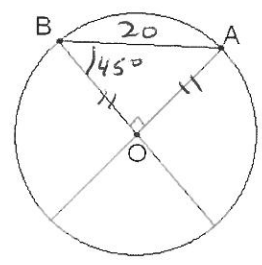
9) If $c = 12$, then the exact value of b is...

- a) 6 b) 9 c) $4\sqrt{3}$ d) $6\sqrt{2}$

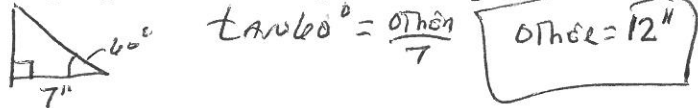
10) If $c = 5\sqrt{6}$, then the exact value of b is...

- a) 10 b) 5 c) $5\sqrt{3}$ d) $5\sqrt{2}$

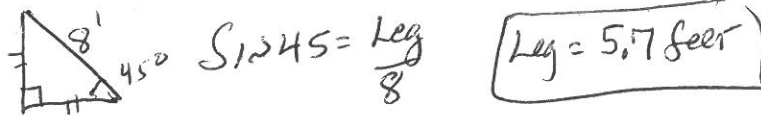


| | |
|--|--|
| <p>11) What is the exact side length of a square that has a diagonal length of 12 inches?</p>  <p>$\sin 45^\circ = \frac{s}{12}$ $s = 6\sqrt{2}$ inches</p> | <p>12) What is the exact perimeter of an equilateral triangle that has a height of 18 cm?</p>  <p>$\sin 60^\circ = \frac{18}{s}$ $3s = P$ $P = 36\sqrt{3}$ cm</p> |
| <p>13) If segment AB has a length of 20, what is the exact radius of the circle with center O?</p> <p>$\sin 45^\circ = \frac{R}{20}$ $R = 10\sqrt{2}$</p> |  |

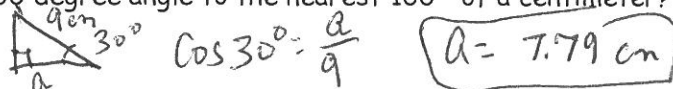
14. A right triangle has a 60 degree angle, and the leg adjacent to that angle has a length of 7 in. Find the length of the other leg to the nearest inch.



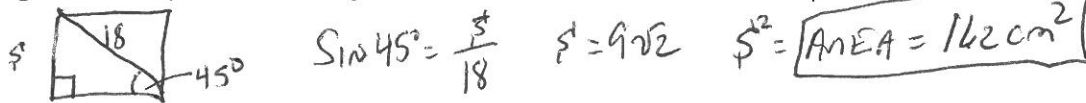
15. A right triangle has a 45 degree angle, and the hypotenuse has a length of 8 ft. Find the length of a leg to the nearest 10th of a foot.



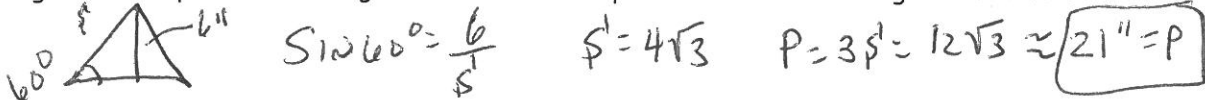
16. The hypotenuse of a right triangle with a 30 degree angle has a length of 9 cm. What is the length of the leg adjacent to the 30 degree angle to the nearest 100th of a centimeter?



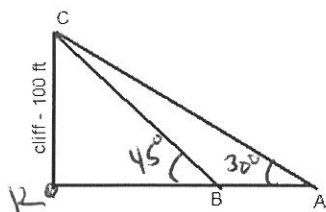
17. The diagonal of a square has a length of 18 cm. Find the area of the square.



18. The height of an equilateral triangle is 6 in. Find the perimeter of the triangle to the nearest inch.



19. Albert is standing at point A. He takes a sighting to the top of a cliff, (point C). The angle of elevation is 30 degrees. Becky is standing at point B and takes a sighting to the top of the same cliff, (point C). The angle of elevation is 45 degrees. If the cliff is 100 feet high, find the distance between Albert and Becky.

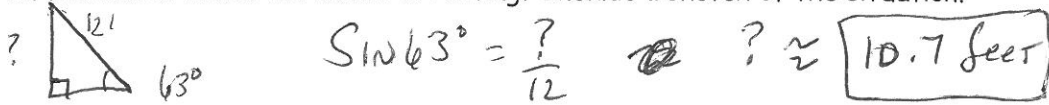


$KC = KB = 100 \text{ ft}$ $BA = KA - BK \approx 73.2 \text{ ft}$

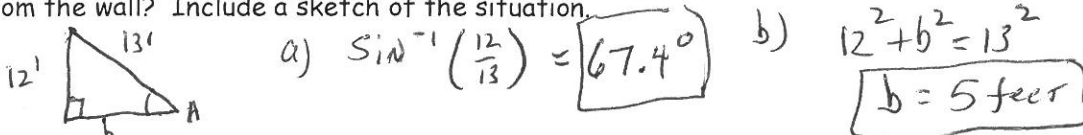
$\tan 30^\circ = \frac{100}{KA}$
 $KA = 100\sqrt{3}$

Using sine, cosine and tangent ratios to solve problems

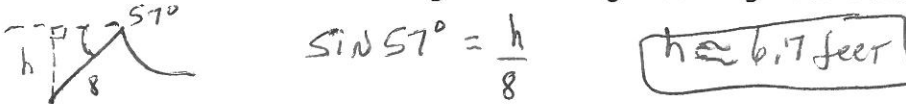
20. A 12-foot ladder leans against a wall to form a 63° angle with the ground. How many feet above the ground is the point on the wall at which the ladder is resting? Include a sketch of the situation.



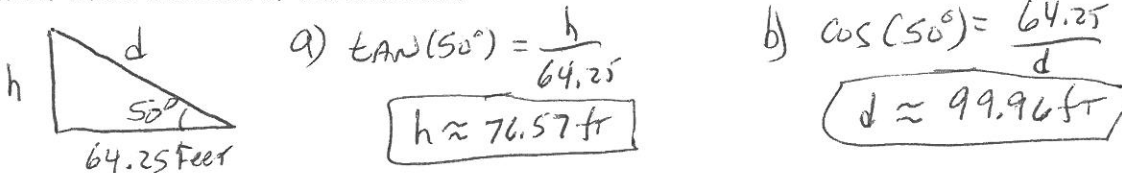
21. A 13-foot ladder is leaning against a brick wall. The top of the ladder touches the wall 12 feet (ft) above the ground. (a) What is the angle formed by the ground and the base of the ladder? (b) How far is the base of the ladder from the wall? Include a sketch of the situation.



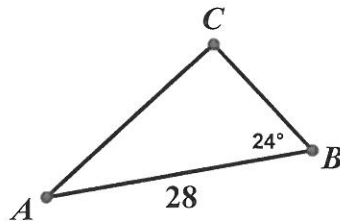
22. Billy is standing on the top of a backyard swing set slide. As he looks back, he notices that the angle of depression for the 8 foot ladder foot is 57 degrees. How high off the ground is Billy? Make a sketch of the situation.



23. Sally has measured the shadow cast by the blue spruce tree in her family's front yard to be about 64.25 feet. She estimates that the angle of elevation when she is standing at the end of the shadow to the top of the blue spruce is 50 degrees. Determine (a) the height of the tree and (b) the distance Sally is from the top of the tree. Make a sketch of the situation.



24. Triangle ABC is shown below.



Which equation should be used to find the length of segment AC if angle C is a right angle?

a. $\sin 24^\circ = \frac{AC}{28}$

b. $\sin 24^\circ = \frac{28}{AC}$

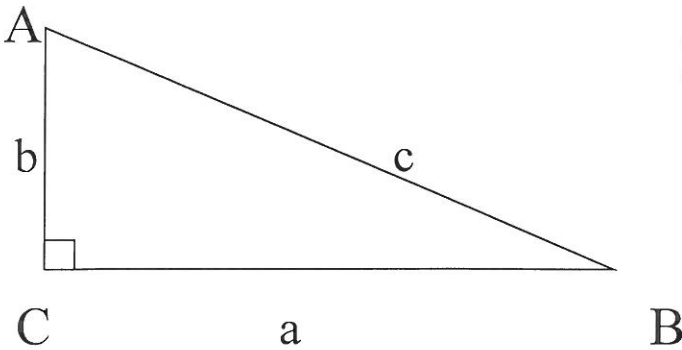
c. $\cos 24^\circ = \frac{AC}{28}$

d. $\cos 24^\circ = \frac{28}{AC}$

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25. In the triangle below, if $\sin B = \frac{5}{13}$, find the $\tan A$.



$$5^2 + a^2 = 13^2$$

$$a = 12$$

$$\tan A = \frac{a}{b} = \frac{12}{5}$$

26. In the triangle above, if $BC = 21$ and $\sin A = 0.7$, what is the length of AB ?

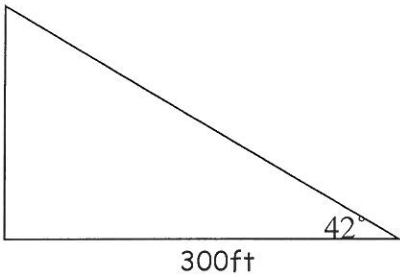
A. 14.7

B. 21.7

C. 30

D. 32

27.

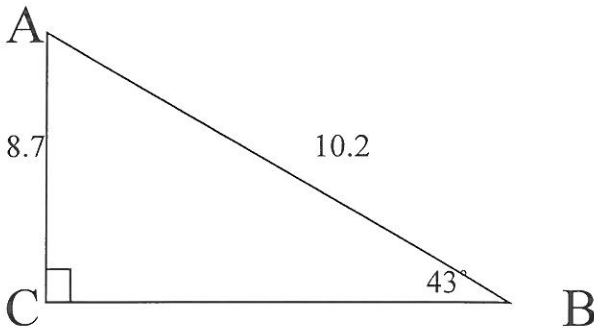


$$\tan 42^\circ = \frac{LH}{300}$$

$$LH \approx 210ft$$

Approximately how tall is the lighthouse if the angle of elevation shown is 42 degrees?

28.



Which equation gives the correct value for BC ?

A. $\sin 43^\circ = \frac{BC}{10.2}$

B. $\cos 43^\circ = \frac{8.7}{BC}$

C. $\tan 47^\circ = \frac{8.7}{BC}$

D. $\sin 47^\circ = \frac{BC}{10.2}$

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Use the unit circle to find all six trigonometric values for the given angle.

| | | | |
|-------------------------|--------------------|------------------------------|------------------------------|
| 1) $\theta = 270^\circ$ | $\sin \theta = -1$ | $\cos \theta = 0$ | $\tan \theta = \text{UNDEF}$ |
| | $\csc \theta = -1$ | $\sec \theta = \text{UNDEF}$ | $\cot \theta = 0$ |

| | | | |
|-------------------|------------------------------|--------------------|------------------------------|
| 2) $\theta = \pi$ | $\sin \theta = 0$ | $\cos \theta = -1$ | $\tan \theta = 0$ |
| | $\csc \theta = \text{UNDEF}$ | $\sec \theta = -1$ | $\cot \theta = \text{UNDEF}$ |

| | | | |
|---------------------------|--------------------|------------------------------|------------------------------|
| 3) $\theta = (-90^\circ)$ | $\sin \theta = -1$ | $\cos \theta = 0$ | $\tan \theta = \text{UNDEF}$ |
| | $\csc \theta = -1$ | $\sec \theta = \text{UNDEF}$ | $\cot \theta = 0$ |

| | | | |
|-----------------------|------------------------------|-------------------|------------------------------|
| 4) $\theta = (-2\pi)$ | $\sin \theta = 0$ | $\cos \theta = 1$ | $\tan \theta = 0$ |
| | $\csc \theta = \text{UNDEF}$ | $\sec \theta = 1$ | $\cot \theta = \text{UNDEF}$ |

Use the unit circle to find the values of the six trigonometric functions for each angle.

| | | | |
|------------------------|-------------------------------------|-----------------------------|------------------------------------|
| 5) $\theta = 60^\circ$ | $\sin \theta = \frac{\sqrt{3}}{2}$ | $\cos \theta = \frac{1}{2}$ | $\tan \theta = \sqrt{3}$ |
| | $\csc \theta = \frac{2\sqrt{3}}{3}$ | $\sec \theta = 2$ | $\cot \theta = \frac{\sqrt{3}}{2}$ |

| | | | |
|-------------------------------|------------------------------|-------------------------------------|-------------------------------------|
| 6) $\theta = \frac{11\pi}{6}$ | $\sin \theta = -\frac{1}{2}$ | $\cos \theta = \frac{\sqrt{3}}{2}$ | $\tan \theta = -\frac{\sqrt{3}}{3}$ |
| | $\csc \theta = -2$ | $\sec \theta = \frac{2\sqrt{3}}{3}$ | $\cot \theta = -\sqrt{3}$ |

| | | | |
|-------------------------|-------------------------------------|-------------------------------------|-------------------|
| 7) $\theta = 225^\circ$ | $\sin \theta = -\frac{\sqrt{2}}{2}$ | $\cos \theta = -\frac{\sqrt{2}}{2}$ | $\tan \theta = 1$ |
| | $\csc \theta = -\sqrt{2}$ | $\sec \theta = -\sqrt{2}$ | $\cot \theta = 1$ |

| | | | |
|------------------------------|-----------------------------|--------------------------------------|-------------------------------------|
| 8) $\theta = \frac{5\pi}{6}$ | $\sin \theta = \frac{1}{2}$ | $\cos \theta = -\frac{\sqrt{3}}{2}$ | $\tan \theta = -\frac{\sqrt{3}}{3}$ |
| | $\csc \theta = 2$ | $\sec \theta = -\frac{2\sqrt{3}}{3}$ | $\cot \theta = -\sqrt{3}$ |

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Key

I. Reciprocal Identities

A) $\sin \theta = \frac{1}{\csc \theta}$ D) $\csc \theta = \frac{1}{\sin \theta}$
 B) $\cos \theta = \frac{1}{\sec \theta}$ E) $\sec \theta = \frac{1}{\cos \theta}$
 C) $\tan \theta = \frac{1}{\cot \theta}$ F) $\cot \theta = \frac{1}{\tan \theta}$

II. Quotient Identities

A) $\tan \theta = \frac{\sin \theta}{\cos \theta}$
 B) $\cot \theta = \frac{\cos \theta}{\sin \theta}$

Find the exact value of each expression, using unit circle angles (answer in radians)

1. $\cos^{-1} 0$

$\frac{\pi}{2}$

2. $\sin^{-1}\left(-\frac{1}{2}\right)$

$\frac{11\pi}{6}$

3. $\tan^{-1} \sqrt{3}$

$\frac{\pi}{3}$

4. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$\frac{\pi}{6}$

5. $\tan^{-1} 1$

$\frac{\pi}{4}$

6. $\sin^{-1} 1$

$\frac{\pi}{2}$

Find the exact value of each expression.

(USING RADIANS)

1. $\cos\left(\sin^{-1} \frac{\sqrt{3}}{2}\right)$

$\frac{1}{2}$

2. $\tan\left[\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)\right]$

-1

3. $\sec\left[\cos^{-1}\left(\frac{1}{2}\right)\right]$

2

4. $\csc(\cos^{-1} 0)$

1

5. $\sin(\tan^{-1} 4)$

$\frac{4\sqrt{17}}{\sqrt{17}}$

6. $\cot^{-1}\left(\cot \frac{2\pi}{3}\right)$

$\frac{2\pi}{3}$

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KEY

Complete the following table, using your unit circle and reciprocal identities

| | | | | | | | | | | | |
|------|-----------------------|-----------------------|------------------|-----------------------|--------------|------------------------|------------------------|-----------------------|-----------------------|------------------------|-----------------------|
| Rad. | $\frac{2\pi}{3}$ | $\frac{3\pi}{4}$ | $\frac{3\pi}{2}$ | $\frac{11\pi}{6}$ | -3π | $-\frac{5\pi}{6}$ | $\frac{10\pi}{3}$ | $-\frac{25\pi}{6}$ | $-\frac{9\pi}{4}$ | $\frac{4\pi}{3}$ | $-\frac{\pi}{4}$ |
| Deg. | 120° | 135° | 270° | 330° | -540° | -150° | 600° | -750° | -405° | 240° | -45° |
| sin | $\frac{\sqrt{3}}{2}$ | $\frac{\sqrt{2}}{2}$ | -1 | $-\frac{1}{2}$ | 0 | $-\frac{1}{2}$ | $\frac{-\sqrt{3}}{2}$ | $-\frac{1}{2}$ | $\frac{-\sqrt{2}}{2}$ | $-\frac{\sqrt{3}}{2}$ | $\frac{-\sqrt{2}}{2}$ |
| cos | $-\frac{1}{2}$ | $\frac{-\sqrt{2}}{2}$ | 0 | $\frac{\sqrt{3}}{2}$ | -1 | $\frac{-\sqrt{3}}{2}$ | $-\frac{1}{2}$ | $\frac{\sqrt{3}}{2}$ | $\frac{\sqrt{2}}{2}$ | $-\frac{1}{2}$ | $\frac{\sqrt{2}}{2}$ |
| tan | $-\sqrt{3}$ | -1 | UNDEF | $\frac{-\sqrt{3}}{3}$ | 0 | $\frac{\sqrt{3}}{3}$ | $\sqrt{3}$ | $\frac{-\sqrt{3}}{3}$ | -1 | $\sqrt{3}$ | -1 |
| cot | $\frac{-\sqrt{3}}{3}$ | -1 | 0 | $-\sqrt{3}$ | UNDEF | $\sqrt{3}$ | $\frac{\sqrt{3}}{3}$ | $-\sqrt{3}$ | -1 | $\frac{\sqrt{3}}{3}$ | -1 |
| sec | -2 | $-\sqrt{2}$ | UNDEF | $\frac{2\sqrt{3}}{3}$ | -1 | $\frac{-2\sqrt{3}}{3}$ | -2 | $\frac{2\sqrt{3}}{3}$ | $\sqrt{2}$ | -2 | $\sqrt{2}$ |
| csc | $\frac{2\sqrt{3}}{3}$ | $\sqrt{2}$ | -1 | -2 | UNDEF | -2 | $\frac{-2\sqrt{3}}{3}$ | -2 | $-\sqrt{2}$ | $\frac{-2\sqrt{3}}{3}$ | $-\sqrt{2}$ |

II
II
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IV
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III
II
IV
IV
III
IV

Convert into degrees, minutes, and seconds. (Round answers to the nearest second, if needed.)

1) 152.65°

$152^\circ 39'$

2) 86.125°

$86^\circ 7' 30''$

Convert to decimal degrees.

1) $52^\circ 28' 22''$

52.4728°

2) $138^\circ 45' 58''$

138.766°