

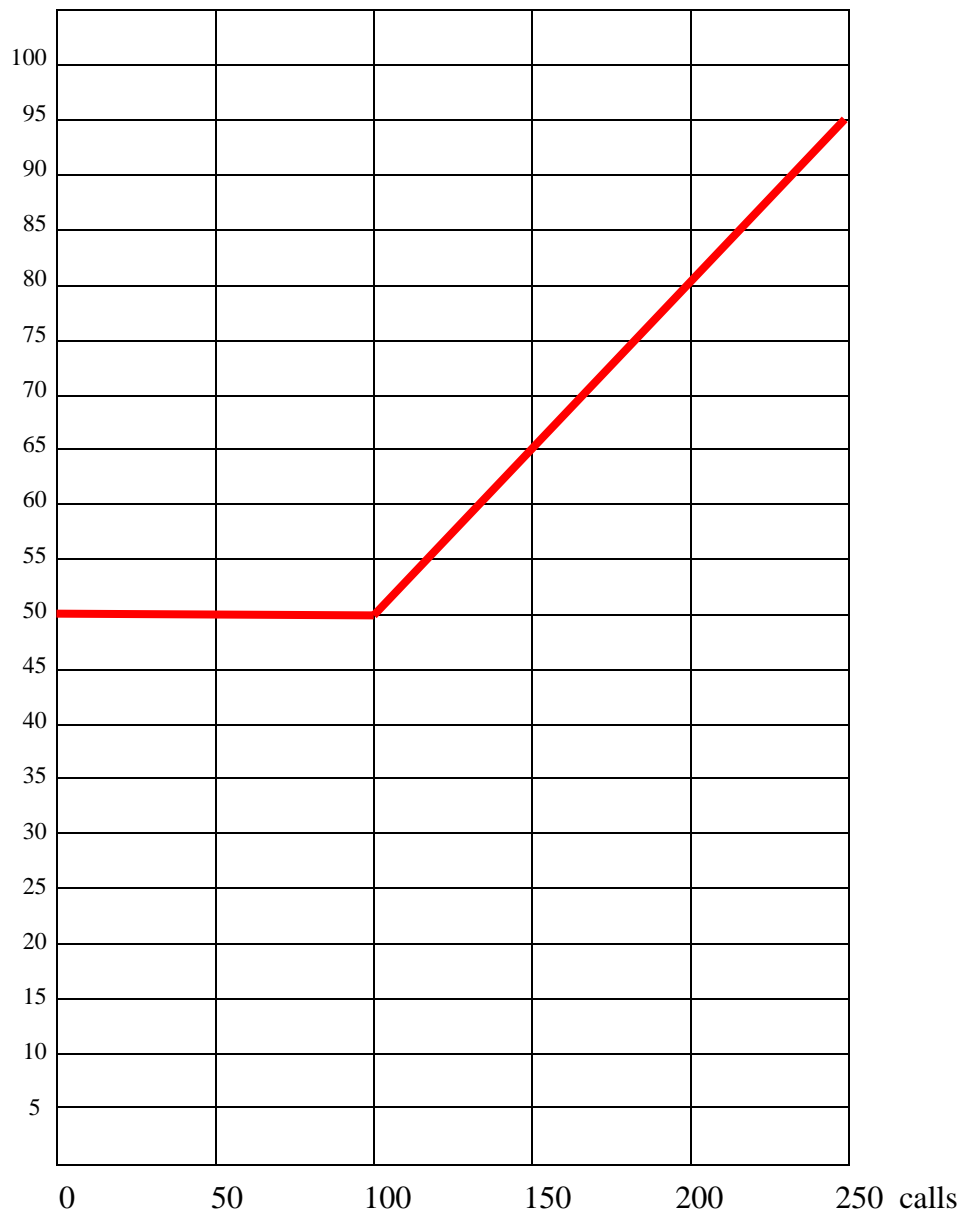
THE TELEPHONE COMPANY SOLUTION

A telephone account is charged at a flat rate of \$50 for the first 100 calls (of any length), then at 30c for each extra call.

Fill in this table showing the charges for up to 250 calls.

x = number of calls	Number of extra calls (more than 100)	Charge for extra calls = \$0.30 per call	Charge for a month in \$
0	0	0	50
50	0	0	50
100	0	0	50
150	50	$50 \times 0.30 = 15$	$50 + 15 = 65$
200	100	$100 \times 0.30 = 30$	$50 + 30 = 80$
250	150	$150 \times 0.30 = 45$	$50 + 45 = 95$

COST \$



If $0 \leq x \leq 100$ the equation is $y = 50$

If $100 \leq x \leq 250$ or just $x \geq 100$ the equation has a gradient of $\frac{30}{100}$

The line goes through the point (100, 50)

Its equation is like $y = mx + c$

Substituting $50 = 0.3 \times 100 + c$

$$50 = 30 + c$$

$$c = 20$$

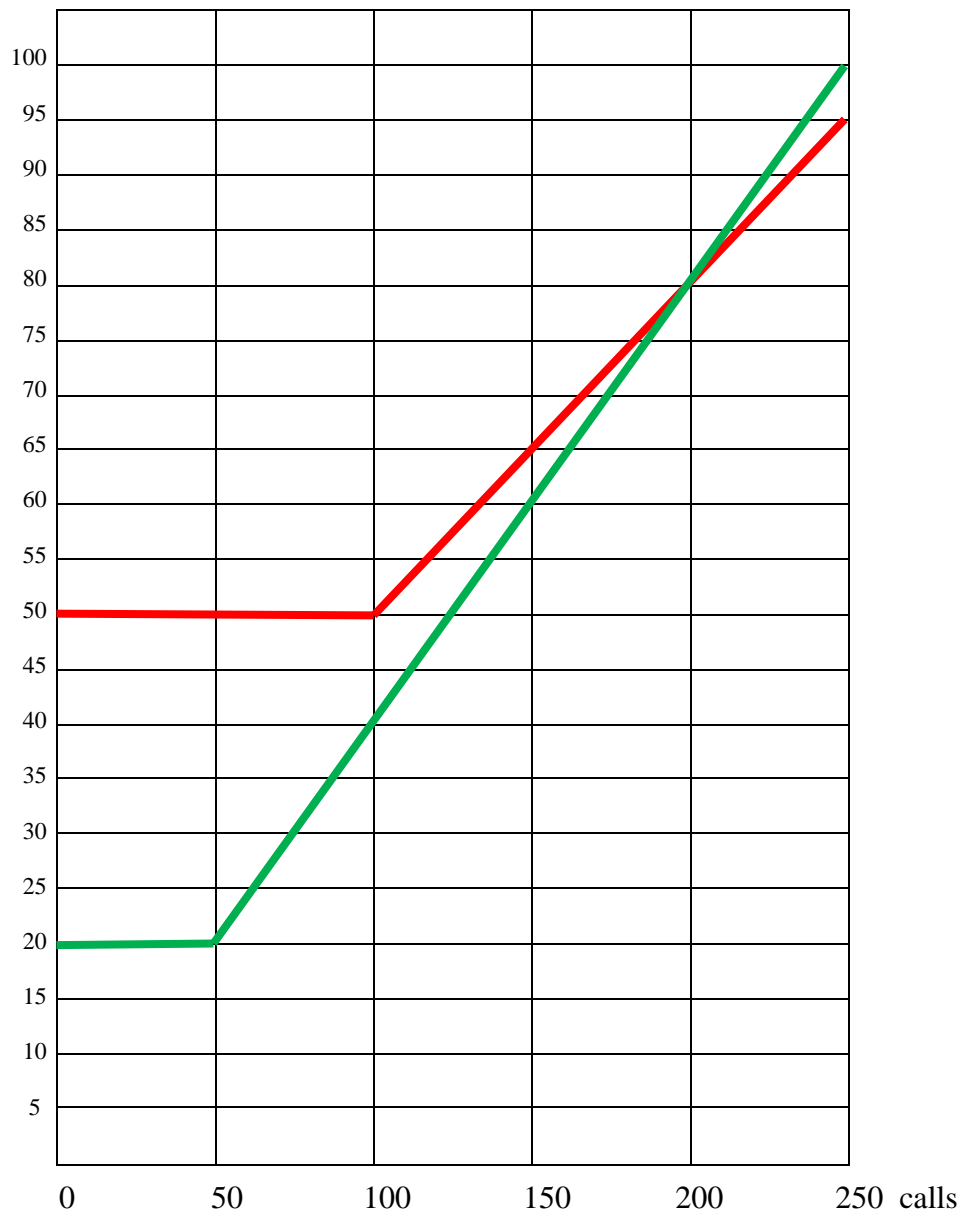
equation is $y = 0.3x + 20$

It is decided to change the charging system so that people pay \$20 per month for the 1st 50 calls then an extra cost of \$0.40 per call.

Fill in this table showing the charges for up to 250 calls.

x = number of calls	Number of extra calls (more than 50)	Charge for extra calls = \$0.40 per call	Charge for a month \$
0	0	0	20
50	0	0	20
100	50	$50 \times 0.40 = 20$	$20 + 20 = 40$
150	100	$100 \times 0.40 = 40$	$20 + 40 = 60$
200	150	$150 \times 0.40 = 60$	$20 + 60 = 80$
250	200	$200 \times 0.40 = 80$	$20 + 80 = 100$

COST \$



If $0 \leq x \leq 50$ the equation is $y = 20$

If $50 \leq x \leq 250$ or just $x \geq 50$ the equation has a gradient of $\frac{20}{50} = 0.4$

The line goes through the point (50, 20)

Its equation is like $y = mx + c$

Substituting $20 = 0.4 \times 50 + c$

$$20 = 20 + c$$

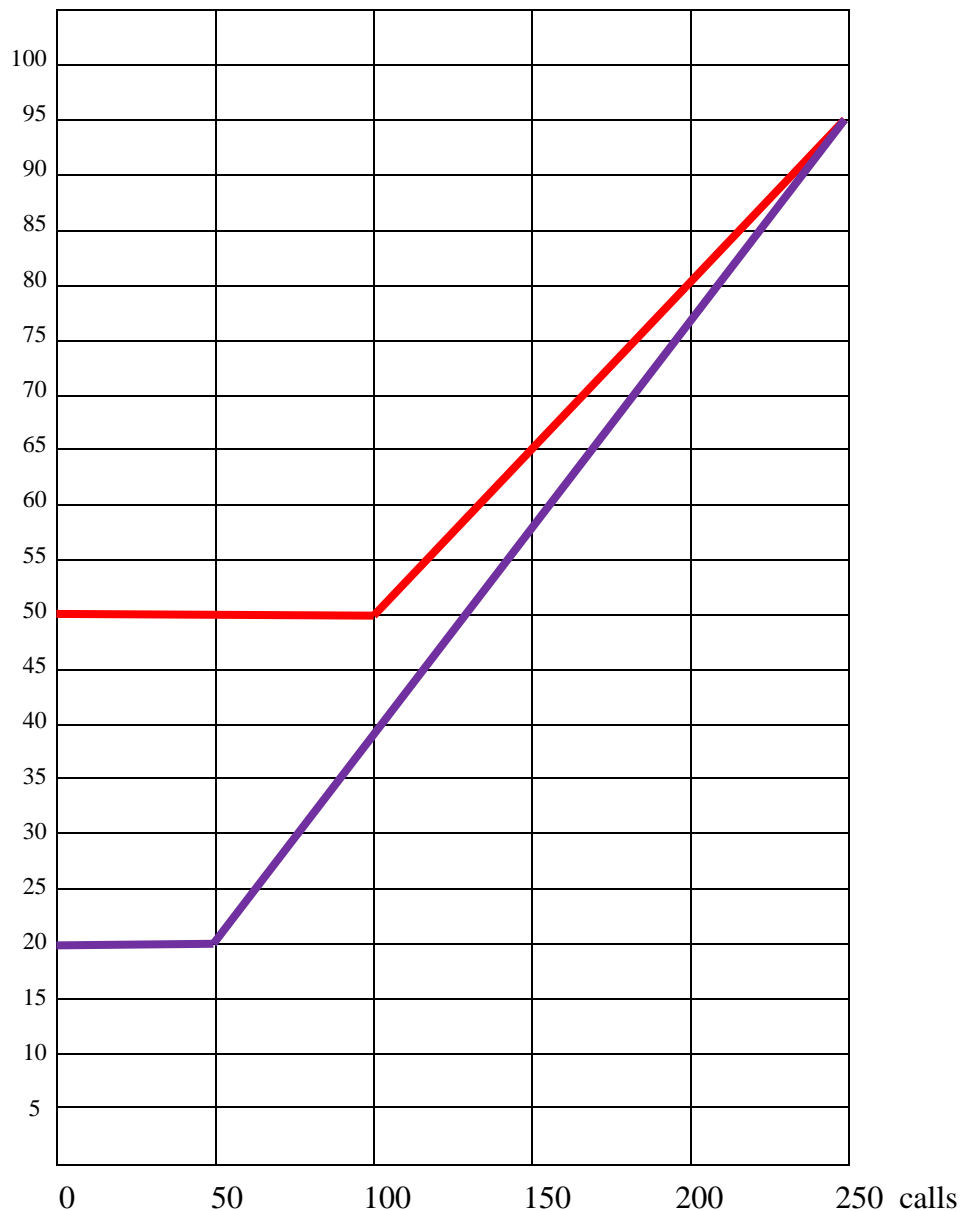
$$c = 0$$

equation is $y = 0.4x$

The head of the costing department thought it would be a good idea if the charge for extra calls could be changed so that the new plan would cost the same as the original plan for 250 calls.

Show the required line on the graph below.

COST \$



The gradient of the new line for $50 \leq x \leq 250$ is $\frac{75}{200} = 0.375$

So the cost per call after the 1st 50 is \$0.375 ie 37.5 cents

The equation of the new line would be like $y = mx + c$ through (50, 20)

Substituting $20 = 0.375 \times 50 + c$

$$20 = 18.75 + c$$

$$c = 1.25 \quad \text{equation is } y = 0.375x + 1.25$$