

Here are some things to look at as you prepare for the exam. Remember to look at quizzes and homework problems also. The actual exam will consist of a large number of true/false and multiple choice problems, but the problems below will help you understand the concepts covered on the exam. Try to do as many of these as you can without looking in your notes or book for guidance.

The first exam will be on Tuesday, 28 September and will cover material in Chapters 1 and §2.1.

1. If it costs \$445 to make twelve units, and \$1585 to make 50 units, find:
 - (a) the linear cost function
 - (b) the marginal cost
 - (c) the average cost per unit to produce 100 units
2. The cost of producing x ink cartridges for a printer is given by $C(x) = 24x + 18,000$. Each cartridge can be sold for \$28.
 - (a) What are the fixed costs?
 - (b) Find the revenue function.
 - (c) Find the profit function.
 - (d) Find the break-even point.
 - (e) If the company sells exactly the number of cartridges needed to break-even, what is its revenue?
3. Suppose the demand and price for the HBO cable channel are related by $p = -0.5q + 30.95$, where p is the monthly price in dollars, and q is measured in millions of subscribers. If the price and supply are related by $p = 0.3q + 2.15$, what are the equilibrium quantity and price?
4. For the following functions, answer the following questions:
 - Does the parabola open up or down?
 - What is the vertex?
 - What is the axis of symmetry?
 - What are the x -intercepts?
 - What is the y -intercept?
 - (a) $f(x) = x^2 + 6x - 2$
 - (b) $f(x) = -4x^2 + 8x + 3$
5. Suppose an investor kept track of the profit, P , she made on her portfolio. At time t months after she began investing, $P(t) = -4t^2 + 32t - 20$. At what time is her profit largest?

6. The height h (in feet) of a rocket at t seconds after liftoff is given by $h = -16t^2 + 800t$.

- (a) How long does it take the rocket to reach 300 feet?
- (b) What is the maximum height of the rocket?

7. For the following functions, do the following:

- Find the vertical asymptotes.
- Find the horizontal asymptote
- Find the x -intercepts
- Graph the function

(a) $f(x) = \frac{1}{x-3}$

- Find the vertical asymptotes.
- Find the horizontal asymptote
- Find the x -intercepts

(b) $g(x) = \frac{5x-2}{4x^2-4x+3}$

- Find the vertical asymptotes.
- Find the horizontal asymptote
- Find the x -intercepts

(c) $h(x) = \frac{x^2-4}{x+2}$

- Find the vertical asymptotes.
- Find the horizontal asymptote
- Find the x -intercepts
- Graph the function

8. A cost-benefit curve for pollution control is given by

$$y = \frac{9.2x}{106-x}$$

where y is the cost in thousands of dollars of removing x percent of a specific industrial pollutant.

- (a) Find y if $x = 50$
- (b) Find y if $x = 98$
- (c) What percent of the pollutant can be removed for \$22,000?