The average cost of a unit can be found by dividing the cost, $C(x)$, by the number of items x.

The function $C(x)=10x+3000$ represents the cost to produce x number of items.

Find:

a. **The average cost function, $c(x)$**

b. **How many items should be produced so that the average cost is less than $40.**

a. $C(x)=10x+3000$

The average cost function is $c(x)=C(x)x$. To find the average cost function, divide the cost function by x.

$$c(x)=C(x)xc(x)=10x+3000x$$

The average cost function is $c(x)=10x+3000x$

b. We want the function $c(x)$ to be less than 40.

$$c(x)<40$$

Substitute the rational expression forc(x).

$$10x+3000x<40,x\neq0$$

Subtract 40 to get 0 on the right.

$$10x+3000x-40<0$$

Rewrite the left side as one quotient by finding the LCD and performing the subtraction.

$$10x+3000x-40(xx)10x+3000x-40xx10x+3000-40xx-30x+3000x<0<0<0<0$$

Factor the numerator to show all factors.

$$-30(x-100)x<0-30(x-100)=0x=0$$

Find the critical points.

$-30\neq0, x-100=0, x=100$ More than 100 items must be produced to keep the average cost below $40 per item.

The function $C(x)=20x+6000$ represents the cost to produce x, number of items. Find:

a. How many items should be produced so that the average cost is less than $60.

a. $c(x)=20x+6000x$
b. More than 150 items must be produced to keep the average cost below $60 per item.