NAME: Answers

If we could not use `math.sqrt` to compute the square root of a float number \( f \), then we could use Newton’s method on the equation \( x^2 - f = 0 \), building the iteration

\[
x_{k+1} = x_k - \frac{x_k^2 - f}{2x_k}, \quad k = 0, 1, \ldots, \quad x_0 = f.
\]

We stop the iteration when the decrement \( \frac{x_k^2 - f}{2x_k} \) is less than \( 10^{-8} \).

1. Draw the flowchart for this algorithm.

2. Give Python code for this algorithm.

   **Answer:**

   ```python
   f = input('give f : ')  
x = float(f)  
while True:  
    dx = (x**2 - f)/(2*x)  
    print 'x = %f dx = %f' % (x,dx)  
    if dx < 1.0E-8: break  
    x = x - dx  
print ' sqrt(%f) = %f' % (f, x)  
import math  
print 'math.sqrt(%f) = %f' % (f, math.sqrt(f))
```