

P.222
#6

Let Q = the quantity manufactured
 E = the total expenditures of the firm (\$)
 R = the firm's revenue.

a) $E = 30Q + 6500$

b) $R = 85Q$

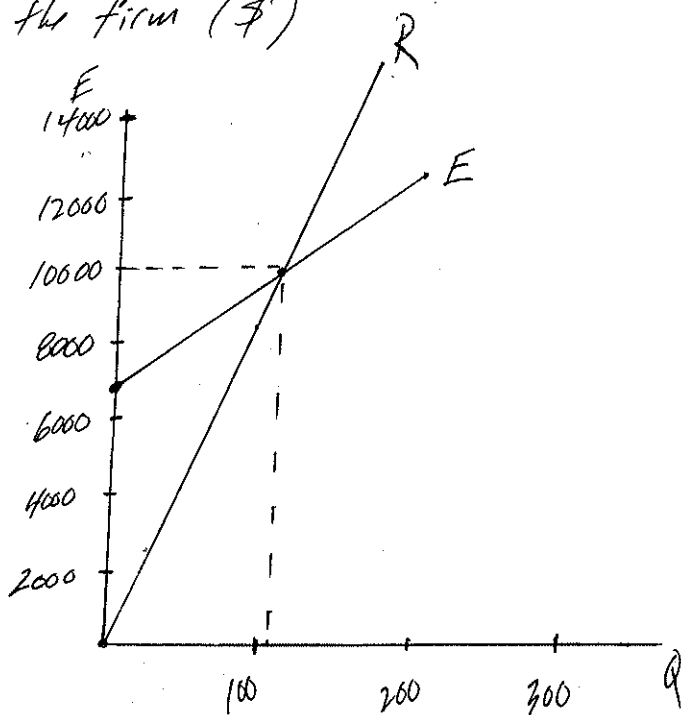
We seek Q such that

$$85Q = 30Q + 6500$$

$$55Q = 6500$$

$$Q \approx 118.18$$

$$R \approx E \approx 10,045.46$$



So, the firm must produce about 118 units per month to break even.

P.263
#40

We seek c and d so that $(2,10)$ and $(5,4)$ are on the graph of $y = \frac{c}{x} + d$.

$$\begin{cases} 10 = \frac{c}{2} + d \\ 5 = \frac{c}{4} + d \end{cases} \Rightarrow \begin{cases} 20 = c + 2d \\ 20 = c + 4d \end{cases}$$

Solving the above linear system we get $c=20$, $d=0$.

The function we seek is $y = \frac{20}{x}$.

P. 276
#30

If $W(M) = 9.8M$, then

$$W(2M+5) = 9.8(2M+5)$$

$$W(2M+5) = 19.6M + 49$$

P. 276
#52

Find c and d if $(2,5)$ and $(6,4)$ are on the graph of $f(x) = c(x-d)$.

$$\begin{cases} 5 = c(2-d) \\ 4 = c(6-d) \end{cases} \Rightarrow \begin{cases} 5 = 2c - cd \\ 4 = 6c - cd \end{cases}$$

$$\Rightarrow \begin{cases} 5 - 2c = -cd \\ 4 - 6c = -cd \end{cases} \Rightarrow \begin{cases} 5 - 2c = 4 - 6c \\ 4c = -1 \end{cases}$$

$$c = -\frac{1}{4}$$

Substituting $c = -\frac{1}{4}$ into one of our equations we get

$$5 = -\frac{1}{4}(2-d)$$

$$5 = -\frac{1}{2} + \frac{1}{4}d$$

$$\frac{11}{2} = \frac{1}{4}d$$

$$22 = d$$

So, the equation we seek is $f(x) = -\frac{1}{4}(x-22)$

P.276
#56
a)

Let $y =$ time in sec for 440-yd dash
 $x =$ # of weeks practice

We seek c and d so that the points $(0, 84)$
and $(1, 79)$ are on the graph of

$$y = \frac{c}{x+d} + 62$$

$$b) \begin{cases} 84 = \frac{c}{d} + 62 \\ 79 = \frac{c}{1+d} + 62 \end{cases} \Rightarrow \begin{cases} 84d = c + 62d \\ 79 + 79d = c + 62 + 62d \end{cases}$$

$$\Rightarrow \begin{cases} 22d = c \quad (*) \\ 17 + 17d = c \end{cases}$$

$$\Rightarrow 22d = 17 + 17d$$

$$\Rightarrow 5d = 17$$

$$\Rightarrow d = \frac{17}{5}$$

Substituting $d = \frac{17}{5}$
in equation (*) we
get

$$22\left(\frac{17}{5}\right) = c$$

$$\Rightarrow c = \frac{374}{5}$$

So, the equation we seek is $y = \frac{\frac{374}{5}}{x + \frac{17}{5}} + 62$

$$\text{or } \boxed{y = \frac{374}{5x+17} + 62} \approx \frac{74.8}{x+3.4} + 62$$

$$c) \text{ If } x=6, y = \frac{374}{5(6)+17} + 62 \approx 69.96 \approx 70$$

So, after 6 weeks the 440-yd time will
be about 70 sec.

P291
#8

$$z(y) = \frac{1}{y+3} ; y(x) = \frac{5}{x-2}$$

$$Z(x) = \frac{1}{\left(\frac{5}{x-2}\right)+3} = \frac{1}{5+3(x-2)}$$

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$$Z(x) = \frac{x-2}{3x-1}$$