

$$X_n = (1/2)(X_{n-1} + a/X_{n-1})$$

$$X_1 = 1$$

$$a = 25$$

prove 2 fact

1) **limit exists**

2) $\lim(x_n) = a$

if $\lim(x_n)$ exist and
 $\lim(x_n) = y$, then

$$y = (1/2)(y + a/y)$$

$$2y = (y + a/y)$$

$$2y - y = a/y$$

$$y = a/y$$

$$a = y^2$$

$$y = \sqrt{a}$$

sqrt

```
void manual_sqrt(double number)
{
    double next, prev;
    prev = 1;
    for(int i=0; i<7; i++)
    {
        next = (0.5)*(prev + number/prev);
        prev = next;
        cout << next << endl;
    }
}
```