

# Tarea #1

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31 de agosto de 2020

## Ejercicio 0

### 1.1. Datos

- $p = 25$
- $c3 = 50$
- $r = 3000$
- $c1 = 0.3 * p$
- $prices = [((0, 39), p), ((40, 69), 0.9 * p), ((70, \infty), 0.85 * p)]$

**q in [0,39] p = 25**

$$Q = \sqrt{2} \sqrt{\frac{c_3 r}{c_1}}$$

$$Q = \sqrt{2} \sqrt{\frac{(50)(3000)}{(7,5000)}}$$

$$Q = 200,0 \quad Ct = \frac{Qc_1}{2} + pr + \frac{c_3 r}{Q}$$

$$Ct = \frac{(39)(7,5000)}{2} + (25)(3000) + \frac{(50)(3000)}{(39)}$$

$$Ct = 78992,375$$

**q in [40,69] p = 22.5000**

$$Q = \sqrt{2} \sqrt{\frac{c_3 r}{c_1}}$$

$$Q = \sqrt{2} \sqrt{\frac{(50)(3000)}{(6,7500)}}$$

$$Q = 210,818 \quad Ct = \frac{Qc_1}{2} + pr + \frac{c_3r}{Q}$$

$$Ct = \frac{(69)(6,7500)}{2} + (22,5000)(3000) + \frac{(50)(3000)}{(69)}$$

$$Ct = 69906,781$$

$$\mathbf{q \text{ in } [70,00] \quad p = 21.2500}$$

$$Q = \sqrt{2} \sqrt{\frac{c_3r}{c_1}}$$

$$Q = \sqrt{2} \sqrt{\frac{(50)(3000)}{(6,3750)}}$$

$$Q = 216,93 \quad Ct = \frac{Qc_1}{2} + pr + \frac{c_3r}{Q}$$

$$Ct = \frac{(216,9304)(6,3750)}{2} + (21,2500)(3000) + \frac{(50)(3000)}{(216,9304)}$$

$$Ct = 65132,932$$

## Resumen

Cantidad	Descuento	Precio	q*	Q*	Costo
0-39	0 %	25	200.0	39	78992.375
40-69	10.0000 %	22.5000	210.8184	69	69906.7812
70-oo	15.0000 %	21.2500	216.9304	216.9304	65132.9317

## Ejercicio 1

Ciclo productivo con faltantes permitidos

## 6.1. Datos

- $r = 1666.6667$
- $k = 2500$
- $c_1 = 0.15$
- $c_2 = 1.6666666666666667$
- $c_3 = 500$

### Inventario Optimo (Q)

$$Q = \sqrt{2} \sqrt{\frac{c_3 r (c_1 + c_2)}{c_1 c_2 \left(1 - \frac{r}{k}\right)}}$$

$$Q = \sqrt{2} \sqrt{\frac{(500)(1666,6667)((0,15)+(1,6666666666666667))}{(0,15)(1,6666666666666667)\left(1 - \frac{(1666,6667)}{(2500)}\right)}}$$

$$Q = 6027,714$$

### Inventario Maximo (S)

$$S = \sqrt{2} \sqrt{\frac{c_2 c_3 r \left(1 - \frac{r}{k}\right)}{c_1 (c_1 + c_2)}}$$

$$S = \sqrt{2} \sqrt{\frac{(1,6666666666666667)(500)(1666,6667)\left(1 - \frac{(1666,6667)}{(2500)}\right)}{(0,15)((0,15)+(1,6666666666666667))}}$$

$$S = 1843,338$$

### Costo Normal (C)

$$C = \sqrt{2} \sqrt{\frac{c_1 c_2 c_3 r \left(1 - \frac{r}{k}\right)}{c_1 + c_2}}$$

$$C = \sqrt{2} \sqrt{\frac{(0,15)(1,6666666666666667)(500)(1666,6667) \left(1 - \frac{(1666,6667)}{(2500)}\right)}{(0,15) + (1,6666666666666667)}}$$

$$C = 276,501$$

## Carencia Maxima (D)

$$D = Q - S$$

$$D = (6027,714) - (1843,3375)$$

$$D = 4184,377$$

## Tiempo en agotarse el inventario (t2)

$$t2 = \sqrt{2} \sqrt{\frac{c_2 c_3 \left(1 - \frac{r}{k}\right)}{c_1 r (c_1 + c_2)}}$$

$$t2 = \sqrt{2} \sqrt{\frac{(1,6666666666666667)(500) \left(1 - \frac{(1666,6667)}{(2500)}\right)}{(0,15)(1666,6667)((0,15) + (1,6666666666666667))}}$$

$$t2 = 1,106$$

## Tiempo de produccion (t1)

$$t1 = \sqrt{\frac{r t_2}{k - r}}$$

$$t1 = \sqrt{\frac{(1666,6667)(1,106)}{(2500) - (1666,6667)}}$$

$$t1 = 1,487$$

## Tiempo incurrido en faltantes (t3)

$$t3 = \sqrt{2} \sqrt{\frac{c_1 c_3 \left(1 - \frac{r}{k}\right)}{c_2 r (c_1 + c_2)}}$$

$$t3 = \sqrt{2} \sqrt{\frac{(0,15)(500) \left(1 - \frac{(1666,6667)}{(2500)}\right)}{(1,6666666666666667)(1666,6667)((0,15) + (1,6666666666666667))}}$$

$$t3 = 0,1$$

## Tiempo en recuperar los faltantes (t4)

$$t4 = \sqrt{\frac{r t_3}{k - r}}$$

$$t4 = \sqrt{\frac{(1666,6667)(0,0995)}{(2500) - (1666,6667)}}$$

$$t4 = 0,446$$

## Tiempo de produccion (tp)

$$tp = \frac{Q}{k}$$

$$tp = \frac{(6027,714)}{(2500)}$$

$$tp = 2,411$$

## tiempo de consumo (tc)

$$tc = \frac{Q}{r}$$

$$tc = \frac{(6027,714)}{(1666,6667)}$$

$$tc = 3,617$$

**Tiempo total (tt)**

$$tt = tc + tp$$

$$tt = (3,6166) + (2,4111)$$

$$tt = 6,028$$

## **Ejercicio 2**

Ciclo productivo sin faltantes

### **18.1. Datos**

- $r = 600$
- $k = 1440$
- $c1 = 0.0042$
- $c3 = 750$

**Inventario Optimo (Q)**

$$Q = \sqrt{2} \sqrt{\frac{c3r}{c1(1-\frac{r}{k})}}$$

$$Q = \sqrt{2} \sqrt{\frac{(750)(600)}{(0,0042)\left(1 - \frac{(600)}{(1440)}\right)}}$$

$$Q = 19166,297$$

## Inventario Maximo (S)

$$S = \sqrt{2} \sqrt{\frac{c_3 r \left(1 - \frac{r}{k}\right)}{c_1}}$$

$$S = \sqrt{2} \sqrt{\frac{(750)(600)\left(1 - \frac{(600)}{(1440)}\right)}{(0,0042)}}$$

$$S = 11180,34$$

## Costo Normal (C)

$$C = \sqrt{2} \sqrt{c_1 c_3 r \left(1 - \frac{r}{k}\right)}$$

$$C = \sqrt{2} \sqrt{(0,0042)(750)(600) \left(1 - \frac{(600)}{(1440)}\right)}$$

$$C = 46,957$$

## Tiempo en agotarse el inventario (t2)

$$t2 = \sqrt{2} \sqrt{\frac{c_3 \left(1 - \frac{r}{k}\right)}{c_1 r}}$$

$$t2 = \sqrt{2} \sqrt{\frac{(750)\left(1 - \frac{(600)}{(1440)}\right)}{(0,0042)(600)}}$$

$$t_2 = 18,634$$

**Tiempo de produccion (tp)**

$$tp = \frac{Q}{k}$$

$$tp = \frac{(19166,2969)}{(1440)}$$

$$tp = 13,31$$

**tiempo de consumo (tc)**

$$tc = \frac{Q}{r}$$

$$tc = \frac{(19166,2969)}{(600)}$$

$$tc = 31,944$$

**Tiempo total (tt)**

$$tt = tc + tp$$

$$tt = (31,9438) + (13,3099)$$

$$tt = 45,254$$