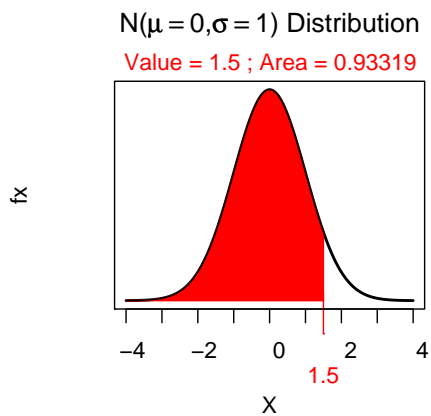


Normal Distributions in R Handout

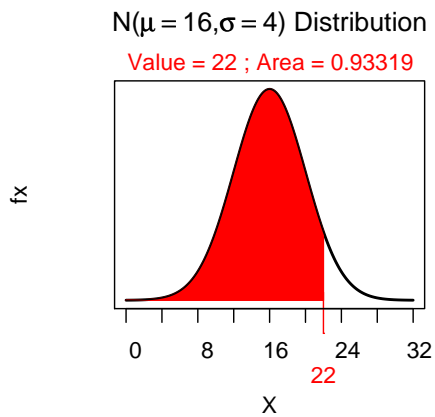
1 Lecture Support

```
> library(NCStats)
```

```
> distrib(1.5)
```



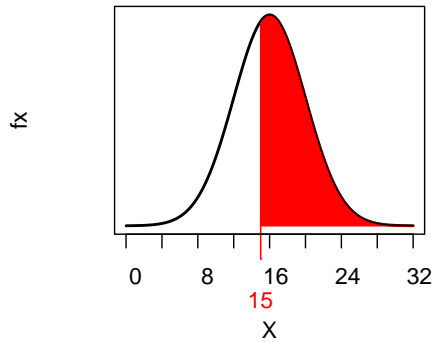
```
> distrib(22, mean=16, sd=4)
```



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

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

Value = 15 ; Area = 0.59871



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

```
[1] 0.9937903
```

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

```
[1] 0.1056498
```

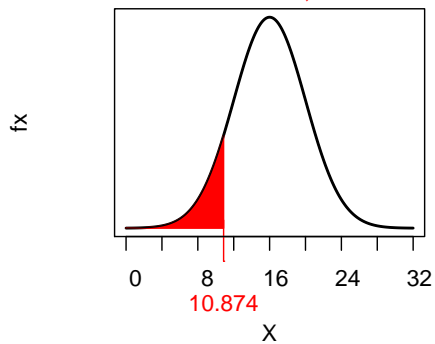
```
> ab-a
```

```
[1] 0.8881406
```

```
> distrib(0.10,type="q",mean=16,sd=4)
```

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

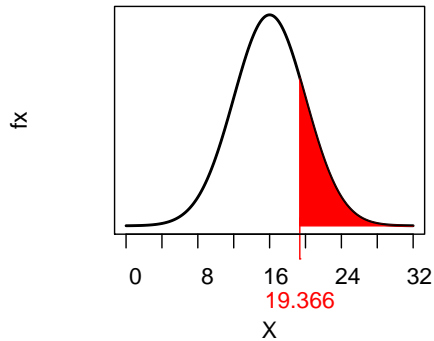
Value = 10.87379 ; Area = 0.1



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

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

Value = 19.36648 ; Area = 0.2



2 Another Example

Suppose that it is known that the distribution of total weed pollen count (spores per cubic meter of air) for LaCrosse, WI on a day in early September is normal with a mean of 40 and a standard deviation of 8 (Note: pollen count information is available from [this site](#)).

2.1 Forward Calculations

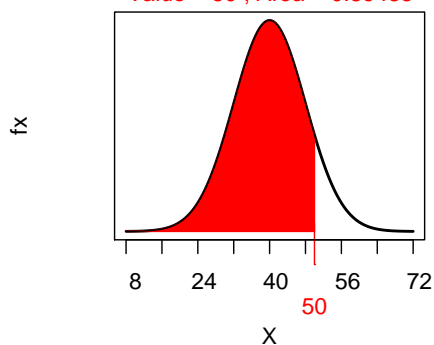
2.1.1 Left-Of Calculations

What proportion of days in LaCrosse have a weed pollen count less than 50 pores/ m^3 ?

```
> distrib(50, "norm", mean=40, sd=8)
```

$N(\mu = 40, \sigma = 8)$ Distribution

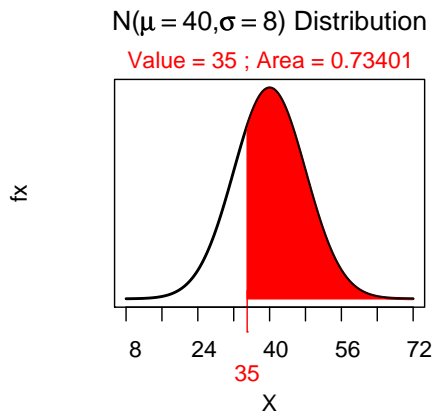
Value = 50 ; Area = 0.89435



2.1.2 Right-Of Calculations

What proportion of days in LaCrosse have a weed pollen count greater than 35 pores/ m^3 ?

```
> distrib(35, "norm", mean=40, sd=8, lower.tail=FALSE)
```



2.1.3 Between Calculations

What proportion of days in LaCrosse have a weed pollen count between 32 and 55 pores/m³?

```
> ab <- distrib(55, "norm", mean=40, sd=8, plot=FALSE)
> ab
```

```
[1] 0.9696036
```

```
> a <- distrib(32, "norm", mean=40, sd=8, plot=FALSE)
> a
```

```
[1] 0.1586553
```

```
> ab-a
```

```
[1] 0.8109484
```

2.2 Reverse Calculations

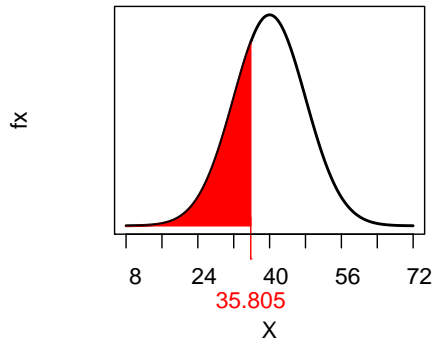
2.2.1 Left-Of Calculations

What is the number of pores/m³ such that 30% of the days have lower pore counts?

```
> distrib(0.30, "norm", "q", mean=40, sd=8)
```

$N(\mu = 40, \sigma = 8)$ Distribution

Value = 35.8048 ; Area = 0.3



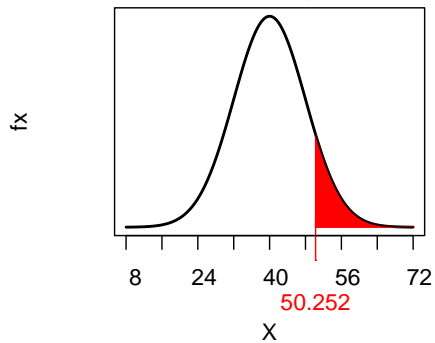
2.2.2 Right-Of Calculations

What is the number of pores/ m^3 such that 10% of the days have higher pore counts?

```
> distrib(0.10, "norm", "q", mean=40, sd=8, lower.tail=FALSE)
```

$N(\mu = 40, \sigma = 8)$ Distribution

Value = 50.25241 ; Area = 0.1



2.2.3 Symmetric Between Calculations

What is the most common 50% of number of pores/ m^3 ?

```
> distrib(0.25, "norm", "q", mean=40, sd=8, plot=FALSE)
```

```
[1] 34.60408
```

```
> distrib(0.25, "norm", "q", mean=40, sd=8, plot=FALSE, lower.tail=FALSE)
```

```
[1] 45.39592
```