

F.TF.C.9: Angle Sum and Difference Identities 1a

- 1 The expression $\cos 4x \cos 3x + \sin 4x \sin 3x$ is equivalent to
 - 1) $\sin x$
 - 2) $\sin 7x$
 - 3) $\cos x$
 - 4) $\cos 7x$
- 2 The expression $\cos 40^\circ \cos 10^\circ + \sin 40^\circ \sin 10^\circ$ is equivalent to
 - 1) $\cos 30^\circ$
 - 2) $\cos 50^\circ$
 - 3) $\sin 30^\circ$
 - 4) $\sin 50^\circ$
- 3 $\cos 70^\circ \cos 40^\circ - \sin 70^\circ \sin 40^\circ$ is equivalent to
 - 1) $\cos 30^\circ$
 - 2) $\cos 70^\circ$
 - 3) $\cos 110^\circ$
 - 4) $\sin 70^\circ$
- 4 Which expression is equivalent to $\cos P \cos 50 - \sin P \sin 50$?
 - 1) $\cos(P - 50)$
 - 2) $\sin(P - 50)$
 - 3) $\cos(P + 50)$
 - 4) $\sin(P + 50)$
- 5 Which expression is equivalent to $\sin 22^\circ \cos 18^\circ + \cos 22^\circ \sin 18^\circ$?
 - 1) $\sin 4^\circ$
 - 2) $\cos 4^\circ$
 - 3) $\sin 40^\circ$
 - 4) $\cos 40^\circ$
- 6 The expression $\cos 80^\circ \cos 20^\circ - \sin 80^\circ \sin 20^\circ$ is equivalent to
 - 1) $\cos 60^\circ$
 - 2) $\cos 100^\circ$
 - 3) $\sin 100^\circ$
 - 4) $\sin 60^\circ$
- 7 $\sin 50^\circ \cos 30^\circ + \cos 50^\circ \sin 30^\circ$ is equivalent to
 - 1) $\cos 80^\circ$
 - 2) $\sin 20^\circ$
 - 3) $\cos 20^\circ$
 - 4) $\sin 80^\circ$
- 8 The expression $\cos 70^\circ \cos 10^\circ + \sin 70^\circ \sin 10^\circ$ is equivalent to
 - 1) $\cos 60^\circ$
 - 2) $\cos 80^\circ$
 - 3) $\sin 60^\circ$
 - 4) $\sin 80^\circ$
- 9 The expression $\cos 80^\circ \cos 70^\circ + \sin 80^\circ \sin 70^\circ$ is equivalent to
 - 1) $\cos 10^\circ$
 - 2) $\cos 150^\circ$
 - 3) $\sin 10^\circ$
 - 4) $\sin 150^\circ$
- 10 The expression $\sin 80^\circ \cos 70^\circ + \cos 80^\circ \sin 70^\circ$ is equivalent to
 - 1) $\sin 10^\circ$
 - 2) $\cos 10^\circ$
 - 3) $\sin 150^\circ$
 - 4) $\cos 150^\circ$

Regents Exam Questions

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- 11 If $\sin x = \sin y = a$ and $\cos x = \cos y = b$, then $\cos(x - y)$ is
- 1) $b^2 - a^2$
 - 2) $b^2 + a^2$
 - 3) $2b - 2a$
 - 4) $2b + 2a$
- 12 Express $\sin 75^\circ \cos 15^\circ - \cos 75^\circ \sin 15^\circ$ as a single trigonometric function of a positive acute angle.
- 13 Which expression is equivalent to $\cos 100^\circ \cos 80^\circ - \sin 100^\circ \sin 80^\circ$?
- 1) 1
 - 2) 0
 - 3) -1
 - 4) $\cos 20^\circ$
- 14 Which expression is equivalent to $\sin 42^\circ \cos 48^\circ + \cos 42^\circ \sin 48^\circ$?
- 1) 1
 - 2) 0
 - 3) $\sin 6^\circ$
 - 4) $\cos 6^\circ$
- 15 The value of $\cos 75^\circ \cos 15^\circ - \sin 75^\circ \sin 15^\circ$ is
- 1) 1
 - 2) $\frac{1}{2}$
 - 3) $\frac{\sqrt{3}}{2}$
 - 4) 0
- 16 What is the value of $\sin 210^\circ \cos 30^\circ - \cos 210^\circ \sin 30^\circ$?
- 1) 1
 - 2) -1
 - 3) 0
 - 4) 180
- 17 The value of $\cos 16^\circ \cos 164^\circ - \sin 16^\circ \sin 164^\circ$ is
- 1) -1
 - 2) $-\frac{1}{2}$
 - 3) 0
 - 4) $\frac{\sqrt{3}}{2}$
- 18 The value of $\sin 170^\circ \cos 20^\circ - \cos 170^\circ \sin 20^\circ$ is
- 1) $\frac{1}{2}$
 - 2) $-\frac{1}{2}$
 - 3) $\frac{\sqrt{3}}{2}$
 - 4) $-\frac{\sqrt{3}}{2}$
- 19 Evaluate: $\sin 300^\circ \cos 90^\circ + \cos 300^\circ \sin 90^\circ$
- 20 Evaluate in radical form:
 $\sin 90^\circ \cos 30^\circ - \cos 90^\circ \sin 30^\circ$
- 21 The expression $\cos(A - B) - \cos(A + B)$ is equal to
- 1) $-2 \sin A \sin B$
 - 2) $-2 \cos B$
 - 3) $2 \cos A \cos B$
 - 4) $2 \sin A \sin B$
- 22 For all values of A and B for which the expressions are defined, prove that the following is an identity:
$$\frac{\sin(A + B) + \sin(A - B)}{\sin(A + B) - \sin(A - B)} = \frac{\tan A}{\tan B}$$

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Answer Section

1 ANS: 3 REF: fall0910a2

2 ANS: 1

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

$$\begin{aligned} \cos(40 - 10) &= \cos 40 \cos 10 + \sin 40 \sin 10 \\ &= \cos 30 \end{aligned}$$

REF: 010401b

3 ANS: 3 REF: 068835siii

4 ANS: 3 REF: 081604a2

5 ANS: 3 REF: 019629siii

6 ANS: 2 REF: 019721siii

7 ANS: 4 REF: 019819siii

8 ANS: 1 REF: 019917siii

9 ANS: 1 REF: 080111siii

10 ANS: 3 REF: 010317siii

11 ANS: 2

$$\cos(x - y) = \cos x \cos y + \sin x \sin y$$

$$= b \cdot b + a \cdot a$$

$$= b^2 + a^2$$

REF: 061421a2

12 ANS:
 $\sin 60^\circ$

REF: 089708siii

13 ANS: 3 REF: 019521siii

14 ANS: 1 REF: 018621siii

15 ANS: 4 REF: 089330siii

16 ANS: 3 REF: 089019siii

17 ANS: 1 REF: 069816siii

18 ANS: 1 REF: 010216siii

19 ANS:

$$\frac{1}{2}$$

REF: 019410siii

20 ANS:

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

REF: 088906siii

21 ANS: 4 REF: 088631siii

22 ANS:

$$\frac{\sin(A+B) + \sin(A-B)}{\sin(A+B) - \sin(A-B)} = \frac{\tan A}{\tan B}$$

$$\frac{(\sin A \cos B + \cos A \sin B) + (\sin A \cos B - \cos A \sin B)}{(\sin A \cos B + \cos A \sin B) - (\sin A \cos B - \cos A \sin B)} = \frac{\frac{\sin A}{\cos A}}{\frac{\sin B}{\cos B}}$$

$$\frac{2 \sin A \cos B}{2 \cos A \sin B} = \frac{\sin A \cos B}{\cos A \sin B}$$

$$\frac{\sin A \cos B}{\cos A \sin B} = \frac{\sin A \cos B}{\cos A \sin B}$$

REF: 089742siii