

The first midterm will cover chapters 1-7 of the textbook (no max/min problems).

This review is not all inclusive, but I hope it helps you to start studying for the midterm. To do well you are expected to have mastered all topics in the chapters above, have good algebra skills and to know how to do all homework problems, worksheet problems and all the problems done in lectures.

1. Chapter 1

Concepts: you need to be able to use unit conversion formulas.

Formulas: distance = speed x time ($d=vt$), change in quantity = rate of change x time

2. Chapter 2.

Concepts: you need to be able to set up and work with coordinate systems.

Formulas: distance between 2 points $P(x_0, y_0)$ and $Q(x_1, y_1)$ is
 $d = \sqrt{(x_1 - x_0)^2 + (y_1 - y_0)^2}$.

3. Chapter 3

Formulas: line through (x_1, y_1) and $Q(x_2, y_2)$: $y = y_2 + \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$

circle centered at (x_0, y_0) with radius r : $(x - x_0)^2 + (y - y_0)^2 = r^2$

Skills: you need to be able to find the intersection of two lines, a line and a circle, to find the equation(s) of the line(s) parallel and perpendicular to a given line, tangent to a given circle through a given point and to find the distance of a line from a given point.

4. Chapter 4

You need to know how to set up and solve:

Linear modeling problem

Line and circle problems:

Parametric equation problems

5. Chapter 5

You need to be able to find the domain of a given function, the range, given the graph of the function, x and y intercepts, use both formulas and graphs to answer questions about a function, compute and simplify $f(\text{EXPR})$.

6. Chapter 6

Concepts: multipart function, semicircle.

Formulas : you need to know the formulas for a semicircle centered at (a, b) with radius r :

$$y = b + \sqrt{r^2 - (x - a)^2} \text{ top half}$$

$$y = b - \sqrt{r^2 - (x - a)^2} \text{ bottom half}$$

Skills: you need to be able derive the formula for a multipart function. Given a multipart function $f(x)$ you need to be able to solve an equation $f(x)=c$.

7. Chapter 7

Concepts : parabolas.

Formulas : equation of a parabola $y = ax^2 + bx + c$; vertex for this parabola is at $(-\frac{b}{2a}, y_0)$, you can calculate y_0 by plugging $x = -\frac{b}{2a}$ in the equation of the parabola; equation of a parabola in vertex form $y = a(x - x_0)^2 + y_0$, where the vertex is at (x_0, y_0) .

Skills: you need to be able to find the equation of a parabola through three given points, or through a given point and with a given vertex. You need to know how to set up and solve quadratic modeling problems.

You need to be comfortable graphing, lines, circles, semicircles, parabolas