Workshop Exercises for Week 5

 Attempt the following workshop exercises. These are the exercises that are used in the workshop portion of the internal lectures. No solutions are available for these exercises. Answers to selected workshop exercises are included.

1. Find the equation of the line passing through the points (1, 4) and (4, 8).
2. Find the equation of the line that passes through (-2,5) and has slope –8.
3. Find the slope of the line $5y - x + 9 = 0$ and sketch the graph.
4. Find the slope of the line $x + 3 = 8$ and sketch the graph.
5. A computer was purchased at the end of 1999 for $3000. The scrap value of this computer at the end of 2001 is expected to be $500. Find a linear function that describes the value of the computer, if t is the age of the computer in years.
6. For the following function $f(x) = x^2 + 6x + 11$, find
   (a) the y-intercept
   (b) the x-intercept(s)
   (c) determine whether the function has a maximum or minimum value
   (d) find that value
   (e) graph the function
7. The demand for a popular ballpoint pen is $p = 0.2 - 0.0004q$ where $p$ is the price (in dollars) per unit when $q$ units are demanded.
   (a) Find the level of production that will maximise the manufacturer’s total revenue.
   (b) Determine this revenue.
8. A manufacturer of TV dinners, knows that its monthly revenue is given by $R = -q^2 + 25q$ where $R$ is the revenue in hundreds of dollars, when $q$ hundred dinners are produced. The monthly cost function is $C = 4q + 40$ where $C$ is also in hundreds of dollars. The manufacturer is limited to producing 2500 dinners per month. Solve equations and use a graph to show how the manufacturer can operate at a profit.
Answers

1. \( y = \frac{4}{3}x + \frac{8}{3} \)

2. \( y = -8x - 11 \)

3. slope = 5

4. slope is undefined

5. \( V = -1250t + 3000 \)

6. a) y-intercept at (0, 11)
   b) no x-intercepts
   c) the function has minimum since \( a = 1 > 0 \)
   d) minimum occurs at (-3, 2)

7. a) Revenue is maximised when 250 units are produced and sold.
   b) The maximum revenue is $25.

8. (18.8815273071, 115.52610923) and (2.1184726929, 48.473890772) are the break even points