

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. Solve for x : $4 - 5x = 9$
2. Solve for x : $(x - 3)(x - 2) = 0$
3. Solve for x : $8x^2 = 8x - 3$
4. Solve for b : $(b + 7)^2 = 5$
5. Solve for k : $9k^2 + 6k = 2$
6. Find the x -intercept(s) and y -intercept of $x - 2y = 3$
7. Find the x -intercept(s) and y -intercept of $y = x^2 - 9$
8. For each of the following, find the equation of a line satisfying the specified conditions:
 - (a) Through $(-1, 4)$ and $(2, 3)$
 - (b) Through $(5, -3)$ and perpendicular to $x = 3y$
 - (c) Through $(7, 11)$ and parallel to $3x + 8y = 0$
 - (d) with x -intercept -3 and y -intercept 5
9. Chris and Josh have received walkie-talkies for Christmas. If they leave from the same point at the same time, Chris walking north at 2.5 mph and Josh walking east at 3 mph, how long will they be able to talk to each other if the range of the walkie-talkies is 4 miles? Round your answer to the nearest minute.
10. A plane flies nonstop from New York to London, cities which are about 3500 miles apart. After one hour and 6 minutes in the air, the plane passes over Halifax, Nova Scotia, which is 600 miles from New York. Estimate the flying time from New York to London.
11. On vacation, Le Hong averaged 50 mph traveling from Denver to Minneapolis. Returning by a different route that covered the same number of miles, he averaged 55 mph. What is the distance between the two cities if his total traveling time was 32 hours?
12. Joan wants to buy a rug for a room that is 12 feet by 15 feet. She wants to leave a uniform strip of floor around the rug. She can afford 108 square feet of carpeting. What dimensions should the rug have?

13. Deer ticks cause concern because they can carry Lyme disease. One study found a relationship between the density of acorns produced in the fall and the density of deer tick larvae the following spring. The relationship can be approximated by the linear equation

$$y = 34x + 230$$

where x is the number of acorns per square meter in the fall and y is the number of deer tick larvae per 400 square meters the following spring. According to this formula, approximately how many acorns per square meter would result in 1000 deer ticks larvae per 400 square meters?

14. One car rental firm charges \$75 for a weekend rental (Friday afternoon through Monday morning) with unlimited mileage. A second firm charges \$50 plus 5 cents per mile. For what range of miles driven is the second firm cheaper?
15. State the definition of function.
16. Which of the following define a function? Explain.

- (a) $y = \sqrt{x}$
- (b) $x = y^2 + 1$
- (c) $x = |y|$
- (d) $y = |x|$

17. For each of the following functions, find

$$f(6) \qquad f(-2) \qquad f(p) \qquad f(r+1) \qquad f(k-5) \qquad f(x+h)$$

- (a) $f(x) = 4x - 1$
- (b) $f(x) = -x^2 + 2x - 4$
- (c) $f(x) = 8 - x - x^2$
- (d) $\frac{x^2 + 2}{x - 6}$

18. Let $f(x) = x^2 + x + 1$. Find each of the following:

- (a) $f(3)$
- (b) $f(1)$
- (c) $f(4)$
- (d) Based on your answers above, is it true that $f(a + b) = f(a) + f(b)$ for all real numbers a and b ?

19. Graph each of the following functions:

- (a) $f(x) = |x| - 3$
- (b) $f(x) = [x - 3]$
- (c) $f(x) = \begin{cases} -4x + 2 & \text{if } x \leq 1 \\ 3x - 5 & \text{if } x > 1 \end{cases}$

$$(d) f(x) = \begin{cases} |x| & \text{if } x < 3 \\ 6 - x & \text{if } x \geq 3 \end{cases}$$

20. Let f be a function that gives the cost to rent a floor polisher for x hours. The cost is a flat \$3 for renting the polisher plus \$4 per day or fraction of day for using the polisher.
- (a) Assume the cost function is linear and find the cost function for renting the polisher.
 - (b) David Fleming wants to rent a polisher, but he can spend no more than \$15. At most how many days can he use it?
21. If it costs \$300 to produce 8 units, and the fixed costs are \$60, find:
- (a) the linear cost function
 - (b) the marginal cost
 - (c) the average cost per unit to produce 100 units
22. If the fixed costs are \$2000, and 36 units cost \$8480 to make, find:
- (a) the linear cost function
 - (b) the marginal cost
 - (c) the average cost per unit to produce 100 units
23. Graph the following polynomial functions:
- (a) $f(x) = x^3 - x$
 - (b) $f(x) = x(x - 2)(x + 3)$
 - (c) $f(x) = x^4 - 7x^2 - 8$