

Exam #1 Review Guide (Chapters 1 & 10)

The first exam will cover Sections 1.1, 1.5-1.6, 1.8/3.7, 1.10, & 10.1-10.3. The problems on this review guide are representative of the type of problems worked on homework and during class time. Do not just depend on this guide for studying for the exam. When you have trouble with a particular problem type, you should go back to the text, homework, and class notes to find additional problems to practice. For the problem types you are comfortable with, you should still practice some more, in addition to this guide. The answers to the following problems are attached. ***Make sure you are in the habit of showing all your work; you will need to do so on the exam to receive credit.***

Chapter 1

1. Solve each equation by factoring.

a. $x^2 - 2x - 8 = 0$

b. $x^2 - 9x = -18$

c. $(x + 1)^2 - 16 = 0$

2. Solve each equation.

a. $3m - 1 + 4m + 4 = 8m - 8$

b. $(x + 4)(x + 1) = x^2 + 14$

c. $\frac{x}{2} + \frac{2x}{3} = -\frac{7}{3}$

d. $\frac{1}{x-4} + \frac{1}{x+4} = \frac{4}{x^2-16}$

3. Solve each equation for x in terms of the other letters.

a. $5cx - 4d = d + 5$

b. $\frac{1}{b} - \frac{1}{x} = \frac{1}{x} + \frac{1}{c}$

c. $\frac{a-x}{a-c} - 3 = 2\frac{b-x}{c-b}$

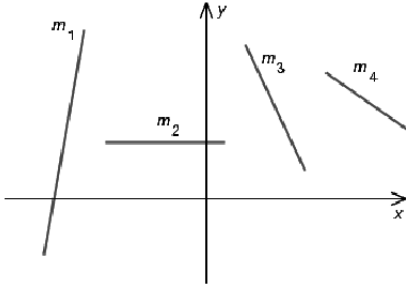
4. By hand and using a calculator to find the x - and y -intercepts of each of the following, accurate to two decimal places.

a. $y = x^3 + x^2 - 5x$

b. $y^2 - 4y - 2 = 3x$

5. Find the slope of the line passing through the points $(-2, 1)$ and $(1, -8)$.

6. The slopes of four lines are indicated in the figure. List the slopes m_1, m_2, m_3, m_4 in order of increasing value.



7. Find the equation of the line described.

- slope -4 and y -intercept $(0, 8)$
- slope 3 and passes through $(-5, -1)$
- x -intercept $(8, 0)$ and y -intercept $(0, 7)$
- passes through $(9, 4)$ and has the same x -intercept as $-4x + y = 1$

8. A ball is thrown straight upward. If the initial velocity is 96 ft/sec, the height of the ball at time t is given by $h = -16t^2 + 96t$, where h is in feet and t is in seconds, with $t = 0$ corresponding to the instant that the ball is first thrown.

- How long does it take before the ball lands?
- What are the times at which the ball is at the height of 80 ft?

9. Solve each equation using the quadratic formula.

- $2x^2 + 3x - 3 = 0$
- $x(3x + 6) = -2$
- $2x^2 = 3x - 5$

10. Find all real solutions to each equation.

- $|x - 7| - 7 = 3$
- $|x + 2| = 2x - 2$
- $t^4 + 3t^3 - 4t^2 = 0$
- $2y^2 = 3 - y^4$
- $\sqrt{5 - 2x} = 3$
- $\sqrt{x^2 + 8x - 5} = 2$
- $4|x - 3| = 3x - 4$
- $2t^5 + 3t^4 - 20t^3 = 0$
- $x^4 + x^2 - 1 = 0$
- $x^4 + 5x^2 - 2 = 0$
- $\sqrt{7 - 3x} + \sqrt{x + 4} = 5$

11. Solve each inequality, writing your solution using interval notation.

a. $9x + 11 < 4(x - 1) - x$

b. $2(t - 1) - 3(t + 1) \leq -7$

c. $\frac{3x + 1}{3} - \frac{x - 1}{6} < x + \frac{1}{3}$

d. $-5 \leq 2x + 5 \leq 15$

e. $|x - 5| \geq 7$

f. $2|3x + 1| - 4 \leq 6$

g. $\left| \frac{x - 4}{3} \right| < 4$

12. Solve each polynomial inequality, writing your solutions using interval notation.

a. $x^2 + 5x - 6 < 0$

b. $10x - x^2 \leq 24$

c. $(x - 3)(x + 1)(x + 5) \geq 0$

d. $x^4(x - 2)(x - 16) < 0$

13. Solve each rational inequality, writing your solutions using interval notation.

a. $\frac{7 - x}{3 - 4x} \geq 0$

b. $\frac{x^2 - 1}{x^2 + 10x + 24} \geq 0$

c. $\frac{1}{x - 2} - \frac{1}{x - 1} < \frac{1}{6}$

Chapter 10

1. Solve using substitution.

$$\text{a. } \begin{cases} 4x - y = 7 \\ -2x + 3y = 9 \end{cases}$$

$$\text{b. } \begin{cases} 6x - 2y = -3 \\ 5x + 3y = 4 \end{cases}$$

2. Solve using elimination.

$$\text{a. } \begin{cases} 5x + 6y = 4 \\ 2x - 3y = -3 \end{cases}$$

$$\text{b. } \begin{cases} -8x + y = -2 \\ 4x - 3y = 1 \end{cases}$$

3. By hand, use matrices to solve the system. Check using your calculator.

$$\text{a. } \begin{cases} x - y + 2z = 7 \\ 3x + 2y - z = -10 \\ -x + 3y + z = -2 \end{cases}$$

$$\text{b. } \begin{cases} x + z = -2 \\ -3x + 2y = 17 \\ x - y - z = -9 \end{cases}$$

Chapter 1 Answers

- a. $-2, 4$ b. $3, 6$ c. $-5, 3$
- a. 11 b. 2 c. -2 d. 2
- a. $x = \frac{d+1}{c}$ b. $x = \frac{2bc}{c-b}$ c. $x = c$
- a. x -int: $(-2.79, 0), (0, 0), (1.79, 0)$; y -int: $(0, 0)$ b. x -int: $(-0.67, 0)$; y -int: $(0, -0.45), (0, 4.45)$
- -3
- m_3, m_4, m_2, m_1
- a. $y = -4x + 8$ b. $y = 3x + 14$ c. $y = -\frac{7}{8}x + 7$ d. $y = \frac{16}{37}x + \frac{4}{37}$
- a. 6 sec b. 1 sec, 5 sec
- a. $x = \frac{-3 \pm \sqrt{33}}{4}$ b. $x = \frac{-3 \pm \sqrt{3}}{3}$ c. $x = \frac{3 \pm \sqrt{31}i}{4}$
- a. $17, -3$ b. 4 c. $0, 1, -4$ d. $1, -1$ e. -2 f. $1, -9$ g. $8, \frac{16}{7}$ h. $0, -4, \frac{5}{2}$
i. $\pm \sqrt{\frac{-1 \pm \sqrt{5}}{2}}$ j. $\pm \sqrt{\frac{-5 \pm \sqrt{33}}{2}}$ k. $-3, -\frac{7}{4}$
- a. $(-\infty, -\frac{5}{2})$ b. $[2, \infty)$ c. $(1, \infty)$ d. $[-5, 5]$ e. $(-\infty, -2] \cup [12, \infty)$ f. $[-2, \frac{4}{3}]$ g. $(-8, 16)$
- a. $(-6, 1)$ b. $(-\infty, 4] \cup [6, \infty)$ c. $[-5, -1] \cup [3, \infty)$ d. $(2, 16)$
- a. $(-\infty, \frac{3}{4}) \cup [7, \infty)$ b. $(-\infty, -6) \cup (-4, -1] \cup [1, \infty)$ c. $(-\infty, -1) \cup (1, 2) \cup (4, \infty)$

Chapter 10 Answers

- a. $x = 3, y = 5$ b. $x \approx -0.0357, y \approx 1.393$
- a. $x \approx -0.222, y \approx 0.852$ b. $x = 1/4, y = 0$
- a. $x = -1, y = -2, z = 3$ b. $x = -5, y = 1, z = 3$