

Pre-Entry Test for MATH101: Solutions

Each completely correct question is worth one mark. If a question has two parts, each correct part is worth half a mark. The test is out of a total of 16 marks, and we would expect students enrolling in MATH101 to get **at least** 75% or 12/16 correct.

1. Solve the following problems. Answers:

(a) $3 - 5 \times 2 = -7$

(b) $6 + 2 \div 4 = \frac{13}{2}$

2. Convert the following decimals and percentages into fractions. Answers:

(a) $0.405 = \frac{405}{1000} = \frac{81}{200}$

(b) $0.1\% = \frac{1}{1000}$

3. (a) What is 5% of 1,000? Answer: 50

(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? Answer: \$120.

4. Evaluate and express as a single fraction in lowest terms (that is, give your answer in the form $\frac{p}{q}$ where p and q have no common factor). Answers:

(a) $\frac{1}{3} + \frac{5}{6} = \frac{7}{6}$

(d) $\frac{2}{3} \div \frac{3}{4} = \frac{2}{3} \times \frac{4}{3} = \frac{8}{9}$

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?

Answer: John receives \$80, Steve receives \$120, and Joanne receives \$160.

6. Expand and simplify the expression $(2x - 3y)^2$. Answer: $4x^2 - 12xy + 9y^2$.

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

(a) $4(x + y)^2$ Answer: 144.

(b) $-5xy + \sqrt{z}$ Answer: -22.

8. Solve the equation $0.04x = 20$. Answer: $x = 500$.

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

10. Solve this pair of simultaneous equations. Answer: $x = 5, y = 3$.

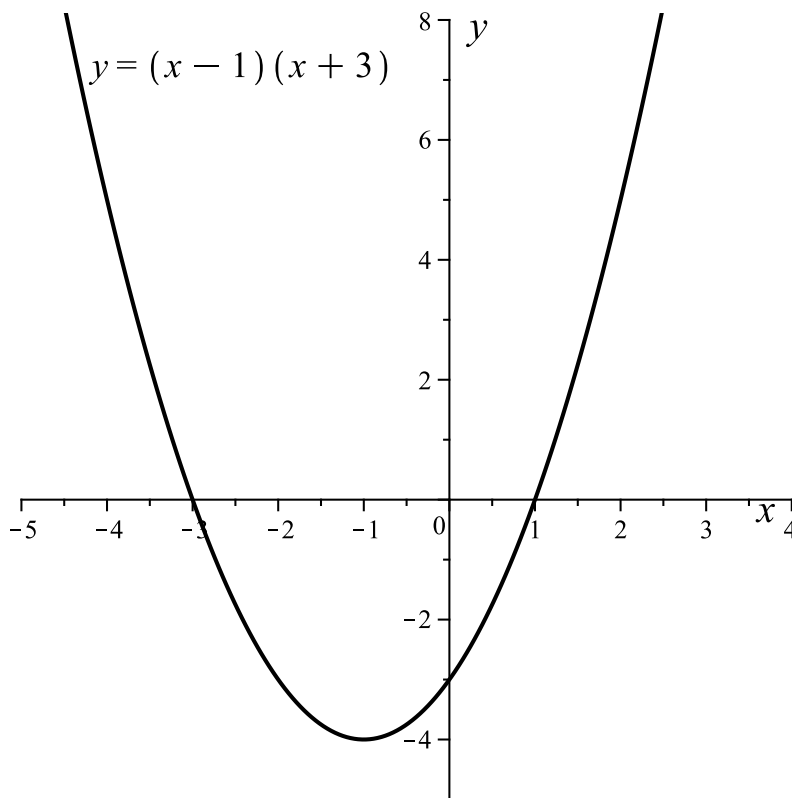
$$\begin{aligned}x + y &= 8 \\2x - y &= 7\end{aligned}$$

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

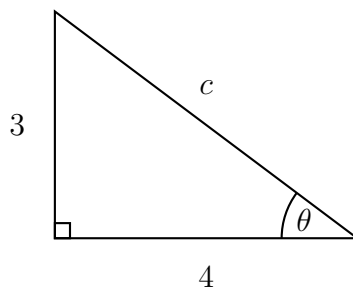
Answer: $y = -\frac{1}{2}x + \frac{3}{2}$.

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

Note: To get the mark for this question, you should have labelled the x - and y - axes and given a suitable scale on each axis.



13. Consider the following triangle.

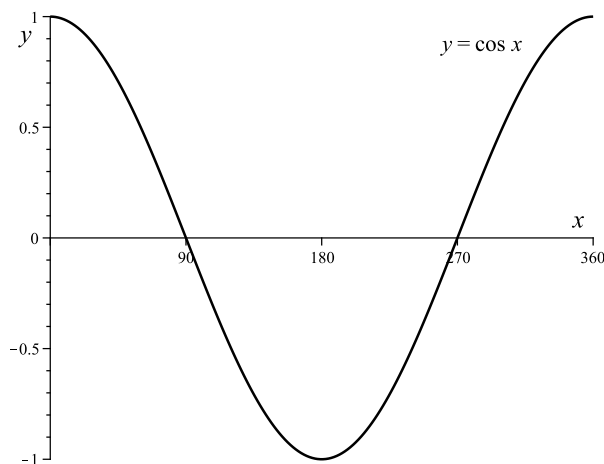


(a) Find the length of side c . Answer: $c = 5$.

(b) Find $\tan \theta$. Answer: $\tan \theta = \frac{3}{4}$.

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

Note that the graph should have labels on the x - and y - axes, a suitable scale on both axes, and have the correct amplitude and period.



15. A function is given by $f(x) = x^2 - 3x + 6$. Find the gradient of this function at the point where $x = -1$. Answer: -5 .

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

(b) Use the result from (a) to find $\int_0^2 (3x^2 + 1) dx$. Answer: 10.