

math16501.mw

Maple 10 Worksheet for Problems in Math 165 - Calculus for Business.

First load plots and student:

```
> with( student):with (plots):
```

Section 1.1 Problem 58 p.12

58. DISTRIBUTION COST Suppose that the number of worker-hours to distribute new telephone books to $x\%$ of the households

in a certain community is given by the function

$$f(x) = (600*x)/(300-x).$$

```
> fdisthours:= proc(x)
```

```
    (600*x) / (300-x) :
```

```
end proc;
```

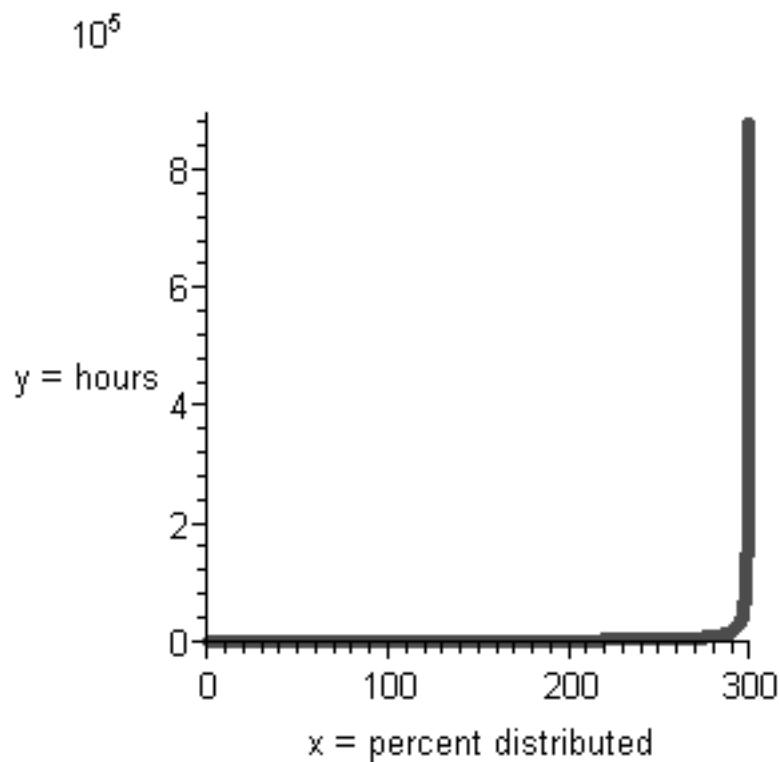
```
>
```

```
fdisthours := proc(x) 600 * x / (300 - x) end proc
```

(1)

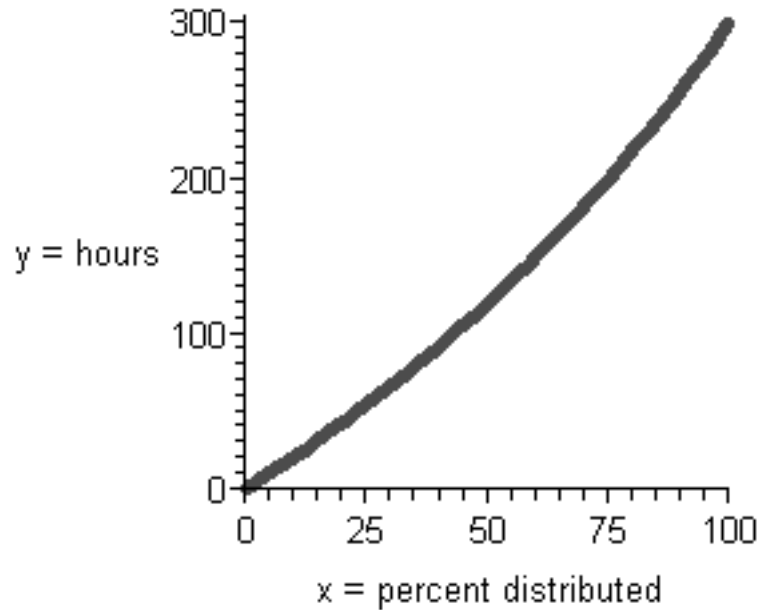
Try to plot

```
> plot(fdisthours(x), x=0..300,thickness=3,labels=[`x = percent  
distributed`, `y = hours`]);
```



Note the size of the units on the y axis. The graph does not tell us much because of the singularity at $x=300$. But the "practical interest" is the percentage x between 0 and 100

```
> plot(fdisthours(x), x=0..100, thickness=3, labels=[`x = percent distributed`, `y = hours`]);
```



The domain of the function `fdistcost` is "all x not equal 300."
 Practical interpretation is valid for $0 \leq x \leq 100$.
 The books are distributed to 50% of the community when $x=50$

```
fdisthours(50);
```

and the number of hours is

120 (2)

The entire community is served when $x=100$:

```
> fdisthours(100);
```

300 (3)

When 150 hours have been completed we have distributed to x % where `fdisthour(x)=50`:

```
solve(fdisthours(x)=150, x);
```

60 (4)

Solve the equation $(600*x)/(300-x) = 150$.

> `eqn := (600*x)/(300-x) = 150;`

$$eqn := \frac{600x}{300-x} = 150 \quad (5)$$

> `simplify(eqn);`

$$-\frac{600x}{-300+x} = 150 \quad (6)$$

> `solve(600*x = 150*(300 - x), x);`
60

(7)