Answer on Question #74064 – Math – Differential Equations

Question

The linear equation $y = 4x + 90$ can be used to calculate the total cost y (in pounds) for x teenagers attending if they choose the cinema. Explain why this equation holds.

Solution

The cost function consists of two different types of cost:
- Variable costs
- Fixed costs.

Variable cost varies with output (the number of purchased tickets). The total variable cost can be expressed as the product of variable cost per unit (price of one ticket) and number of purchased tickets. If more tickets are purchased cost is more.

Fixed costs normally do not vary with output.
In general these costs must be incurred whether the tickets are sold or not.

Then Cost Function

$$C(x) = F + Vx$$

$C = Total\ cost$
$F = Fixed\ cost$
$V = Variable\ cost\ per\ unit$
$x = Number\ of\ tickets\ sold$

It is called a linear Cost Function.

Example
$F = 90$ £
$V = 4$ £
$y = C(x)$
$x =$ Number of purchased tickets(one ticket for one teenager)
Then

$$y = 90 + 4x$$