Trig Identities

N5 Maths Exam Questions

$$\sin^2 x + \cos^2 x = 1 \qquad \tan x = \frac{\sin x}{\cos x}$$

Source: 2019 P2 Q17 N5 Maths	
(1)	Expand and simplify $$(\sin x° + \cos x°)^2.$$ **Show your working.**
Answer: $1 + 2\sin x\cos x$	

Source: 2018 P1 Q18 N5 Maths	
(2)	Express $\sin x° \cos x° \tan x°$ in its simplest form. **Show your working.**
Answer: $\sin^2 x$	

Source: 2016 P1 Q11 N5 Maths	
(3)	Simplify $$\tan^2 x° \cos^2 x° .$$ **Show your working.**
Answer: $\sin^2 x$	

Source: Practice Paper A P2 Q9b N5 Maths	
(4)	Show that $$\tan x \cos x = \sin x.$$
Answer: *Prove using* $\tan x = \frac{\sin x}{\cos x}$ *on the LHS and cancelling down to make the same as the RHS*	

Trig Identities Worksheet

1. Show that $tanxcosx = sinx$

2. Show that $\frac{sin\,x}{tan\,x} = cos\,x$

3. Show that $\frac{tan\,x}{sin\,x} = \frac{1}{cos\,x}$

4. Show that $\frac{sin^2x}{tan\,x} = sinxcos\,x$

5. Show that $\frac{1 - cos^2A}{cos^2A} = tan^2A$

6. Show that $\frac{1 - sin^2A}{cos^2A} = 1$

7. Show that $(cosx + sinx)^2 = 1 + 2sinxcosx$

8. Show that $(cosx + sinx)(cosx - sinx) + 2sin^2x = 1$

9. Show that $sin^3x + sinxcos^2x = sinx$

10. Show that $cos^2xsin^2x + cos^4x = cos^2x$

1. $tanxcosx = sinx$

LHS: Substitute $tanx = \frac{sin\,x}{cosx}$: $\frac{sin\,x}{cosx} \times cosx$

Cancel the $cosx$ diagonally: $= sinx$

2. $\frac{sin\,x}{tan\,x} = cos\,x$

LHS: Substitute $tanx = \frac{sin\,x}{cosx}$: $\frac{sinx}{\frac{sinx}{cosx}}$

$= \frac{sinx}{1} \div \frac{\sin x}{\cos x}$

Cancel the $sinx$ diagonally: $= \frac{sinx}{1} \times \frac{cosx}{sinx}$

$= cos\,x$

3. $\frac{tan\,x}{sin\,x} = \frac{1}{cos\,x}$

LHS Substitute $tanx = \frac{sin\,x}{cosx}$: $\frac{\frac{sinx}{cosx}}{sin\,x}$

$= \frac{\sin x}{\cos x} \div \frac{sinx}{1}$

Cancel the $sinx$ diagonally: $= \frac{\sin x}{\cos x} \times \frac{1}{sinx}$

$= \frac{1}{cos\,x}$

4. $\frac{sin^2 x}{tan\, x} = sinxcos\ x$

LHS Substitute $tanx = \frac{sin\ x}{cosx}$: $\frac{sin^2 x}{\frac{sin\ x}{cosx}}$

$$= \frac{sin^2 x}{1} \div \frac{\sin x}{\cos x}$$

$$= \frac{sin^2 x}{1} \times \frac{\cos x}{\sin\ x}$$

Cancel the $sinx$ diagonally: $= sinxcosx$

5. $\frac{1 - cos^2 A}{cos^2 A} = tan^2 A$

$$sin^2 A + cos^2 A = 1$$

Re-arrange: $sin^2 A = 1 - cos^2 A$ --- (1)

Substitute (1) into the top line, LHS: $\frac{1 - cos^2 A}{cos^2 A}$

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

Since $tanx = \frac{sin\ x}{cosx}$: $= tan^2 A$

6. $\frac{1 - Sin^2 A}{Cos^2 A} = 1$

$$sin^2 A + \ cos^2 A = 1$$

Re-arrange: $cos^2 A = 1 - sin^2 A$ --- (1)

Substitute (1) into the top line, LHS: $\frac{1 - Sin^2 A}{Cos^2 A}$

$$= \frac{cos^2 A}{cos^2 A}$$

$$= 1$$

7. $(cosx + sinx)^2 = 1 + 2sinxcosx$

LHS: $(cosx + sinx)^2$

$$= \ (cosx + sinx)(cosx + sinx)$$

$$= \ cos^2 x + cosxsinx + sinxcosx + sin^2 x$$

$$= \ cos^2 x + 2sinxcosx + sin^2 x$$

$= 1 + 2sinxcosx$ (since $sin^2 x + \ cos^2 x = 1$)

8. $(cosx + sinx)(cosx - sinx) + 2sin^2 x = 1$

LHS: $(cosx + sinx)(cosx - sinx) + 2sin^2 x$

Multiply out brackets: $= cosx(cosx - sinx) + sinx(cosx - sinx) + 2sin^2 x$

$$= cos^2 x - cosxsinx + sinxcosx - sin^2 x + 2sin^2 x$$

Simplify: $= cos^2 x - sin^2 x + 2sin^2 x$

Simplify again: $= cos^2 x + sin^2 x$

$= 1$ (since $sin^2 x + \ cos^2 x = 1$)

9. $sin^3x + sinxcos^2x = sinx$

LHS, factorise: $sinx(sin^2x + cos^2x)$

Substitute: $sin^2A + cos^2A = 1$ $= sinx(1)$

$= sinx$

10. $cos^2xsin^2x + cos^4x = cos^2x$

LHS, factorise: $cos^2x(sin^2x + cos^2x)$

Substitute: $sin^2A + cos^2A = 1$ $= cos^2x(1)$

$= cos^2x$