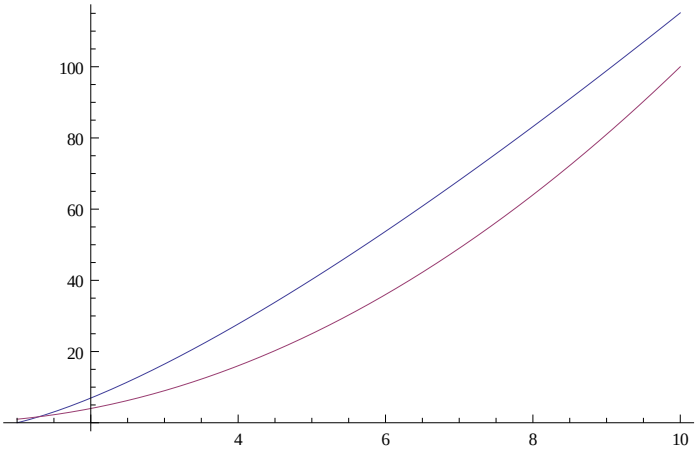
Exercises on O and Θ

$5\,n \log n \in O\left(n^2\right)$

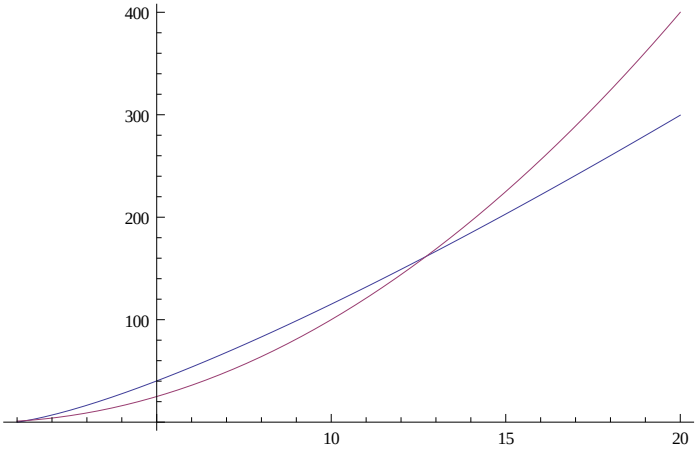
```
Plot[Tooltip[{5 n Log[n], n^2}], {n, 1, 10}]
```




```
Limit[5 n Log[n] / n^2, n → ∞]
```

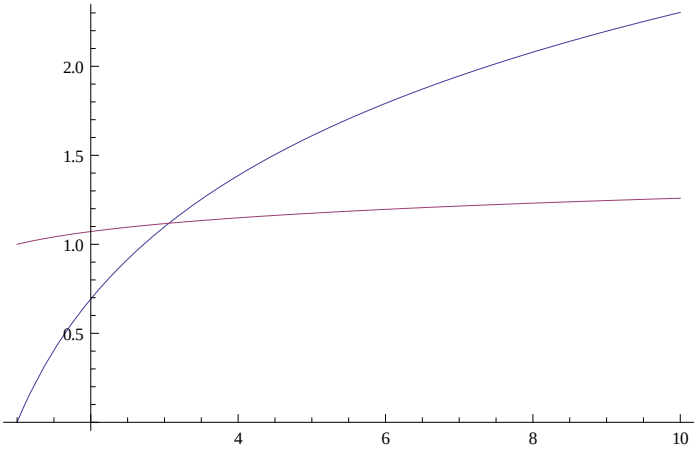
```
0
```

```
Plot[Tooltip[{5 n Log[n], n^2}], {n, 1, 20}]
```



$\log n \in O\left(n^{0.1}\right)$

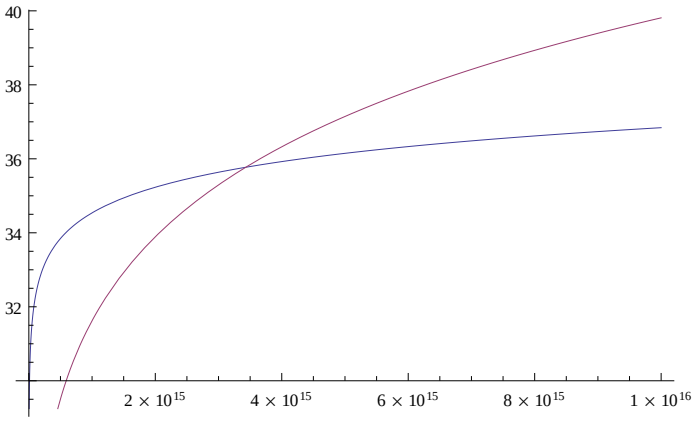
```
Plot[Tooltip[{Log[n], n^.1}], {n, 1, 10}]
```




```
Limit[Log[n] / n^.1, n → ∞]
```

```
0.
```

```
Plot[Tooltip[{Log[n], n^.1}], {n, 1, 10000000000000000}]
```

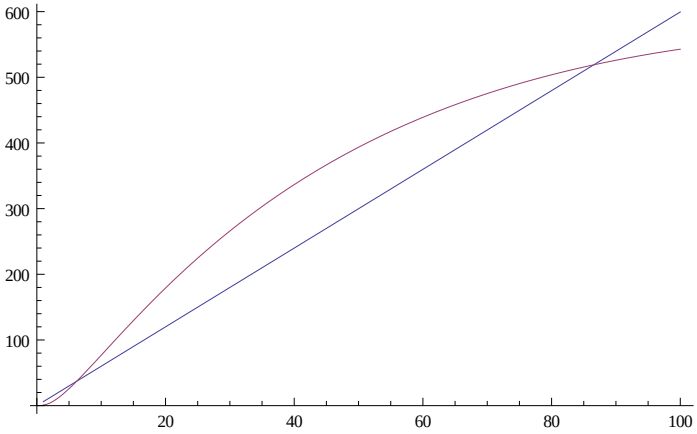


$$n \log n \in O\left(n^{1.1}\right)$$

More exercises

$$5\,n + n \cos\frac{\sqrt{n}}{100} \in \Theta\,(5\,n - 4\,n \cos \log n)$$

```
Plot[Tooltip[{5 n + n Cos[Sqrt[n] / 100], 5 n - 4 n Cos[Log[n]]}], {n, 1, 100}]
```




```
Limit[(5 n + n Cos[Sqrt[n] / 100]) / (5 n - 4 n Cos[Log[n]]), n → ∞]
```

```
Interval[{4/9, 6}]
```