Trigonometric Relations
Multiple Choice Question

1. [13-14 Standardized Test 2]

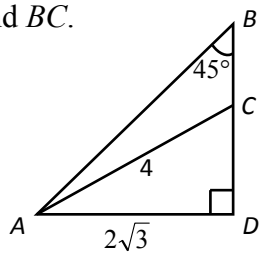
It is given that $\tan\theta = \frac{7}{3}$ and θ is an acute angle. Find the value of $\sin\theta + \cos\theta$.

A. $\frac{5}{29}$ **B.** $5\sqrt{58}$

C. $\frac{\sqrt{58}}{29}$ **D.** $\frac{5\sqrt{58}}{29}$

2. [13-14 Standardized Test 2]

In the figure, find BC.



A. 1
B. $\sqrt{3}$
C. $\sqrt{3}-1$
D. $2\sqrt{3}-2$

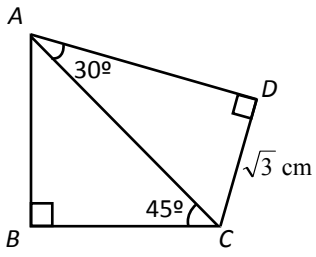
3. [13-14 Final Exam #12]

Which of the following is false?

A. $\tan(90°-\theta) \equiv \frac{\cos\theta}{\sin\theta}$
B. $\sin^3\theta - \sin\theta \equiv \sin\theta\cos^2\theta$
C. $1-\cos^2\theta \equiv \sin\theta\cos\theta\tan\theta$
D. $(1+\sin\theta)(1-\sin\theta) \equiv \sin^2(90°-\theta)$

4. [13-14 Final Exam #23]

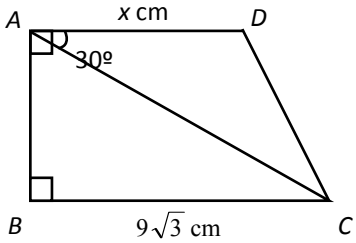
In the figure, find the area of quadrilateral $ABCD$.



A. $\left(\sqrt{3}+3\right)$ cm^2
B. $\left(\sqrt{3}+9\right)$ cm^2
C. $[3(\sqrt{3}+3)]$ cm^2
D. $\left(1.5\sqrt{3}+3\right)$ cm^2

5. [13-14 Final Exam #29]

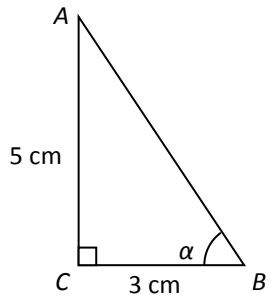
In the figure, AC bisects $\angle BCD$. Find x.



A. 6 **B.** 9
C. 10 **D.** $6\sqrt{3}$

6. [14-15 Standardized Test #5]

In the figure, $\cos\alpha =$



A. $\frac{3}{4}$.

B. $\frac{4}{3}$.

C. $\frac{3\sqrt{34}}{34}$.

D. $\frac{5\sqrt{34}}{34}$.

7. [14-15 Standardized Test #7]

ΔABC is a right-angled triangle, where $\tan\angle BAC = \tan\angle ABC$. Which of the following must be true?

I. $AC = BC$

II. $AC \perp BC$

III. $\sin\angle BAC = \cos\angle ABC$

A. I and II only **B.** I and III only

C. II and III only **D.** I, II and III

8. [14-15 Final Exam #14]

Which of the following is/are an identity/identities?

I. $\sin(\theta+\theta) = 2\sin\theta$

II. $\tan^2 45° = \cos^2\theta + \sin^2\theta$

III. $\cos\left(\frac{3\theta}{\theta}\right) = \frac{\cos 3\theta}{\cos\theta}$

A. I only **B.** II only

C. I and III only **D.** I, II and III

9. [14-15 Final Exam #15]

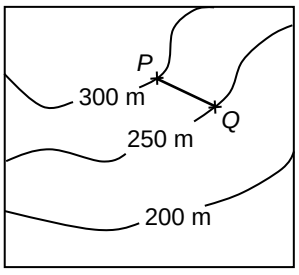
The figure shows a part of a contour map. The map is drawn to the scale 1 : 15000 and the length of PQ is measured to be 1 cm on the map. The gradient of road PQ is

A. $\frac{1}{300}$.

B. $\frac{1}{3}$.

C. 3.

D. 300.



10. [14-15 Final Exam #23]

$$\frac{\sin\theta\cos 60°}{\sin^2 30°} - \frac{\cos(90° - \theta)}{\tan 45°} =$$

A. $\sin\theta$. **B.** $2\sin\theta$.

C. $3\sin\theta$. **D.** $2\sin\theta - \cos\theta$.

11. [14-15 Final Exam #25]

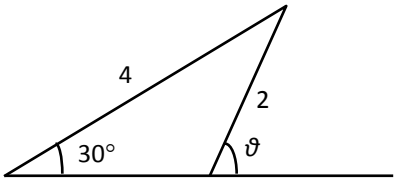
In the figure, $\sin\theta =$

A. -1.

B. $\frac{1}{2}$.

C. $\frac{\sqrt{3}}{2}$.

D. 1.



12. [15-16 Standardized Test #4]

$$\frac{1}{\tan\theta\sin(90°-\theta)} + \frac{2}{\cos\theta} =$$

A. 2. **B.** $\frac{3}{\cos\theta}$.

C. $\frac{\sin\theta + 2\cos\theta}{\cos^2\theta}$. **D.** $\frac{\cos\theta + 2\sin\theta}{\sin\theta\cos\theta}$.

13. [15-16 Standardized Test #7]

If a and b are acute angles such that $a + b = 90°$, which of the following must be true?

I. $\sin a = \cos(90° - b)$

II. $\frac{\sin a}{\sin b} = \tan(90° - b)$

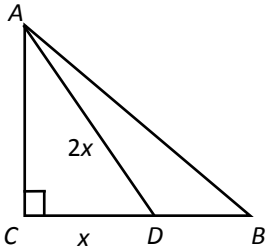
III. $\sin^2 a + \cos^2 b = 1$

A. I only
B. II only
C. III only
D. None of the above

14. [15-16 Standardized Test #8]

In the figure, BDC is a straight line and $\angle BAC = 45°$. Find BD.

A. $(\sqrt{3} - 1)x$
B. x
C. $\sqrt{3}\,x$
D. $2x$



15. [15-16 Final Exam #9]

Find the acute angle θ in $\tan 75° = \frac{\cos 15°}{\sin\theta}$.

A. 15° **B.** 45°
C. 60° **D.** 75°

16. [15-16 Final Exam #20]

Simplify $\dfrac{[\sin(90°-\theta)+\sin\theta][\cos(90°-\theta)-\cos\theta]}{\tan 45°}$.

A. –1 **B.** 1
C. $\tan\theta$ **D.** $2\sin^2\theta-1$

17. [16-17 Standardized Test #6]

$\sin^2 10° + \sin^2 20° + \sin^2 30° + ... + \sin^2 80° =$

A. 4. **B.** 4.5.
C. 8. **D.** 8.5.

18. [16-17 Final Exam #9]

$\dfrac{\cos(90°-\theta)\sin(90°-\theta)}{\tan\theta} =$

A. $\sin\theta$. **B.** $\cos\theta$.
C. $\sin^2\theta$. **D.** $\cos^2\theta$.

19. [16-17 Final Exam #10]

$1-\sin^2\theta+\tan^2\theta\cos^2\theta =$

A. $\tan^2\theta$. **B.** $\cos^2\theta$.
C. $\sin^2\theta$. **D.** 1.

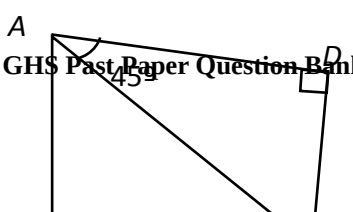
20. [17-18 Standardized Test 2 #6]

$\dfrac{\tan 30°}{\cos 30°\sin 45°} =$

A. $\dfrac{4\sqrt{3}}{9}$.
B. $\dfrac{2\sqrt{2}}{3}$.
C. $2\sqrt{2}$.
D. $2\sqrt{6}$.

21. [17-18 Standardized Test 2 #7]

In the figure, find the area of the quadrilateral *ABCD*.



A. $(2\sqrt{3}+4)\,\text{cm}^2$

B. $(2\sqrt{3}+12)\,\text{cm}^2$

C. $(6\sqrt{3}+12)\ \ \text{cm}^2$

D. $(6\sqrt{3}+24)\,\text{cm}^2$

22. [17-18 Final Exam #8]

$$\left(\frac{\cos\theta}{\tan\theta}-\frac{1}{\sin\theta}\right)^2=$$

A. 1.

B. $\sin^2\theta$.

C. $-\sin^2\theta$.

D. $\dfrac{1}{\sin^2\theta}$.

23. [17-18 Final Exam #19]

Which of the following are correct?

I. $\dfrac{1}{\tan(90°-\theta)}\equiv\dfrac{\sin\theta}{\cos\theta}$

II. $\cos^3\theta-\cos\theta\equiv-\cos\theta\sin^2\theta$

III. $1-2\cos^2\theta+\cos^4\theta\equiv\sin^2\theta\cos^2\theta\tan^2\theta$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III