1. **Answer: 1681**

   There are 41 words in the problem statement. Since 41 is itself a prime, the answer is $41^2 = 1681$.

2. **Answer: $\frac{100}{x-1}$%**

   After yesterday, the fraction of the initial gold remaining is $1 - \frac{1}{x} = \frac{x-1}{x}$. Therefore, in order to reach the original amount of gold, we must multiply by $\frac{x}{x-1} = 1 + \frac{1}{x-1}$. Thus, the gold must be increased by $\frac{100}{x-1}$ percent.

3. **Answer: $(5, 0), (4, 1), (1, -2)$, and $(2, -3)$**

   We factor the expression as follows:

   \[
   ab + a - 3b - 3 = 5 - 3 \\
   (a - 3)(b + 1) = 2
   \]

   We can use a table to find appropriate values for $a$ and $b$. Thus, $(5, 0), (4, 1), (1, -2)$, and $(2, -3)$ are the desired solutions.

   \[
   \begin{array}{cccc}
   a - 3 & b + 1 & a & b \\
   2 & 1 & 5 & 0 \\
   -2 & -1 & 1 & -2 \\
   1 & 2 & 4 & 1 \\
   -1 & -2 & 2 & 3
   \end{array}
   \]

4. **Answer: $x = 1$**

   \[
   f(x) + xf\left(\frac{1}{x}\right) = x \\
   f\left(\frac{1}{x}\right) + \frac{1}{x}f(x) = \frac{1}{x} \\
   f\left(\frac{1}{x}\right) = \frac{1}{x} - \frac{1}{x}f(x) \\
   f(x) + x\left(\frac{1}{x} - \frac{1}{x}f(x)\right) = x \\
   x = 1
   \]

5. **Answer: $-\frac{5}{4}$**

   We complete the square:

   \[
   2x^2 + 2xy + 4y + 5y^2 - x = (x^2 + 2xy + y^2) + (x^2 - x + \frac{1}{4}) + (4y^2 + 4y + 1) - \left(\frac{1}{4} + 1\right) \\
   = (x + y)^2 + (x - \frac{1}{2})^2 + (2y + 1)^2 - \frac{5}{4}
   \]

   Notice that $x = \frac{1}{2}$ and $y = -\frac{1}{2}$ would yield the minimum, which is $-\frac{5}{4}$.

6. **Answer: 506**
Let \( P_n \) be the value of the dollar in gold after the \( n^{th} \) bailout. Let \( s = \frac{1}{2} \). Then after the \( n^{th} \) bailout, the dollar is a factor of \((1 + s^{2^{n-1}})\) of its \((n-1)^{th}\) value. Thus,

\[
\begin{align*}
P_4 &= \frac{1}{980}(1 + s)(1 + s^2)(1 + s^4)(1 + s^8) \\
&= \frac{1}{980}(1 + s + s^2 + s^3)(1 + s^4)(1 + s^8) \\
&= \frac{1}{980}(1 + s + s^2 + s^3 + s^4 + s^5 + s^6 + s^7)(1 + s^8) \\
&= \frac{1}{980}(1 + s + s^2 + s^3 + s^4 + s^5 + s^6 + s^7 + s^8 + s^9 + s^{10} + s^{11} + s^{12} + s^{13} + s^{14} + s^{15}) \\
&= \frac{1}{980} \left(1 - \frac{1}{s^{16}}\right).
\end{align*}
\]

Plug in \( s = \frac{1}{2} \), and we find that \( P_4 = \frac{1}{490} \left(1 - \frac{1}{2^{16}}\right) \). So \( b + c = 490 + 16 = 506 \).

**7. Answer:** 32670

Largest multiple of 60 below 2009 is 1980, so find the sum for \( k = 1 \) to 1979, so that we have each value of \( \lfloor k/60 \rfloor \) exactly 60 times. This sum is therefore \(60(1 + 2 + \ldots + 32) = 60(1 + 32)^2 = 31680\). The remaining terms are all 33, and there are \(2009 - 1980 + 1 = 30\) of them, giving an answer of \(31680 + 30 \times 33 = 32670\).

**8. Answer:** 1011

\[\begin{align*}
(1\overline{100})(\overline{11}) &= \overline{11000} + 1\overline{100} = \overline{1100} \\
\overline{1100} + 1\overline{11} &= 1\overline{011}.
\end{align*}\]

**9. Answer:** -58

Let the roots be \( r, s, \) and \( t \). Then they satisfy \( r + s + t = -a, rs + st + rt = b, \) and \( rst = -c. \) So we have \(- (a + b + c + 1) = r + s + t - rs - rt - st + rst - 1 = (r - 1)(s - 1)(t - 1) = 2009 = 7 \times 7 \times 41. \)

Thus the roots are 8, 8, and 42, and \( a = -(r + s + t) = -58 \).

**10. Answer:** 20

For convenience, set \( x = \sum_{n=1}^{\infty} \frac{\delta(n)}{n^2} \) and \( y = \sum_{n=0}^{\infty} \frac{(-1)^{n-1}\delta(n)}{n^2}. \)

The crucial observation is that \( \frac{1}{2}(x + y) \) and \( \frac{1}{2}(x - y) \) give the same summation as \( x \), restricted to the terms with odd \( n \) and even \( n \) respectively. The latter summation is easily related to \( x \) using the fact that \( \delta(2n) = \delta(n) \) (since multiplying by 2 is simply appending a 0 in the binary expansion), as follows.

\[
\frac{1}{2}(x - y) = \sum_{\text{even } n \geq 2} \frac{\delta(n)}{n^2} \\
= \sum_{n=1}^{\infty} \frac{\delta(2n)}{(2n)^2} \\
= \sum_{n=1}^{\infty} \frac{\delta(n)}{4n^2} \\
= \frac{1}{4} x.
\]

Thus we have \( \frac{1}{2}(x - y) = \frac{1}{4} x. \) It follows that \( x = 2y, \) so \( x/y = 2. \) Thus, the desired answer is 20.