

Sign Test

```
> data(exec.pay, package = "UsingR")
> exec.pay = sample(exec.pay, 25)
> print(sort(exec.pay))
```

```
[1]  0  9  9  9 11 12 12 13 14 16 19 21 22 26 27
[16] 28 36 36 38 39 49 51 106 142 167
```

Do a sign test of

$$H_0 : \text{median} = 40, \quad H_A : \text{median} < 40$$

$$T = \{i : X_i > 40\}, Z = \frac{T - n(1/2)}{\sqrt{(1/2)(1/2)/n}} = \frac{2T - n}{\sqrt{n}}$$

Under null, Z has approximate standard normal distribution.

```
> T = sum(exec.pay > 40)
> n = length(exec.pay)
> Z = (2 * T - n)/sqrt(n)
> cat("T=", T, " n = ", n, " Z = ", Z, "\n")
```

```
T= 5  n =  25 Z =  -3
```

```
> pnorm(Z)
```

```
[1] 0.00135
```