

## Worksheet: Using Trigonometric Formulas in Integration

This worksheet has questions on the calculation of integrals with trigonometric formulas. Before attempting the questions below, you could read the study guide: [Using Trigonometric Formulas in Integration](#).

Using Trigonometric Formulas in Integration Study Guide



Model Answers to this sheet



1. Find the following integrals using the double angle formulas:

a.  $\int \sin^2(x) dx$

b.  $\int \sin^4(x) dx$

2. Using the appropriate product formula, calculate the following integrals:

a.  $\int \sin(4x)\sin(2x) dx$

b.  $\int \sin(12x)\sin(5x) dx$

c.  $\int \cos(12x)\cos(5x) dx$

d.  $\int \sin(x)\cos(x) dx$

e.  $\int \sin\left(\frac{3}{2}x\right)\sin(x) dx$

f.  $\int \cos\left(\frac{4}{3}x\right)\cos\left(\frac{1}{6}x\right) dx$

g.  $\int \sin\left(\frac{3}{4}x\right)\cos\left(\frac{1}{2}x\right) dx$

h.  $\int \cos\left(\frac{4}{3}x\right)\sin\left(\frac{11}{6}x\right) dx$

3. Decide which of the following identities are true:

i.  $\sin^2(x)\cos^2(x) = (\sin(x)\cos(x))^2$

ii.  $\sin^2(x)\cos^2(x) = (\sin(x) + \cos(x))^2$

iii.  $\sin^2(x)\cos^2(x) = \left(\frac{1}{2} + \frac{1}{2}\cos(2x)\right)\left(\frac{1}{2} - \frac{1}{2}\cos(2x)\right)$

Use a correct identity to find  $\int \sin^2(x)\cos^2(x) dx$ .



This worksheet is one of a series on mathematics produced by the Learning Enhancement Team with funding from the UEA Alumni Fund. Scan the QR-code with a smartphone app for [more resources](#).

