

# Pre-Entry Test for MATH101

This test is to help you determine if you have the background and skills needed to enrol in MATH101. Print out the test, and work through the questions. You should do this test with pen and paper only. Do NOT use a calculator. The test should take **no more than** 1 hour. After completing the test, use the solutions file to mark your answers. Each completely correct question is worth one mark, and we would expect students enrolling in MATH101 to get **at least** 75% or 12/16 correct.

**Note:** If you have not studied mathematics for some time, you may need to review some of this material before you start the test.

1. Solve the following problems.

(a)  $3 - 5 \times 2$

(b)  $6 + 2 \div 4$

2. Convert the following decimals and percentages into fractions.

(a) 0.405

(b) 0.1%

3. (a) What is 5% of 1,000?

(b) If the original retail price of an item is \$160.00, what is the price of the item when it is reduced by 25% in a sale?

4. Solve the following problems.

(a)  $\frac{1}{3} + \frac{5}{6}$

(b)  $\frac{2}{3} \div \frac{3}{4}$

5. A group of three investors buy some shares together. John puts in \$2000, Steve puts in \$3000, and Joanne puts in \$4000. A year later they receive their first dividend of \$360. How should they share out this amount?

6. Expand and simplify the expression  $(2x - 3y)^2$ .

7. Given that  $x = 1$ ,  $y = 5$ , and  $z = 9$ , evaluate the following expressions.

(a)  $4(x + y)^2$

(b)  $-5xy + \sqrt{z}$

8. Solve the equation  $0.04x = 20$ .

9. Solve the quadratic equation  $x(x - 3) = 0$ .

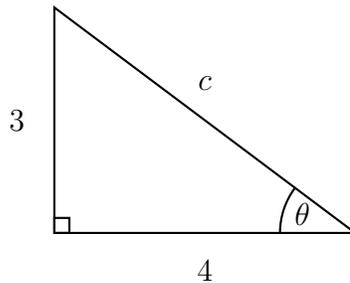
10. Solve this pair of simultaneous equations.

$$\begin{aligned}x + y &= 8 \\2x - y &= 7\end{aligned}$$

11. Give the equation of the line through the points  $(1, 1)$  and  $(-1, 2)$ .

12. Plot the graph of  $y = (x - 1)(x + 3)$ .

13. Consider the following triangle.



(a) Find the length of side  $c$ .

(b) Find  $\tan \theta$ .

14. Plot the graph of  $y = \cos(x)$  from  $x = 0^\circ$  to  $x = 360^\circ$ .

15. A function is given by  $f(x) = x^2 - 3x + 6$ . Find the gradient of this function at the point where  $x = -1$ .

16. (a) Evaluate  $\int (3x^2 + 1) dx$ .

(b) Use the result from (a) to find  $\int_0^2 (3x^2 + 1) dx$ .