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**Lesson 9: Trigonometry, Imaginary Numbers, Geometry**

1. In a right triangle, one angle measures x°, where $\cos(x°)=\frac{5}{13}$ . What is $sin(90° -x°)$?
	1. 0.385
	2. 0.923
	3. 0.417
	4. 2.6
2. In a right triangle, one angle measures x°$ (x°\ne 90)$, where $\sin(x°)=\frac{24}{26}$ . What is $cosx°$?
	1. 0.923
	2. 0.385
	3. 1.083
	4. 0.417
3. In the xy-plane below, O is at the center of the circle, and the measure of ∠AOB is $\frac{π}{a}$ radians. What is the value of *a*?



* 1. 6
	2. 5
	3. 4
	4. 3
1. In a right triangle, $\cos(\frac{π}{a})=\frac{1}{2}$. What is the $\cos(\frac{2π}{a})$?
	1. 0.5
	2. -0.5
	3. 0.9
	4. -0.9
2. In triangle ABC, the measure of ∠B is 90°, BC = 8, and AC = 10. Triangle DEF is similar to triangle ABC, where vertices D, E, and F correspond to vertices A, B, and C, respectively, and each side of triangle DEF is 2 times the length of the corresponding side of triangle ABC. What is the value of $\cos(F)$?
	1. 0.2
	2. 0.6
	3. 0.8
	4. 1.0
3. The angles shown above are acute and $\sin(a)=\cos(b)$. If $a=3k-7$ and $b=2k+17$, what is the value of k?



* 1. 12
	2. 14
	3. 16
	4. 18
1. If $\sin(30)=0.5$, $\cos(x)=0.5$. Find the value of *x*?
	1. 60
	2. 45
	3. 30
	4. 15
2. In a circle with center O, central angle AOB has a measure of $\frac{7π}{6}$radians. The area of the sector formed by central angle AOB is what fraction of the area of the circle?
	1. $\frac{π}{6}$
	2. $\frac{1}{6}$
	3. $\frac{7π}{12}$
	4. $\frac{7}{12}$
3. In a circle with center O, central angle AOB has a measure of $225°$. How many radians would be needed to complete the circle?
	1. $\frac{π}{4}$
	2. $\frac{3π}{4}$
	3. $\frac{5π}{4}$
	4. $\frac{7π}{4}$
4. In a right triangle, $\sin(\frac{π}{a})=\frac{1}{2}$. What is the $\sin(\frac{7π}{a})$?
	1. $\frac{1}{2}$
	2. $\frac{π}{2}$
	3. $-\frac{1}{2}$
	4. $-\frac{π}{2}$
5. The angles shown above are acute and $\sin(a)=\cos(b)$. If $a=5k-3$ and $b=7k+9$, what is the value of k?



* 1. 7
	2. 5
	3. 3
	4. 2
1. In a right triangle, one angle measures x°, where $\sin(x°)=\frac{8}{10}$ . What is $cos(90° -x°)$?
	1. .4
	2. .6
	3. .8
	4. 1.2
2. In the xy-plane below, O is at the center of the circle, and the measure of ∠AOB is $\frac{π}{a}$ radians. What is the value of *a*?
	1. 2
	2. 3
	3. 4
	4. 6
3. In a right triangle, $\tan(\frac{π}{a})=1$. What is the $\tan(\frac{5π}{a})$?
	1. 1.00
	2. 0.50
	3. 0.87
	4. -0.50
4. If the expression below is rewritten in the form *a+b*, where *a* and *b* are real numbers, what is the value of *a*? (Note $i=\sqrt{-1}$)

$$\frac{7-i}{1-2i}$$

* 1. $\frac{7}{2}$
	2. $\frac{9}{5}$
	3. $\frac{13}{5}$
	4. $\frac{9}{2}$
1. In triangle ABC, the measure of ∠B is 90°, AB = 12, and AC = 13. Triangle DEF is similar to triangle ABC, where vertices D, E, and F correspond to vertices A, B, and C, respectively, and each side of triangle DEF is $\frac{1}{2}$ times the length of the corresponding side of triangle ABC. What is the value of $\tan(D)$?
	1. 0.87
	2. 0.42
	3. 0.50
	4. 0.39
2. What is the value of $i^{39}$? (Note $i=\sqrt{-1}$)
	1. $\sqrt{-1}$
	2. $-$1
	3. $-\sqrt{-1}$
	4. $1$
3. A rectangular object has a hole with the radius of 1 cm drilled through it. The base of the object is 2 cm, the length of the object is 3 cm, and the height of the object is 4 cm. The density of the object is 6.3 grams per cubic centimeter. What is the mass to the nearest gram?
	1. 74
	2. 75
	3. 76
	4. 72
4. If the expression below is rewritten in the from *a+b*, where *a* and *b* are real numbers, what is the value of *a*? (Note $i=\sqrt{-1}$)

$$\frac{3-i}{4-2i}$$

* 1. $\frac{1}{10}$
	2. $\frac{7}{10}$
	3. $\frac{10}{7}$
	4. $\frac{1}{7}$
1. In the xy-plane below, O is at the center of the circle, and the measure of ∠AOB is $\frac{π}{a}$ radians. What is the value of $tan\frac{aπ}{4}$?
	1. 1
	2. -.5
	3. -1
	4. .5
2. A triangular prism shaped object has a hole drilled all the way through in the shape of a rectangle with the side lengths of 1 cm and 2 cm. The sides of the triangular face are all 6 cm and the length of the object is 5 cm. The density of the object is 3.7 grams per cubic centimeter. What is the mass to the nearest gram?
	1. 59
	2. 61
	3. 63
	4. 65
3. What is the value of $i^{25}$? (Note $i=\sqrt{-1}$)
	1. $\sqrt{-1}$
	2. $-$1
	3. $-\sqrt{-1}$
	4. $1$
4. The angles shown above are acute and $\sin(a)=\cos(b)$. If $a=3k-4$ and $b=7k+4$, what is the value of k?



* 1. 7
	2. 5
	3. 6
	4. 9
1. In a right triangle, $\tan(x)=1$. What is the $\cos(7x)$?
	1. 0.83
	2. 0.71
	3. 0.42
	4. 0.92