1. Identify the five components $e$, $\pi$, $i$, 1, and 0 that appear in the famous formula: $e^{\pi i} + 1 = 0$.
   
   (a) The additive identity: _____
   (b) The square root of $-1$: _____
   (c) The multiplicative identity: _____
   (d) The base of the natural logarithm: _____
   (e) The ratio of a circle's circumference to its diameter: _____

2. Order the following five numbers in an increasing order: $e, \sqrt{2}, 1, \pi, 0$
   
   ____ < ____ < ____ < ____ < ____

3. (a) Expand $(x + y)^2 =$ __________________________
   (b) Expand $(x - y)^2 =$ __________________________
   (c) Factor $x^2 - y^2 =$ __________________________

4. (a) Simplify $x^n \times x^m =$ __________________________
   (b) Simplify $x^n \times y^n =$ __________________________
   (c) If $\log_a(y) = x$, then $a^x =$ __________________________
   (d) If $\log_a(x) + \log_a(y) = \log_a(z)$, then $z =$ __________________________

5. (a) $4! =$ __________________________
   (b) Simplify $\frac{(n+1)!}{n!} =$ __________________________

6. (a) Solve the following two linear equations. Find the values of $x$ and $y$.

   
   \[
   \begin{align*}
   x + y &= 20 \\
   2x - 3y &= 5 \\
   \end{align*}
   \]

   $x =$ __________________________ $y =$ __________________________

   (b) What are the two roots of the quadratic equation $x^2 - 2x - 15 = 0$?

   $x_1 =$ __________________________ $x_2 =$ __________________________
7. When a fair coin is flipped, then both the probabilities of Heads (H) and Tails (T) are 1/2. Three fair coins are flipped. What is the probability that

(a) all the coins show H: ________________________________

(b) exactly one coin shows H while the other two coins show T: __________________________

8. (a) Let $T$ be a right-angled triangle with sides $a$, $b$, and $c$ where $c$ is the hypotenuse (the side opposite the right angle). Write $c$ as a function of $a$ and $b$.

(b) What is the sum of the degrees of all the inner angles of the following geometric shapes?
   i. Triangle: ________________________________
   ii. Square: ________________________________

(c) Let $C$ be a circle whose radius is $r$.
   i. What is the circumference of $C$ as a function of $r$? ________________________________
   ii. What is the area of $C$ as a function of $r$? ________________________________

9. What is the value of $c$ when each procedure terminates?

   (a) $f(n)$ (* $n > 0$ is an integer number *)
   \[
   c = 0 \\
   \text{for } i = 1 \text{ to } n \text{ do} \\
   \quad \text{for } j = 1 \text{ to } n \text{ do} \\
   \quad \quad c := c + 1 \\
   c = ________________________________
   \]

   (b) $f(n)$ (* $n > 0$ is an integer number *)
   \[
   c = 1 \\
   \text{for } i = 1 \text{ to } n \text{ do} \\
   \quad c := c \times 2 \\
   c = ________________________________
   \]

10. Order the following functions from the slowest to the fastest when $n$ tends to infinity:

\[
\begin{align*}
    n^2 & ; \quad \log(n) & ; \quad n & ; \quad 2^n \\
\end{align*}
\]

____ < ____ < ____ < ____