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Chapter 6 Exercises

1.

```
>       m ^ 0 = 1
>       m ^ (n+1) = m * m^n
```

```
2 ^ 3
2 * (2 ^ 2)
2 * (2 * (2^1))
2 * (2 * (2 * (2 ^ 0)))
2 * (2 * (2 * 1))
8
```

2.

```
length [1,2,3]
1 + length [2,3]
1 + (1 + length [3])
1 + (1 + (1+ length [ ]))
1 + (1 + (1+ 0))
= 3
```

```
drop 3 [1,2,3,4,5]
drop 2 [2,3,4,5]
drop 1 [3,4,5]
drop 0 [4,5]
= [4,5]
```

```
init [1,2,3]
1:init [2,3]
1:2:init [3]
1:2:[ ]
= [1,2]
```

3.

```
and [ ]         = True
and (b:bs)      = b ^ and bs
```

```
concat []       = []
concat (xs:xss)         = xs ++ concat xss
```

```
replicate 0 _           = x
replicate (n+1)x        = x: replicate n x
```

```
(x:_)!!0                = x
(_:xs)!!(n+1)           = xs!!n
```

```
elem x []               = False
elem x (y:ys)
        |x==y           =True
        |otherwise      =elem x ys
```

5.

```
>       halve xs = splitAt (length xs `div` 2) xs

>       msort [] = []
>       msort [x] = [x]
>       msort xs = merge (msort ys) (msort zs)
>                  where
>                    (ys, zs) = halve xs
```