1. The only integer pair with a difference equal to the quotient is (4, 2). Find the sum of the only pair of positive fractions with denominator 8 in lowest terms with this property.

a. 11.0 b. 11.25 c. 11.5 d. 11.75 e. 12.0

The property can be represented by: $a - b = \frac{a}{b}$

Solving the equation for a: $a - b = \frac{a}{b} \rightarrow ab - b^2 = a \rightarrow a(b-1) = b^2 \rightarrow a = \frac{b^2}{b-1}$

Let $b = \frac{c}{8}$ to represent one of the positive fractions with denominator 8 in lowest terms.

Substituting into $a = \frac{b^2}{b-1}$ gives $a = \frac{\frac{c^2}{64}}{\frac{c}{8}-1} \rightarrow a = \frac{c^2}{8c-64}$

Since a is a fraction with denominator 8, $8c - 64 = 8 \rightarrow c = 9$

Substituting $c = 9$ gives $a = \frac{81}{8}$ $and$ $b = \frac{9}{8}$ $and\ the\ sum\ a + b = 11.25$

2. The interior angles of an n-gon form an arithmetic sequence with the first term 128° and common difference 4°. There are two values of n which satisfy this condition. Find their sum.

a. 20 b. 21 c. 22 d. 25 e. 27

The sum of the interior angles of an n-gon is 180(n-2).

The arithmetic sequence of interior angles of the n-gon is represented by:

$$128 + 132 + 136 + \cdots + (128 + 4(n-1))$$

The condition is satisfied when

$$128 + 132 + 136 + \cdots + (128 + 4(n-1)) = 180(n-2)$$

Using the formula for the sum of an arithmetic sequence, this equation becomes

$$\frac{n}{2}\left(128 + (128 + 4(n-1))\right) = 180(n-2)$$

Which can be simplified to the quadratic equation

$$n^2 - 27n + 180 = 0$$

And the solutions are $n = 12\ and\ n = 15$, so the sum is 27.

3. For the function f(x), f(1) = 4. Also, f(x)*f(y) = f(x+y) + f(x – y) for all real numbers x and y. Find f(5).

a. 720 b. 724 c. 728 d. 732 e. 736

Using the property $f(x) \cdot f(y) = f(x+y) + f(x-y),\ let\ x = 1\ \ and\ \ y = 0$

$$f(1) \cdot f(0) = f(1) + f(1)$$

Since $f(1) = 4,\ f(1) \cdot f(0) = f(1) + f(1)\ \rightarrow\ \ 4 \cdot f(0) = 8 \rightarrow\ \ f(0) = 2$

Now, using the property $f(x) \cdot f(y) = f(x+y) + f(x-y),\ let\ x = 1\ \ and\ \ y = 1$

$$f(1) \cdot f(1) = f(2) + f(0)$$

$$4 \cdot 4 = f(2) + 2$$

$$f(2) = 14$$

Now, using the property $f(x) \cdot f(y) = f(x+y) + f(x-y),\ let\ x = 2\ \ and\ \ y = 1$

$$f(2) \cdot f(1) = f(3) + f(1)$$

$$14 \cdot 4 = f(3) + 4$$

$$f(3) = 52$$

Now, using the property $f(x) \cdot f(y) = f(x+y) + f(x-y),\ let\ x = 3\ \ and\ \ y = 2$

$$f(3) \cdot f(2) = f(5) + f(1)$$

$$52 \cdot 14 = f(5) + 4$$

$$f(5) = 724$$