Problem #1

In the cryptosum

\[
\begin{array}{c}
S \\
E \\
N \\
D \\
+ \\
M \\
O \\
R \\
E \\
\hline \\
M \\
O \\
N \\
E \\
Y
\end{array}
\]

What should be the value of M?
Problem #1

Problem

In the cryptosum

\[
\begin{array}{c}
\text{S E N D} \\
+ \text{M O R E} \\
\hline \\
\text{M O N E Y}
\end{array}
\]

What should be the value of M?

Answer

\[M = 1\]
Problem #2

Problem

If \( x = 1 + 2^p \) and \( y = 1 + 2^{-p} \), find \( y \) in terms of \( x \) only.
Problem #2

**Problem**

If \( x = 1 + 2^p \) and \( y = 1 + 2^{-p} \), find \( y \) in terms of \( x \) only.

**Answer**

\[
y = 1 + \frac{1}{x - 1} = \frac{x}{x - 1}
\]
Problem #3

Problem

The addition of two numbers is 12 and the product is 30. What is the addition of the inverses of those two numbers?
Problem #3

Problem

The addition of two numbers is 12 and the product is 30. What is the addition of the inverses of those two numbers?

Answer

\[
\frac{2}{5}
\]
Problem #4

Problem

What is the least number of children in a family if each child has at least one brother and at least one sister?
Problem #4

Problem
What is the least number of children in a family if each child has at least one brother and at least one sister?

Answer
4
Problem #5

If \(a \ast b = \frac{a + b + 3}{5ab}\), compute \((1 \ast 1) \ast (1 \ast 1)\).
Problem #5

If \( a \ast b = \frac{a + b + 3}{5ab} \), compute \((1 \ast 1) \ast (1 \ast 1)\).

Answer

1
Problem #6

Problem

Find the least positive integer number divisible by 11 such that the sum of its digits is divisible by 11.
Problem #6

Problem

Find the least positive integer number divisible by 11 such that the sum of its digits is divisible by 11.

Answer

209
Problem #7

Problem

Find the sum of the digits of $10^{100} - 101$. 
Problem #7

Find the sum of the digits of \(10^{100} - 101\).

Answer

899
Problem #8

Problem

How many numbers between 10 and 1000 have the property that their digits are in strictly increasing order?
Problem #8

Problem
How many numbers between 10 and 1000 have the property that their digits are in strictly increasing order?

Answer
120
Problem #9

What is the last digit (unit digit) of $3^{1001} \cdot 7^{1002} \cdot 13^{1003}$?
Problem #9

What is the last digit (unit digit) of $3^{1001} \cdot 7^{1002} \cdot 13^{1003}$?

Answer

9
Problem #10

In the following figure:

What is the value of the radius $r$?
Problem #10

In the following figure:

What is the value of the radius $r$?

Answer

$r = 1$
THE END