

Solutions to Exercises in Chapter 1

- 1.1** The GCD of 6 and 9 is 3; the GCD of 12 and 18 is 6; the GCD of 15 and 21 is 3; the GCD of 11 and 15 is 1.
- 1.2** Using Newton's algorithm to calculate the square root of a number accurate to two decimal places, the square root of 4 is 2.00; the square root of 6 is 2.45; the square root of 8 is 2.83; and the square root of 9 is 3.00.

Method to calculate the square root of a:

```
static float squareRoot (float a) {  
    float r = (1 + a)/2;  
    while (Math.abs(r*r - a) > 0.01)  
        r = (r + a/r)/2;  
    return r;  
}
```

If step 2 of the algorithm continued until $r^2 = a$, the algorithm would be unlikely to terminate, since two approximately-computed numbers are unlikely to be exactly equal.

- 1.6** To find the roots of the general quadratic equation $ax^2 + bx + c = 0$:
1. Let r be the square root of $(b^2 - 4ac)$.
 2. Let $root1$ be $(-b + r) / 2a$, and let $root2$ be $(-b - r) / 2a$.
 3. Terminate with answers $root1$ and $root2$.