

## Homework 2 answers

1. *reciprocals*(−1) and *reciprocals*( $\frac{1}{2}$ ) are not well defined under the given definition for *reciprocals*; they cannot be evaluated.

2.

$$factor(k, n) = \begin{cases} \text{true} & \text{if } mod(n, k) = 0 \\ \text{false} & \text{otherwise} \end{cases}$$

3.

$$largest\_factor(n) = largest\_factor\_upto(n, n - 1)$$

$$largest\_factor\_upto(k, n) = \begin{cases} k & \text{if } factor(n, k) \\ largest\_factor\_upto(n, k - 1) & \text{otherwise} \end{cases}$$

4.

$$prime(n) = \begin{cases} \text{true} & \text{if } largest\_factor(n) = 1 \\ \text{false} & \text{otherwise} \end{cases}$$

5.

$$prime\_reciprocals(n) = \begin{cases} 0 & \text{if } n = 1 \\ prime\_reciprocals(n - 1) + \frac{1}{n} & \text{if } prime(n) \\ prime\_reciprocals(n - 1) & \text{otherwise} \end{cases}$$

6. 

```
(defun mb-iters (z z0 i)
  (if (or (too-big z) (= i 100))
      0
      (+ 1 (mb-iters (f z z0) z0 (+ 1 i))))))
```

7. 

```
(defun mandelbrot-iters (z)
  (mb-iters z z 0))
```

8. 

```
(defun mandelbrot-iters (z)
  (min 15 (mb-iters z z 0)))
```