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Project 2.3
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5.53 An inventory study determines that, on average, demands for a particular item at a warehouse are made 5 times per day. What is the probability that on a given day this item is requested

(a) more than 5 times?

```
> A <- 1 - ppois(5, 5)
> A
[1] 0.3840393
```

(b) not at all?

```
> A <- ppois(0, 5)
> A
[1] 0.006737947
```

6.11 A soft-drink machine is regulated so that it discharges an average of 200 milliliters per cup. If the amount of drink is normally distributed with a standard deviation equal to 15 milliliters,

(a) what fraction of the cups will contain more than 224 milliliters?

```
> A <- 1 - pnorm(224, 200, 15)
> A
[1] 0.05479929
```

(b) what is the probability that a cup contains between 191 and 209 milliliters?

```
> A <- pnorm(209, 200, 15) - pnorm(191, 200, 15)
> A
[1] 0.4514938
```

(c) how many cups will probably overflow if 230 milliliter cups are used for the next 1000 drinks?

```
> A <- 1 - pnorm(230, 200, 15)
> A * 1000
[1] 22.75013
```

(d) below what value do we get the smallest 25% of the drinks?

```
> A <- pnorm(190, 200, 15)
> A
[1] 0.2524925
```

8.24 If a certain machine makes electrical resistors having a mean resistance of 40 ohms and a standard deviation of 2 ohms, what is the probability that a random sample of 36 of these resistors will have a combined resistance of more than 1458 ohms?

```
> avgRes <- 1458/36
> sampStd = 2/sqrt(36)
> A <- 1 - pnorm(totalRes, 40, sampStd)
> A
[1] 0.0668072
```

8.54 Construct a quantile plot of these data, which represent the lifetimes, in hours, of fifty 40-watt, 110 volt internally frosted incandescent lamps taken from forced life tests:

919 1196 785 1126 936 918 1156 920 948 1067 1092 1162 1170 929 950 905 972 1035 1045 855 1195 1195 1340 1122 938 970 1237 956 1102 1157 978 832 1009 1157 1151 1009 765 958 902 1022 1333 811 1217 1085 896 958 1311 1037 702 923

(but do a normal QQ plot)

```
> qqnorm(dat, pch = 1, frame = FALSE)
> dat <- c(919, 1196, 785, 1126, 936, 918,
+          1156, 920, 948, 1067, 1092, 1162,
+          1170, 929, 950, 905, 972, 1035,
+          1045, 855, 1195, 1195, 1340, 1122,
+          938, 970, 1237, 956, 1102, 1157,
+          978, 832, 1009, 1157, 1151, 1009,
+          765, 958, 902, 1022, 1333, 811,
+          1217, 1085, 896, 958, 1311, 1037,
+          702, 923
+ )
> qqnorm(dat, pch = 1, frame = FALSE)
> qqline(dat, col = "steelblue", lwd = 2)
```


Normal Q-Q Plot