

1. Solve the following equations for A and B where $A, B \in \mathbb{R}$

$$(a) \frac{11}{x^2 - 4x - 12} = \frac{A}{x - 6} + \frac{B}{x + 2}$$

$$(c) \frac{1}{(n)(n+1)} = \frac{A}{n} + \frac{B}{n+1}$$

$$(b) \frac{2x + 5}{x^2 - 4x - 12} = \frac{A}{x - 6} + \frac{B}{x + 2}$$

$$(d) \frac{2}{(n+1)(n+3)} = \frac{A}{n+1} + \frac{B}{n+3}$$

2. Complete the following table.

Value x	Floor $\lfloor x \rfloor$	Ceiling $\lceil x \rceil$	Fractional $\{x\}$
-1.4	-2	-1	
2.3			
7/9			
-16/3			
0			0
1		1	

3. Provide some values for x and y that **contradict** the following statement.

$$\lfloor x + y \rfloor = \lfloor x \rfloor + \lfloor y \rfloor$$

If the values of x and y were integers, would the equation be true for all values of x and y ?

4. Express the following numbers as fractions. For example $0.777777... = \frac{7}{9}$

(i) 0.29292929....

(iii) 0.4545454545....

(ii) 0.475475475....

(iv) 0.473473473.....

5. Evaluate the following function for $x = -1, 0, 1$ and 2 respectively.

$$f(x) = \frac{e^x - e^{-x}}{2}$$

6. Evaluate the function for each of the following values : $0.5, 1, 1.25, 2$.

$$f(x) = \sqrt{1 + e^x}$$

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10. Use the Laws of Logarithms to evaluate the following expressions:

- | | |
|---------------------------|----------------------------------|
| (i) $\log_2(8)$ | (iv) $\log_5(125) + \log_3(729)$ |
| (ii) $\log_2(\sqrt{128})$ | (v) $\log_2(64/4)$ |
| (iii) $\log_2(64)$ | (vi) $\log_3(\frac{1}{81})$ |

11. Determine the values of A and B from the following expression

$$\frac{7}{x^2 - x - 12} = \frac{A}{x + 3} + \frac{B}{x - 4}$$

12. Determine whether or not the function

$$f(x) = x \cos(x)$$

is odd, even or neither.

13. Consider the functions $f(x) = \sqrt{2x - 6}$ and $g(x) = \log_e(2x + 1)$

- Find $f(4 - 2x^2)$ and simplify answer.
- Write down the domain and range of $f(x)$.
- Determine $g^{-1}(x)$, the inverse of $g(x)$.

14. Evaluate the function for the values of $x = \{0.25, 0.5, 0.75\}$

$$f(x) = \sqrt{1 + x^2}$$

15. Find the value of x in each of the following equations.

- | | |
|-------------------------------------|--------------------------------------|
| (a) $\log_3(x + 1) + \log_3(5) = 5$ | (c) $\ln(e^x + 2) = 4$ |
| (b) $e^{2x-5} = 3$. | (d) $\log_3(2x - 1) + \log_3(5) = 3$ |

16. Determine if the function $f(x) = x^4 + x^2$ is an even function, an odd function or neither. Justify your answer.