2
```
x <- c(-1, 0, 1)
fx <- c(4, 1, 4)/9
(EX <- sum(x * fx))

## [1] 0

(EX2 <- sum(x^2 * fx))

## [1] 0.8888889

3*EX2 - 2*EX + 4

## [1] 6.666667
```

3
```
x <- c(25, 10000, 50000, 200000, -.5)
px <- c(12000, 4, 1, 1, 3e6 - sum(c(12006)))/3e6
sum(x * px)

## [1] -0.3013323
```

5
```
x <- c(200, 200, 100, 100)
px <- (5 - 1:4)/10
sum(x * px)

## [1] 170
```

6 $\sum_{x\in[0,6]} f(x) = 1 = 0.9 + \sum_{x\in[1,6]} c/x \to c = 0.1/2.45$

```
c <- 0.1/2.45
x <- 1:6 - 1
px <- c/(1:6)
sum(x * px)

## [1] 0.144898
```

8 (a) $\sum_{x\in\mathbb{N}\setminus\{0\}} \frac{1}{x^2} = \frac{\pi^2}{6}$, which will make this a probability mass function.

(b) $\mathbb{E}(X) = \frac{6}{\pi^2} \sum_{x\in\mathbb{N}\setminus\{0\}} \frac{x}{x^2} > \infty$, by the p-series convergence test.