Distributions-Class.R

```r
# General Discrete distribution
  # 40. Exercise - Repairs
exprepairs <- 0*.55 + 1*.25 + 2*.14 + 3*.04 + 4*.02
exprepairs
```

```
## [1] 0.73
```

```r
40*exprepairs
```

```
## [1] 29.2
```

```r
# Binomial distribution
  # Ex. 4.3.2. Extra
  # The probability that an egg in a two-dozen carton is cracked is 0.025.
  # Let X = # cracked eggs in a carton. Find:
    # (Binomial distribution: n = 24, p = .025)
      # Part 1: p(X < 3)
pbinom(2, 24, .025)
```

```
## [1] 0.978636
```

```r
      # Part 2: P(2 ≤ X < 6)
pbinom(5, 24, .025) - pbinom(1, 24, .025)
```

```
## [1] 0.1201721
```

```r
# Normal distribution
  # Ex. 5.4.22.; plus - Glucose N(96, 8.5)
    # 5.4.22
qnorm(.05, 96, 8.5)
```

```
## [1] 82.01874
```

```r
qnorm(.95, 96, 8.5)
```

```
## [1] 109.9813
```

```r
    # Extra 1: Find P(95 < X < 100)
pnorm(100,96,8.5)-pnorm(95,96,8.5)
```

```
## [1] 0.2278589
```

```r
    # Extra 2: The glucose levels of 40 randomly sampled people are tested.
    # Based on the definition of “normal glucose level”, find the probability
that all 40 will have normal levels.
dbinom(40,40,.90)
```

```
## [1] 0.01478088
```

```r
# Probability and Sampling distributions
  # Ex. R2-1. - Triathlon
    # Parts a-c
      # Leo = 4948 seconds; Men ~ N(4313, 583)
      # Mary = 5513 seconds; Women ~ N(5261, 807)
leoZ <- (4948-4313)/583
maryZ <- (5513-5261)/807
leoZ
```

```
## [1] 1.089194
```

```r
maryZ
```

```
## [1] 0.3122677
```

```r
    # Part d
1-pnorm(4948,4313,583)
```

```
## [1] 0.1380342
```

```r
(4948-4313)/583
```

```
## [1] 1.089194
```

```r
1 - pnorm(1.089194)
```

```
## [1] 0.1380342
```

```r
    # Part e
1-pnorm(5513,5261,807)
```

```
## [1] 0.3774186
```

```r
    # Part g
qnorm(.05,4313,583)
```

```
## [1] 3354.05
```

```r
    # Part h
qnorm(.9,5261,807)
```

```
## [1] 6295.212
```

```r
    # Part i
1-pnorm(5513,5261,807/(sqrt(50)))
```

```
## [1] 0.01361984
```

```r
  # Ex. R2-2. - Sales incentives
    # X = daily sales/person ~ N($3000, $400)
      # Part a
1-pnorm(3500, 3000, 400)
```

```
## [1] 0.1056498
```

```r
      # Part b
1-pnorm(3500, 3000, (400/sqrt(8)))
```

```
## [1] 0.000203476
```