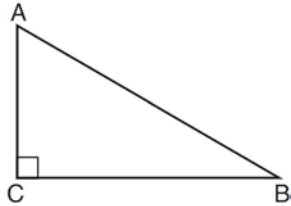


**G.SRT.C.7: Cofunctions 1**

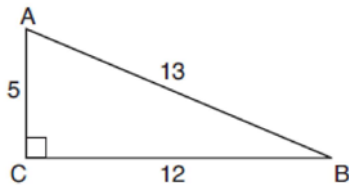
- 1 In scalene triangle  $ABC$  shown in the diagram below,  $m\angle C = 90^\circ$ .



Which equation is always true?

- 1)  $\sin A = \sin B$
- 2)  $\cos A = \cos B$
- 3)  $\cos A = \sin C$
- 4)  $\sin A = \cos B$

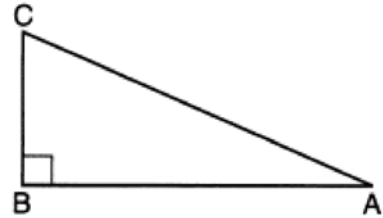
- 2 In  $\triangle ABC$  below, angle  $C$  is a right angle.



Which statement must be true?

- 1)  $\sin A = \cos B$
- 2)  $\sin A = \tan B$
- 3)  $\sin B = \tan A$
- 4)  $\sin B = \cos B$

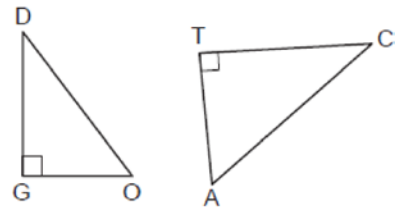
- 3 Right triangle  $ABC$  is shown below.



Which trigonometric equation is always true for triangle  $ABC$ ?

- 1)  $\sin A = \cos C$
- 2)  $\cos A = \sin A$
- 3)  $\cos A = \cos C$
- 4)  $\tan A = \tan C$

- 4 In the diagram below,  $\triangle DOG \sim \triangle CAT$ , where  $\angle G$  and  $\angle T$  are right angles.



Which expression is always equivalent to  $\sin D$ ?

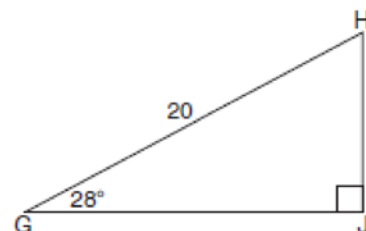
- 1)  $\cos A$
- 2)  $\sin A$
- 3)  $\tan A$
- 4)  $\cos C$

- 5 In right triangle  $DAN$ ,  $m\angle A = 90^\circ$ . Which statement must always be true?

- 1)  $\cos D = \cos N$
- 2)  $\cos D = \sin N$
- 3)  $\sin A = \cos N$
- 4)  $\cos A = \tan N$

- 6 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)  $\sin T = \cos M$
- 7 In  $\triangle ABC$ , the complement of  $\angle B$  is  $\angle A$ . Which statement is always true?
- 1)  $\tan \angle A = \tan \angle B$
  - 2)  $\sin \angle A = \sin \angle B$
  - 3)  $\cos \angle A = \tan \angle B$
  - 4)  $\sin \angle A = \cos \angle B$
- 8 If scalene triangle  $XYZ$  is similar to triangle  $QRS$  and  $m\angle X = 90^\circ$ , which equation is always true?
- 1)  $\sin Y = \sin S$
  - 2)  $\cos R = \cos Z$
  - 3)  $\cos Y = \sin Q$
  - 4)  $\sin R = \cos Z$
- 9 In right triangle  $ABC$ ,  $m\angle C = 90^\circ$  and  $AC \neq BC$ . Which trigonometric ratio is equivalent to  $\sin B$ ?
- 1)  $\cos A$
  - 2)  $\cos B$
  - 3)  $\tan A$
  - 4)  $\tan B$
- 10 Right triangle  $ACT$  has  $m\angle A = 90^\circ$ . Which expression is always equivalent to  $\cos T$ ?
- 1)  $\cos C$
  - 2)  $\sin C$
  - 3)  $\tan T$
  - 4)  $\sin T$
- 11 In right triangle  $ABC$ ,  $m\angle C = 90^\circ$ . If  $\cos B = \frac{5}{13}$ , which function also equals  $\frac{5}{13}$ ?
- 1)  $\tan A$
  - 2)  $\tan B$
  - 3)  $\sin A$
  - 4)  $\sin B$
- 12 In  $\triangle ABC$ , where  $\angle C$  is a right angle,  $\cos A = \frac{\sqrt{21}}{5}$ . What is  $\sin B$ ?
- 1)  $\frac{\sqrt{21}}{5}$
  - 2)  $\frac{\sqrt{21}}{2}$
  - 3)  $\frac{2}{5}$
  - 4)  $\frac{5}{\sqrt{21}}$
- 13 Which expression is always equivalent to  $\sin x$  when  $0^\circ < x < 90^\circ$ ?
- 1)  $\cos(90^\circ - x)$
  - 2)  $\cos(45^\circ - x)$
  - 3)  $\cos(2x)$
  - 4)  $\cos x$
- 14 Which expression is equal to  $\sin 30^\circ$ ?
- 1)  $\tan 30^\circ$
  - 2)  $\sin 60^\circ$
  - 3)  $\cos 60^\circ$
  - 4)  $\cos 30^\circ$

- 15 The expression  $\sin 57^\circ$  is equal to
- 1)  $\tan 33^\circ$
  - 2)  $\cos 33^\circ$
  - 3)  $\tan 57^\circ$
  - 4)  $\cos 57^\circ$
- 16 In a right triangle, the acute angles have the relationship  $\sin(2x + 4) = \cos(46)$ . What is the value of  $x$ ?
- 1) 20
  - 2) 21
  - 3) 24
  - 4) 25
- 17 For the acute angles in a right triangle,  $\sin(4x)^\circ = \cos(3x + 13)^\circ$ . What is the number of degrees in the measure of the *smaller* angle?
- 1)  $11^\circ$
  - 2)  $13^\circ$
  - 3)  $44^\circ$
  - 4)  $52^\circ$
- 18 In a right triangle,  $\sin(40 - x)^\circ = \cos(3x)^\circ$ . What is the value of  $x$ ?
- 1) 10
  - 2) 15
  - 3) 20
  - 4) 25
- 19 If  $\sin(2x + 7)^\circ = \cos(4x - 7)^\circ$ , what is the value of  $x$ ?
- 1) 7
  - 2) 15
  - 3) 21
  - 4) 30
- 20 If  $\sin(3x + 9)^\circ = \cos(5x - 7)^\circ$ , what is the value of  $x$ ?
- 1) 8
  - 2) 11
  - 3) 33
  - 4) 42
- 21 Find the value of  $R$  that will make the equation  $\sin 73^\circ = \cos R$  true when  $0^\circ < R < 90^\circ$ . Explain your answer.
- 22 In right triangle  $ABC$  with the right angle at  $C$ ,  $\sin A = 2x + 0.1$  and  $\cos B = 4x - 0.7$ . Determine and state the value of  $x$ . Explain your answer.
- 23 Explain why  $\cos(x) = \sin(90 - x)$  for  $x$  such that  $0 < x < 90$ .
- 24 Given: Right triangle  $ABC$  with right angle at  $C$ . If  $\sin A$  increases, does  $\cos B$  increase or decrease? Explain why.
- 25 When instructed to find the length of  $\overline{HJ}$  in right triangle  $HJG$ , Alex wrote the equation  $\sin 28^\circ = \frac{HJ}{20}$  while Marlene wrote  $\cos 62^\circ = \frac{HJ}{20}$ . Are both students' equations correct? Explain why.



### G.SRT.C.7: Cofunctions 1 Answer Section

- 1 ANS: 4                    REF: 061512geo  
 2 ANS: 1                    REF: 081919geo  
 3 ANS: 1                    REF: 012304geo  
 4 ANS: 1                    REF: 062312geo

5 ANS: 2

Sine and cosine are cofunctions.

REF: 082403geo

6 ANS: 3

Sine and cosine are cofunctions.

REF: 062206geo

- 7 ANS: 4                    REF: 011609geo  
 8 ANS: 4                    REF: 082210geo  
 9 ANS: 1                    REF: 011922geo  
 10 ANS: 2                   REF: 082311geo  
 11 ANS: 3                   REF: 061703geo  
 12 ANS: 1                   REF: 081606geo  
 13 ANS: 1                   REF: 081504geo

14 ANS: 3

$$90 - 30 = 60$$

REF: 012401geo

15 ANS: 2

$$90 - 57 = 33$$

REF: 061909geo

16 ANS: 1

$$2x + 4 + 46 = 90$$

$$2x = 40$$

$$x = 20$$

REF: 061808geo

17 ANS: 3

$$4x + 3x + 13 = 90 \quad 4(11) < 3(11) + 13$$

$$7x = 77 \quad 44 < 46$$

$$x = 11$$

REF: 012021geo

18 ANS: 4  
 $40 - x + 3x = 90$   
 $2x = 50$   
 $x = 25$

REF: 081721geo

19 ANS: 2  
 $2x + 7 + 4x - 7 = 90$   
 $6x = 90$   
 $x = 15$

REF: 081824geo

20 ANS: 2  
 $3x + 9 + 5x - 7 = 90$   
 $8x + 2 = 90$   
 $8x = 88$   
 $x = 11$

REF: 062420geo

21 ANS:  
 $73 + R = 90$  Equal cofunctions are complementary.  
 $R = 17$

REF: 061628geo

22 ANS:  
 $4x - .07 = 2x + .01$   $\sin A$  is the ratio of the opposite side and the hypotenuse while  $\cos B$  is the ratio of the adjacent side and the hypotenuse. The side opposite angle  $A$  is the same side as the side adjacent to angle  $B$ . Therefore,  
 $2x = 0.8$   
 $x = 0.4$

$\sin A = \cos B$ .

REF: fall1407geo

23 ANS:  
 The acute angles in a right triangle are always complementary. The sine of any acute angle is equal to the cosine of its complement.

REF: spr1407geo

24 ANS:  
 $\cos B$  increases because  $\angle A$  and  $\angle B$  are complementary and  $\sin A = \cos B$ .

REF: 011827geo

25 ANS:

Yes, because  $28^\circ$  and  $62^\circ$  angles are complementary. The sine of an angle equals the cosine of its complement.

REF: 011727geo