

# Normal Distribution

R Handout

*Derek H. Ogle*

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## Wood-Burning Example

Suppose that the amount of wood that I burn per day is approximately normally distributed with a mean of  $16 \text{ ft}^3$  and a standard deviation of  $4 \text{ ft}^3$ . Use this information to answer the questions below.

- What is an individual?
  - What is the variable and what type of variable is it?
  - On what proportion of days do I burn less than  $22 \text{ ft}^3$  of wood?
  - On what proportion of days do I burn more than  $15 \text{ ft}^3$  of wood?
  - On what proportion of days do I burn between 11 and  $26 \text{ ft}^3$  of wood?
  - What is the amount of wood burned per day such that I burn less than that amount on 10% of the days?
  - What is the amount of wood burned per day such that I burn more than that amount on 20% of the days?
  - What are the most common 50% of amounts of wood burned per day?
- 

## Load NCStats Package

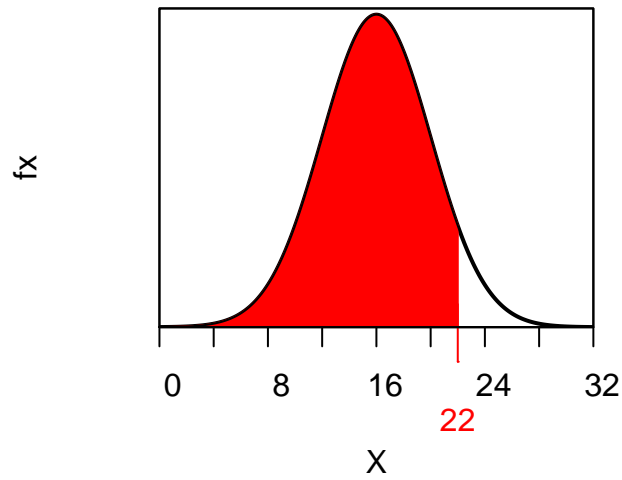
```
> library(NCStats)
```

## Forward, Less-Than

```
> ( distrib(22,mean=16,sd=4) )
```

$N(\mu = 16, \sigma = 4)$  Distribution

Value = 22 ; Area = 0.9332



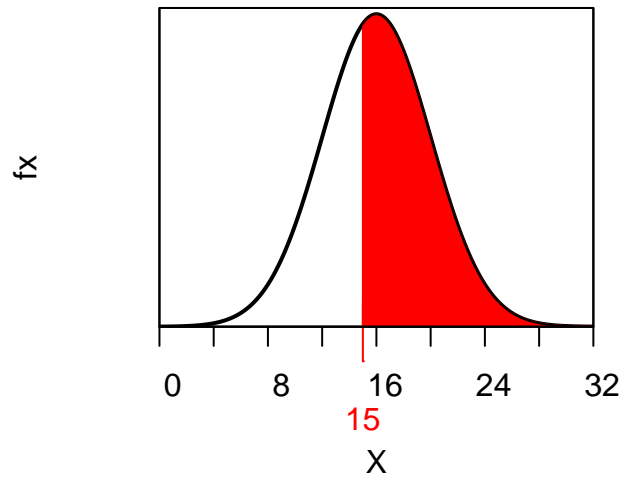
```
[1] 0.9331928
```

Forward, Greater-Than

```
> ( distrib(15,mean=16,sd=4,lower.tail=FALSE) )
```

$N(\mu = 16, \sigma = 4)$  Distribution

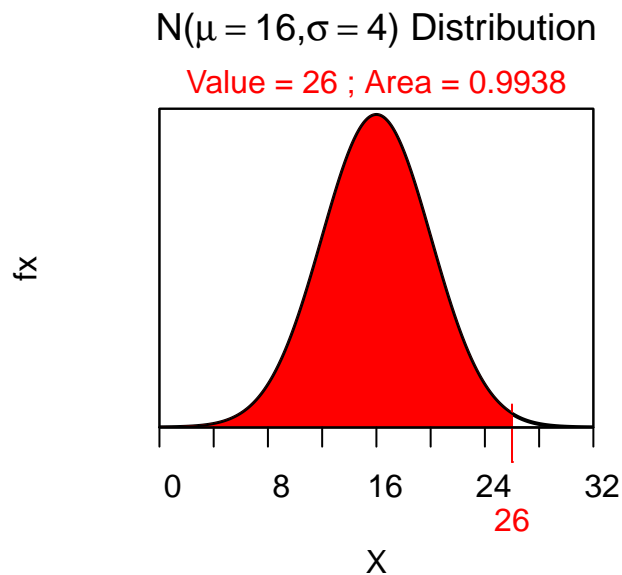
Value = 15 ; Area = 0.5987



```
[1] 0.5987063
```

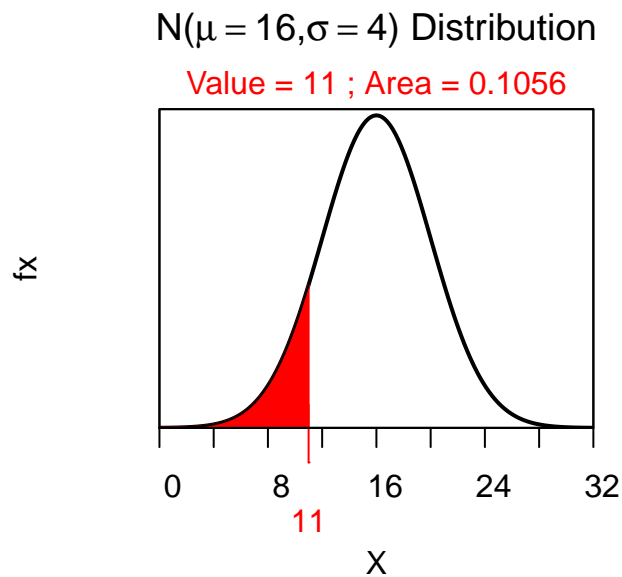
Forward, Between

```
> ( ab <- distrib(26,mean=16,sd=4) )
```



```
[1] 0.9937903
```

```
> ( a <- distrib(11,mean=16,sd=4) )
```



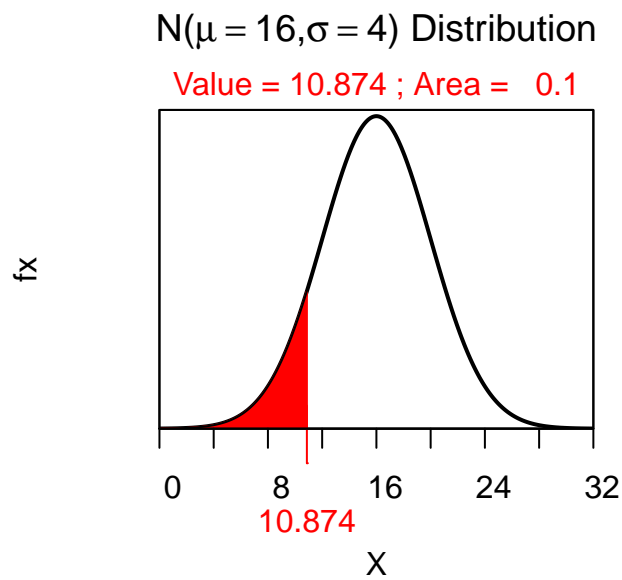
```
[1] 0.1056498
```

```
> ab-a
```

```
[1] 0.8881406
```

Reverse, Less-Than}

```
> ( distrib(0.1,mean=16,sd=4,type="q") )
```



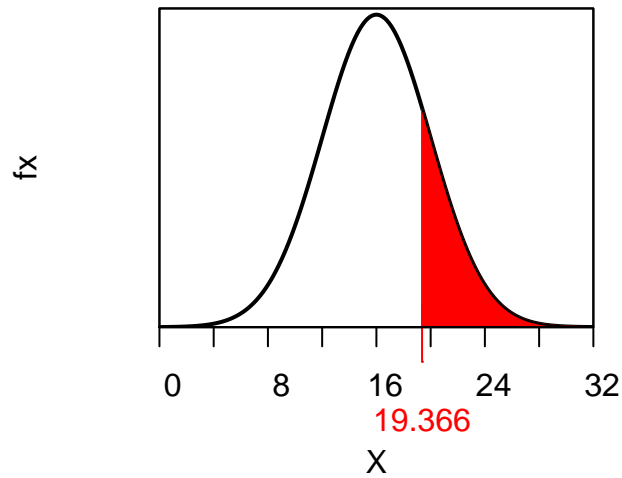
```
[1] 10.87379
```

Reverse, Greater Than

```
> ( distrib(0.20,mean=16,sd=4,type="q",lower.tail=FALSE) )
```

$N(\mu = 16, \sigma = 4)$  Distribution

Value = 19.366 ; Area = 0.2



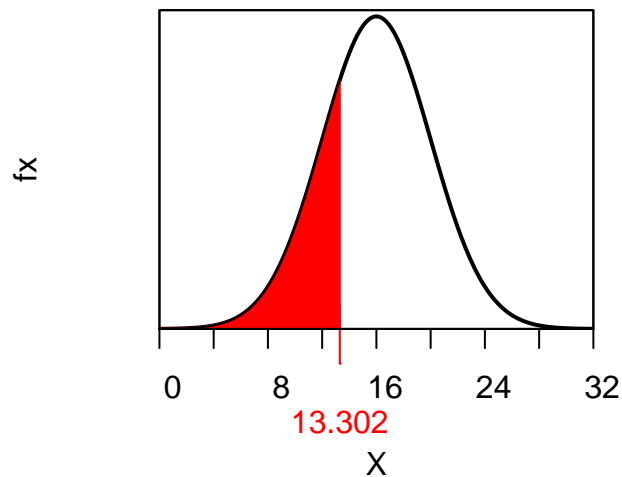
```
[1] 19.36648
```

Reverse, Between

```
> ( distrib(0.25,mean=16,sd=4,type="q") )
```

$N(\mu = 16, \sigma = 4)$  Distribution

Value = 13.302 ; Area = 0.25

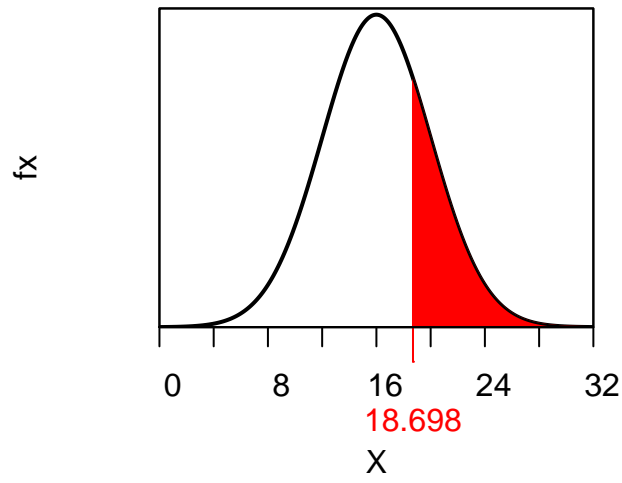


```
[1] 13.30204
```

```
> ( distrib(0.25,mean=16,sd=4,type="q",lower.tail=FALSE) )
```

$N(\mu = 16, \sigma = 4)$  Distribution

Value = 18.698 ; Area = 0.25



[1] 18.69796