

Calculus I (11th edition textbook) Assignments

Note: "eoo" means "every other odd" problem. Items in **bold** are for advanced track students.

Assignments below are not mandatory for every student. Adjustments are allowed for a variety of reasons, including time constraints. Contact Dana@chalkdust.com with questions or comments.

Since organizational skills contribute to student success in math, I encourage students to organize assignments using the guidelines below. You are welcome to alter the guidelines as you wish, but thought you'd like to know what I do in a classroom environment.

1. Place homework on lined paper, either loose leaf or in a notebook.
2. Place your name and the section number at the top of each page.
3. Work on one side of each sheet of paper.
4. Show all work necessary to complete each problem, including a diagram wherever applicable.
5. Problem numbers should appear in the left margin and the problem should appear to the right.
6. Copy each problem as it appears in the text except for word problems.
7. Problems must be in sequential order and arranged vertically.
8. Use only a pencil.
9. A second column may be used on a page by drawing a second margin line (with a ruler) down the middle of the page.

Notes:

1. Chapter tests are not printed in the textbook, so test problems are taken from the Review Exercise problem set. Therefore, please review for tests by going over homework problems.
2. I suggest there be no time constraints on tests. In fact, if necessary, allow more than one day for the completion of tests.
3. Allow 3-4 days for the completion of each section. That is, watch video on the first day and begin the assignment. Continue to work on the assignment, referring back to the video, to examples in the textbook and, when needed, to the solutions guide for the next 2 or 3 days until the assignment is complete. There are 42 sections in the textbook so allowing 4 days per section is not going to delay the completion of the course in a normal school year.
4. The front and rear overleaf of the textbook contains quite a bit of handy quick-reference information. Make liberal use of that information on homework and on tests. [There are too many complicated formulas to expect all of them to be memorized. Besides, learning calculus is more about how you use and interpret the formulas than it is about recalling them correctly.]
5. Some chapters are relatively long and, therefore, contain quite a bit of content. For that reason, it's okay to separate test problems into two parts and treat the parts as separate tests.

Chapter P

- P.1 3-6, 7-23 odd, 29, 37, 43, 45, 49, 57, 59, 67, 69
P.2 1-9 odd, 13, 19, 23, 29, 31, 37, 41, 43, 45, 59
P.3 5, 9, 11, 17-23 odd, 27, 29, 35, 39-42, 47-57 odd, 61
P.4 5-11 odd, 15-37 odd, 45, 49, 55, 63, 67

Chapter P Test: Review Exercises, page 41

Problems 1, 2, 15, 19, 23, 25, 30, 32, 33(c), 37, 42, 52(a,d), 57, 62, 66, 68, 71, 73, 77, 79
(may require 2 days)

Chapter 1

- 1.1 3, 4, 5
1.2 5, 7, 9, 21, 24, 25, 26, 30, 35, 41, 45, 49, 55, 73-76
- see information about the delta / epsilon definition of limit -
1.3 5-33 odd, 37, 41-53 odd, 63, 67, 75, 79, 101, 103, 115, 119
1.4 5-17 odd, 21-27 odd, 31, 39-51 odd, 59, 63, 75, 79, 83, 89, 91, 93
1.5 3-6, 7, 9, 17-51 odd, 61, 63(a), 65, 67

Chapter 1 Test: Review Exercises, page 95

Problems 6, 9, 12, 17, 20, 37, 38, 41, 45, 59, 69, 71, 75, 79, 81, 89

Chapter 2

- 2.1 5-8, 17, 21, 23, 29, 31, 33, 43, 45, 46, 48, 61, 64, 77-80
2.2 5-29 eoo, 31-47 eoo, 55, 59-67 odd, 77, 85, 87, 89, 95, 97, 107, 109
2.3 5-25 odd, 29-35 odd, 39, 41-47 odd, 63, 65, 69, 83, 86, 91, 95, 101
2.4 3-27 odd, 35-43 odd, 61-67 odd, 71, 73, 75, 83, 87
2.5 5-19 odd, 25-35 odd, 37, 39, 63, 67
2.6 3-15 odd, 21, 23, 29, 42

Chapter 2 Test: Review Exercises, page 161

Problems 3, 7, 11, 13, 15, 21, 23, 29, 33, 35, 41, 45, 55, 59, 61, 81, 85, 90

[You may look up derivative formulas for trig functions. A good reference is the text overleaf.]

Chapter 3

- 3.1 9-17 odd, 21-27 odd, 37-45 odd, 57, 65, 67
3.2 3-19 odd, 27, 29, 33, 39, 45, 47, 49, 53
3.3 3-35 eoo, 59, 61
3.4 3-11 odd, 17-27 odd, 33, 35, 37, 51, 53, 55, 61, 65
3.5 5-9, 11-27 odd, 33, 41
3.6 5, 7, 11, 15, 19, 27, 31, 37, 41, 51, 53, 55, 87
3.7 5-25 odd, 33, 35
3.8 3-11 odd, 17, 19, 25, 29

3.9 5, 7, 13, 15, 19, 23, 25, 29-35 odd, 43

Chapter 3 Test: Review Exercises, page 242

Problems 1, 7, 10, 17, 23, 29, 37, 43, 45, 49, 57, 71, 75, 83, 89, 97

Chapter 4

4.1 5-21 odd, 29, 33, 37-43 odd, 55, 57, 59, 61, 65

4.2 5-13 odd, 17, 19, 21, 29, 33, 35, 37, 39, 47, 51, 57, 61

4.3 5-27 odd, 33, 35, 37, 41, 43, 53, 59, 61

4.4 5-37 eoo, 39, 41, 43, 53, 57, 62, 69, 71, 81, 83

4.5 5, 7, 9, 11-31 eoo, 39, 41, 45, 49, 51, 53, 57, 61, 63, 65, 69, 71, 77

Chapter 4 Test: Review Exercises, page 309

Problems 3, 7, 9, 13, 25, 37, 41, 43, 47, 55, 59, 65, 73

Chapter 5

5.1 5, 7, 9-12, 13, 17-35 odd, 39-61 odd, 67, 69, 73, 75, 77, 79, 81, 85, 91

5.2 5-39 odd, 43, 47, 51-57 odd, 65-71 odd, 91

5.3 5-8, 9-27 odd, 35, 39, 43, 51-57 odd, 75-81 odd

5.4 3-23 odd, 25-28, 29-57 odd, 63, 67, 73, 77, 79, 91, 93, 97, 101, 123, 125

5.5 5-35 odd, 39-49 odd, 61-73 odd, 87(a,b), 91, 99

5.6 3, 7-29 odd, 43-51 odd

5.7 7-31 odd, 37, 39, 41-47 odd, 53, 55, 57, 87

5.8 3-15 odd, 23-31 odd, 35, 37, 41, 57, 61, 63, 65

5.9 5-29 eoo, 35, 45-49 odd, 55-59 odd, 65-69 odd, 75, 79, 89, 91

Chapter 5 Test: Review Exercises, page 400

[This is a very long chapter and the test is extensive. Please extend the test over 2 or 3 days with each session counting as a chapter test.]

Problems

5-11 odd, 17, 21, 27, 29, 31, 35, 43, 45, 51, 57, 61, 69, 73, 77, 85, 89, 97, 101, 107, 115, 119

Chapter 6

6.1 5-19 odd, 23-33 odd, 37, 39, 43, 49, 61(a,b), 63(a,b), 73, 75

6.2 3-13 odd, 17-25 odd, 29-33 odd, 37-41 odd, 45, 47, 55

6.3 5-25 odd, 29, 31, 49-52, 77, 79

6.4 3-11 odd, 17, 19, 21, 37(a,b), 43-46, 51, 53, 57, 59

Chapter 6 Test: Review Exercises, page 439

Problems 1, 3, 5, 11, 15, 19, 25, 35, 39, 41, 53, 57, 59

Calculus, 11e
Solutions to Test Questions
(not found in the solutions guide)

Chapter P Test: Review Exercises, page 41

2. $y = x^2 - 8x + 12$

x-intercept(s)

Let $y = 0$

$0 = x^2 - 8x + 12$

$0 = (x-6)(x-2)$

$x = 6, x = 2$

(6,0) and (2,0)

y-intercept

Let $x = 0$

$y = 0^2 - 8(0) + 12$

$y = 12$

(0,12)

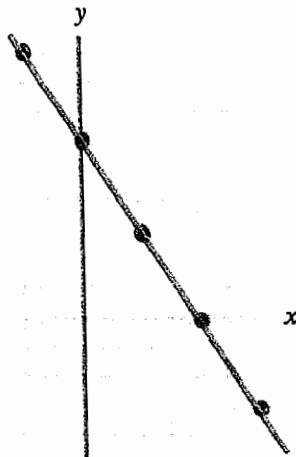
30. $3x + 2y = 12$

$2y = -3x + 12$

$y = -\frac{3}{2}x + 6$

slope = $-\frac{3}{2}$

y-intercept = 6



32. $(-5, 5), (10, -1)$

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{5 - (-1)}{-5 - 10}$

$m = \frac{6}{-15} = -\frac{2}{5}$

$y - y_1 = m(x - x_1)$

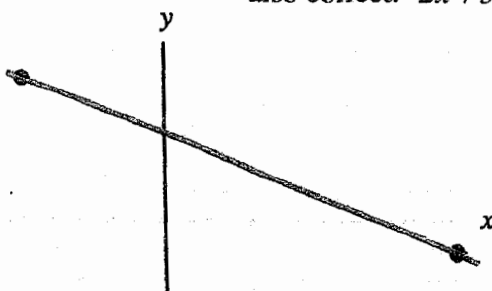
$y - 5 = -\frac{2}{5}(x - (-5))$

$y - 5 = -\frac{2}{5}(x + 5)$

$y - 5 = -\frac{2}{5}x - 2$

$y = -\frac{2}{5}x + 3$

also correct: $2x + 5y = 15$



42. $g(x) = \sqrt{6-x}$

domain: x-values that make the radicand ≥ 0

$6 - x \geq 0$

$-x \geq -6$

$x \leq 6$

domain: $x \leq 6$

range: $y \geq 0$

52(a,d).

(a) 3 (cubic), negative leading coefficient

(d) 5, positive leading coefficient

62. $\frac{11\pi}{4}$ $\frac{\theta_{\text{degrees}}}{180} = \frac{\theta_{\text{radians}}}{\pi}$

$\frac{\theta_{\text{degrees}}}{180} = \frac{11\pi/4}{\pi}$

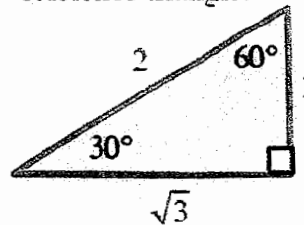
$\theta_{\text{degrees}} = 180 \left(\frac{11}{4} \right)$

$\theta = 495^\circ$

66. 240° third quadrant angle

reference angle: $240 - 180 = 60^\circ$

reference triangle:



$\sin 240^\circ = -\frac{\sqrt{3}}{2}$

$\cos 240^\circ = \frac{1}{2}$

$\tan 240^\circ = \sqrt{3}$

68. $-\frac{4\pi}{3}$

convert to degrees, $-\frac{4\pi}{3} = 240^\circ$

so answers are the same as #66

Chapter 1 Test: Review Exercises, page 95

6. $g(x) = \frac{-2x}{x-3}$

(a) $\lim_{x \rightarrow 3} g(x)$

Notice on the graph,
the limit from the left (∞) and
the limit from the right ($-\infty$) are not the same.
Therefore, the limit does not exist.

(b) $\lim_{x \rightarrow 0} g(x) = 0$ by direct substitution

12. $\lim_{x \rightarrow 0} (5x - 3) = -3$ by direct substitution

20. $\lim_{t \rightarrow 4} \frac{t^2 - 16}{t - 4} = \lim_{t \rightarrow 4} (t + 4) = 8$

38. When will the object hit the ground? At what velocity will the object impact the ground?

$$-4.9t^2 + 250 = 0 \Rightarrow t = \frac{50}{7} \text{ sec}$$

When $a = \frac{50}{7}$, the velocity is

$$\begin{aligned} \lim_{t \rightarrow a} \frac{s(a) - s(t)}{a - t} &= \lim_{t \rightarrow a} \frac{[-4.9a^2 + 250] - [-4.9t^2 + 250]}{a - t} \\ &= \lim_{t \rightarrow a} \frac{4.9(t^2 - a^2)}{a - t} \\ &= \lim_{t \rightarrow a} \frac{4.9(t - a)(t + a)}{a - t} \\ &= \lim_{t \rightarrow a} [-4.9(t + a)] \\ &= -4.9(2a) \quad \left(a = \frac{50}{7} \right) \\ &= -70 \text{ m/sec} \end{aligned}$$

The velocity of the object when it hits the ground is about 70 m/sec.

Chapter 2 Test: Review Exercises, page 161

90. Find the rate at which the shadow of the sandbag is traveling along the ground when the sandbag is at a height of 35 m.

$$\begin{aligned} s(t) &= 60 - 4.9t^2 & s &= 35 \\ s'(t) &= -9.8t & 35 &= 60 - 4.9t^2 \\ & & 49t^2 &= 25 \\ & & t &= \frac{5}{\sqrt{49}} \end{aligned}$$

$$\tan 30 = \frac{1}{\sqrt{3}} = \frac{s(t)}{x(t)}$$

$$x(t) = \sqrt{3}s(t)$$

$$\frac{dx}{dt} = \sqrt{3} \frac{ds}{dt} = \sqrt{3}(-9.8) \frac{5}{\sqrt{49}} \approx -38.34 \text{ m/sec}$$

Chapter 3 Test: Review Exercises, page 242

10. $f(x) = (x-2)(x+3)^2$, $[-3, 2]$

Yes. $f(-3) = f(2) = 0$. f is continuous on $[-3, 2]$, differentiable on $(-3, 2)$.

$$\begin{aligned} f'(x) &= (x-2)[2(x+3)] + (x+3)^2 \\ &= (x-2)[2x+6] + x^2 + 6x + 9 \\ &= 2x^2 + 2x - 12 + x^2 + 6x + 9 \\ &= 3x^2 + 8x - 3 \\ &= (x+3)(3x-1) \end{aligned}$$

$$0 = (x+3)(3x-1)$$

$$x = -3, \quad x = \frac{1}{3}$$

$[-3$ is not in the open interval $(-3, 2)$.]

$$c = \frac{1}{3} \text{ satisfies } f'(c) = 0$$