EduSahara™ Assignment

Name : Complex Trigonometric Expressions Simplification

Chapter : Trigonometry

Grade : SSC Grade X

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1. $\frac{1-\tan^2\theta}{1+\tan^2\theta} =$

(i) $\cot 2\theta$ (ii) $\cos 2\theta$ (iii) $\tan 2\theta$ (iv) $\sin 2\theta$

2. $\frac{1-\tan^2 80°}{1+\tan^2 80°} =$

(i) $\tan 160°$ (ii) $\cot 160°$ (iii) $\cos 160°$ (iv) $\sin 160°$

3. $\frac{\sin^2 20° + \sin^2 70°}{\cos^2 75° + \cos^2 15°} =$

(i) 2 (ii) undefined (iii) -1 (iv) 0 (v) 1

4. $\frac{1+\tan^2\theta}{1+\cot^2\theta} =$

(i) $\tan^2\theta$ (ii) $\text{cosec}^2\theta$ (iii) $\cot^2\theta$ (iv) $\sec^2\theta$ (v) 1

5. If $\cot\theta = \frac{1}{2}$, find $\frac{(1+\sin\theta)(1-\sin\theta)}{(1-\cos\theta)(1+\cos\theta)}$

(i) $\frac{1}{6}$ (ii) $\frac{1}{4}$ (iii) $(\frac{-1}{4})$ (iv) $\frac{3}{4}$ (v) $\frac{1}{2}$

6. If $\tan\theta = \frac{2}{3}$, find $\frac{(1+\cos\theta)(1-\cos\theta)}{(1+\sin\theta)(1-\sin\theta)}$

(i) $\frac{4}{9}$ (ii) $\frac{4}{11}$ (iii) $\frac{2}{3}$ (iv) $\frac{4}{7}$ (v) $\frac{2}{9}$

7. Find the value of $\frac{(1+\sin\theta)}{(\cos\theta)} + \frac{(\cos\theta)}{(1+\sin\theta)}$

(i) $2\text{cosec}\theta$ (ii) $2\sin\theta$ (iii) $2\cos\theta$ (iv) $2\sec\theta$

8. Find the value of $6\sec^2\theta - 6\tan^2\theta$

(i) 0 (ii) 6 (iii) 4 (iv) 1 (v) 9

9. Find the value of $(1 + \tan\theta + \sec\theta)(1 + \cot\theta - \operatorname{cosec}\theta)$

(i) 2 (ii) 0 (iii) 1 (iv) 3 (v) 4

10. Find the value of $(\operatorname{cosec}\theta - \cot\theta)^2$

(i) $\frac{1 - \sin\theta}{1 + \sin\theta}$ (ii) $\frac{1 + \sin\theta}{1 - \sin\theta}$ (iii) $\frac{1 + \cos\theta}{1 - \cos\theta}$ (iv) $\frac{1 - \cos\theta}{1 + \cos\theta}$

11. If $\tan\theta + \cot\theta = 3$, find $\tan^2\theta + \cot^2\theta$

(i) 5 (ii) 10 (iii) 8 (iv) 7 (v) 6

12. If $\tan\theta - \cot\theta = 3$, find $\tan^2\theta + \cot^2\theta$

(i) 10 (ii) 9 (iii) 11 (iv) 12 (v) 13

13. Which of the following are true?

a) $\frac{\cos\theta}{1 - \sin\theta} + \frac{\cos\theta}{1 + \sin\theta} = 2$

b) $(\sec\theta - \tan\theta)^2 = \frac{1 - \sin\theta}{1 + \sin\theta}$

c) $\frac{\cos\theta}{\operatorname{cosec}\theta + 1} + \frac{\cos\theta}{\operatorname{cosec}\theta - 1} = 2\tan\theta$

d) $\frac{1 + \sin\theta}{\cos\theta} + \frac{\cos\theta}{1 + \sin\theta} = 2\sec\theta$

e) $(\sec\theta - \tan\theta)^2 = \frac{1 + \sin\theta}{1 - \sin\theta}$

(i) {b,c,d} (ii) {a,e,d} (iii) {e,c} (iv) {a,b} (v) {a,b,c}

14. Which of the following are true?

a) $\frac{\sec\theta}{1+\operatorname{cosec}\theta} = \frac{1-\operatorname{cosec}\theta}{\sec\theta}$

b) $\cos^3\theta + \sin^3\theta = (\sin\theta + \cos\theta)(1 - \sin\theta\cos\theta)$

c) $(\sin\theta - \cos\theta)^2 = 1 + \sin 2\theta$

d) $(\sin\theta + \cos\theta)^2 = 1 + \sin 2\theta$

e) $\frac{\cos\theta}{1+\sin\theta} = \frac{1-\sin\theta}{\cos\theta}$

f) $\cos^3\theta - \sin^3\theta = (\sin\theta + \cos\theta)(1 - \sin\theta\cos\theta)$

g) $(\sin\theta + \cos\theta)^2 + (\sin\theta - \cos\theta)^2 = 2$

(i) {b,d,e,g} (ii) {f,a,e} (iii) {c,g,b} (iv) {a,b} (v) {c,d}

15. If Q, R and S are the interior angles of a triangle, then $\sin(\frac{Q+R}{2}) =$

(i) $\sin S$ (ii) $\cos(\frac{S}{2})$ (iii) $\cos(\frac{Q}{2})$ (iv) $\sin(\frac{Q}{2})$ (v) $\sin(\frac{S}{2})$

16. If $x = \cos\theta + \sin\theta, y = \cos\theta\sin\theta$ then

(i) $(x^2 - y^2) = 1$ (ii) $x^2 = (-2y+1)$ (iii) $(x^2 + y^2) = 1$ (iv) $(x^2 + y^2) = 0$ (v) $x^2 = (2y+1)$

17. If $r = \cos\theta + \sin\theta, s = \cos\theta - \sin\theta$ then

(i) $(r^2 + s^2) = 2$ (ii) $(r^2 - s^2) = 1$ (iii) $(r^2 - s^2) = 2$ (iv) $(r^2 + s^2) = 1$ (v) $(r^2 + s^2) = 0$

18. If $b = q\cos\theta + r\sin\theta$ and $c = q\sin\theta - r\cos\theta$, then

(i) $bc = qr$ (ii) $(b^2 + c^2) = (q^2 + r^2)$ (iii) $(b^2 - c^2) = (q^2 - r^2)$ (iv) $(q^2 + b^2) = (r^2 + c^2)$

Assignment Key

1) (ii)	2) (iii)	3) (v)	4) (i)	5) (ii)	6) (i)
7) (iv)	8) (ii)	9) (i)	10) (iv)	11) (iv)	12) (iii)
13) (i)	14) (i)	15) (ii)	16) (v)	17) (i)	18) (ii)

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