

Activity 21

Trigonometric expressions

1.

- a) $\cos^2 x + \sin^2 x$
- b) 1
- c) $1 - 2\sin^2 x$
- d) $\sin(x + y)$
- e) $\sin(3y - 1)$
- f) $\sin(x + y)$
- g) $\cos x \sin y + \sin x \cos y$
- h) $\sin(x + y)$
- i) $\cos(x + y)$
- j) $2\sin x \cos y$
- k) $\sin(2x)$
- l) $2\sin x \cos x$
- m) $-\sin^3 x + 3\cos^2 x \sin x$
- n) $\frac{1 - \cos 2x}{2}$
- o) $\sin^3 x$
- p) $\frac{3\sin x - \sin 3x}{4}$
- q) $\frac{2(\cos x + \sin x)}{\sin(2x)}$
- r) $16\sin(2x) + 16$

The image shows two screenshots of a CAS interface. The top screenshot shows the simplification of $\sin(x)^2 + \cos(x)^2$ to 1, and the expansion of $\sin(x+y)$ to $\sin(x)\cos(y) + \cos(x)\sin(y)$. The bottom screenshot shows the simplification of $2\sin(x)\cos(x)$ to $\sin(2x)$, the simplification of $-\sin^3(x) + 3\cos^2(x)\sin(x)$ to $\frac{3\sin(x) - \sin(3x)}{4}$, and the simplification of $16\sin(2x) + 16$ to $16\sin(2x) + 16$.

2.

- a) | Substitute the following expression
- b) tCollect: Transforms products into sums
- c) tExpand: Uses sum and difference formulae to expand expressions
- d) combine: Transforms fraction sums or differences into a single fraction
- e) expand: Multiplies out brackets
- f) simplify: Attempts to simplify the expression. Some results are unexpected. The result is just the way the CAS engine has been programmed.