

# Westlake High Magnet

## Practice Exam



## MATHEMATICS PRACTICE: Directions

Solve each problem, choose the correct answer. You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some problems may best be done without using a calculator.

Note: Unless otherwise stated, all the following should be assumed:

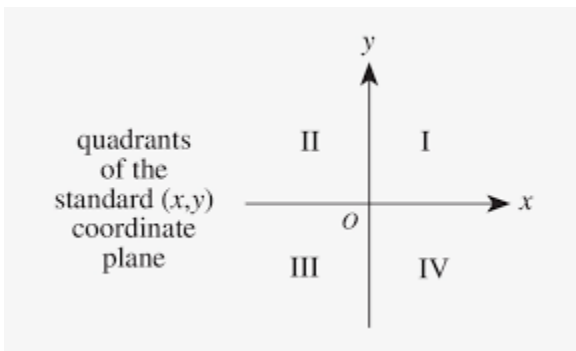
1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word line indicates a straight line.
4. The word average indicates arithmetic mean

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1. The area of a square is 25 square feet. What is the perimeter of the square, in feet?

- A. 5
- B. 10
- C. 20
- D. 25
- E. 100

2. Point A is to be graphed in a quadrant, not on an axis, of the standard  $(x,y)$  coordinate plane below.



If the  $x$ -coordinate and the  $y$ -coordinate of point A are to have opposite signs, then point A must be in:

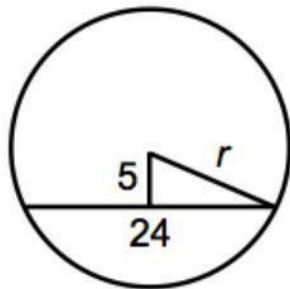
- A. Quadrant II only.
- B. Quadrant IV only.
- C. Quadrant I or IV only.
- D. Quadrant II or IV only.
- E. Quadrant I or III only.

3. For two consecutive integers, the sum of the smaller and quadruple the larger is 79. What are the two integers?

- A. 14, 15
- B. 15, 16
- C. 16, 17
- D. 19, 20
- E. 39, 40

4. To visit the local aquarium, members pay \$13 per ticket while nonmembers pay \$15 per ticket. What is the total amount, in dollars, from the sale of 55 member tickets and  $n$  nonmember tickets?

- A.  $n+55$
- B.  $(15+13)n$
- C.  $15(n+13)$
- D.  $15(n+55)$
- E.  $15n+13(55)$



5. A chord 24 inches long is 5 inches from the center of a circle, as shown below. What is the radius of the circle, to the nearest tenth of an inch?

- A. 13.0
- B. 16.9
- C. 29.0
- D. 10.9
- E. 24.5

## READING PRACTICE: Prose Fiction

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The summer I was twelve came to be known as the “Summer of the Sandwich,” at least between my brother and me. He was ten, just old enough to be interested in sandwiches.

5 We lived in the city. It was hot and muggy and sweaty during the summertime, especially inside the dim confines of our cramped apartment. Our mother was tired of listening to our arguments and kept sending us off to the park. It was hot there, too, the air flat and moist and still, like underneath  
10 the bed. We’d throw the Frisbee around a couple times before collapsing in the shade, sluggish and annoyed.

Our only hope for enjoying the summer lay in De Luca’s, the deli three blocks north and four blocks west. De Luca’s specialized in sandwiches; the big chalkboard behind  
15 the counter listed three dozen different kinds, maybe more. The sandwiches were named after friends and family members, old TV shows, puns and plays on words. De Luca’s also served soft drinks in slim glass bottles, which made the plain old soda seem more sophisticated, and very cold  
20 lemonade that was both mouth-numbingly sour and deliciously sweet. Best of all, they had air conditioning.

Tommy De Luca, the deli owner, still sliced the ham, fried the eggs, and sautéed the onions behind the counter. He could recount the history of every deli in the city, and  
25 detail the anatomy of each sandwich served on their menus. He described himself as “one of the last true hoagie connoisseurs.” This summer, he was running an intriguing special. If a customer could invent their own completely unique, delicious sandwich – along with the clever, play-  
30 name that would sum up all that sandwich offered to the world – and if Tommy chose this sandwich as one of his “Featured Sandwiches,” to be written up on the chalkboard, along with all the other great sandwiches that had gone before it – that customer would be allowed to eat half-price for

35 the duration of the summer. We were hooked.

This invitation was extended to all, written in a flowing script on an A-shaped blackboard propped up just inside the door. But we may have given our parents the impression that Mr. De Luca had taken one look at us and realized we  
40 were sandwich pioneers in the making, and therefore issued us this sandwich challenge specifically. Of course, after this our parents had no choice but to support us in our endeavors.

So, we embarked on a journey of innovation. The first thing, of course, was to stop by De Luca’s and meticulously  
45 copy down each menu item into our college-ruled notebook, to ensure we didn’t cover any familiar ground. We studied this notebook over the next couple days, and then began brainstorming our own concoctions. We narrowed these hypothetical delicacies down to a few likely candidates. Then  
50 we began assembling the chosen few.

Most were disappointments. Grilled cheese with banana peppers and bologna was a particular low point; also, peanut butter and pickles sound good together in theory, but leave a lot to be desired in practice.

55 Despite our parents’ desire to see us succeed, they were also showing signs of discomfort over our new hobby. Our frequent trips to the grocery store exceeded our allowance and we had to beg our mother for cash. Meanwhile, our methodical approach in the kitchen tended to yield huge messes  
60 as well as scientific data. Since my brother was only ten, he was pretty oblivious to our parents’ growing annoyance, but I could see the writing on the wall: if we didn’t invent the perfect sandwich soon, they were going to shut this whole operation down.

65 And then we found it. Slightly stale raisin bread, thinly sliced Granny Smith apple, and extra sharp cheddar cheese: it was sweet and simple, and best of all, it wasn’t on the menu. Tommy De Luca would be impressed; we were sure of it. We couldn’t decide between the names ‘Green-Eyed  
70 Monster’ or ‘Cheesy Granny.’ We felt both were

good. We created a beautiful specimen, complete with toothpick, and carried it to De Luca's.

It was the hot, boring part of the afternoon, between lunch and dinner, when no one was particularly hungry.

75 Tommy sat in the dining area, reading a newspaper. He looked with mild interest at our sandwich, then listened to our pitch. We held our breath as he took a bite – slowly chewed – nodded – took another bite – nodded again.

“It's pretty good,” he said. “Pretty good. Not too bad,  
80 kids. But I don't know – it just doesn't scream De Luca's tome. Know what I mean?”

We wandered home, disappointed but determined. My brother kept harping on about how we should have tried the meatball grilled cheese he'd suggested. Secretly, I agreed,

85 although I steadfastly refused to admit it. Anyway, this was no time for blame or regrets. It was time to go back to the cutting board. It was time to invent a better sandwich.

1. The point of view from which the passage is told is best described as that of:
    - A. a twelve-year-old describing the events of his summer.
    - B. an adult reminiscing about a summer when he was young.
    - C. a deli owner explaining how he gets his ideas.
    - D. a parent who wants to encourage his children's hobby.
  
  2. The main purpose of the last paragraph is to:
    - A. demonstrate the siblings' sense of disappointment.
    - B. indicate that the siblings should have pursued another idea.
    - C. show that the siblings' resolve had not been broken.
    - D. explain why this incident made an impact on the narrator.
- 3.
4. As it is used in lines 26-27, the word *connoisseur* most nearly means:
    - A. expert.
    - B. chef.
    - C. inventor.
    - D. businessman.
  
  5. The passage makes clear that the brothers liked eating at DeLuca's deli because:
    - A. it was close to the park and had delicious food.
    - B. it offered air conditioning along with food.
    - C. Tommy De Luca was a neighborhood friend.
    - D. it led to their journey of innovation.
  
  6. The passage implies that which of the following is most likely to result from De Lucas' decision?
    - A. The parents will put an end to the sandwich project.
    - B. The boys will take a more methodical and scientific approach.
    - C. The boys will return to the process of brainstorming new creations.
    - D. The boys will go shopping to obtain new ingredients.

**SCIENCE PRACTICE: Directions**

After reading the passage, choose the best answer to the question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

**Passage 1**

When a non-native organism spreads to a new ecosystem, it is called an invasive species. Originally from the rainforest of South America, *Solenopsis invicta*, the red fire ant, is a type of invasive species that builds nests in ecosystems with particular climatic conditions (including temperature and moisture levels), referred to here as Condition Set A. When ants of this species colonize, they form a nest with a diameter that is about 8 times its height. Figure 1 shows the number of ants per colony for a range of ant nest diameters.

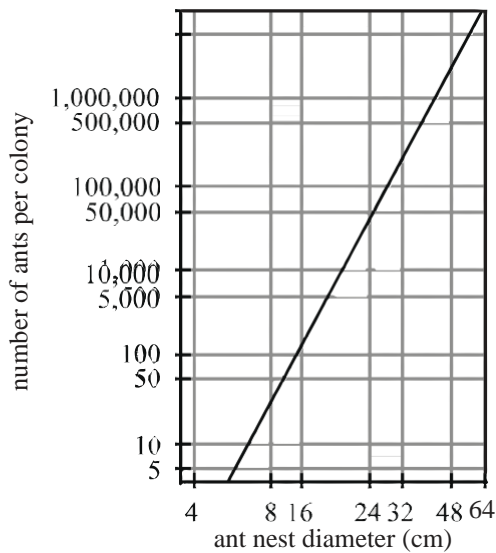


Figure 1

Figure 2 shows the average distance between equally-sized ant nests found in the rainforest. Figure 3 shows the percent of the deciduous forest, alpine, and savanna regions that is covered by ant nests of various heights.

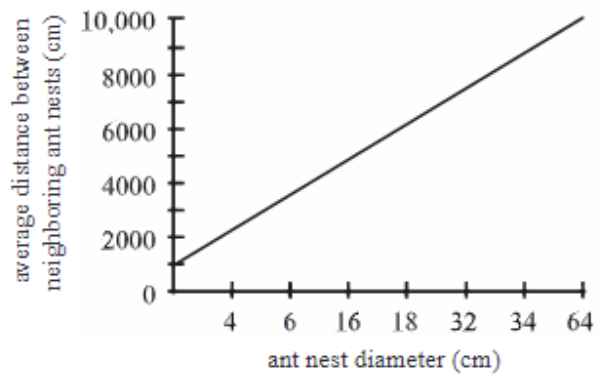


Figure 2

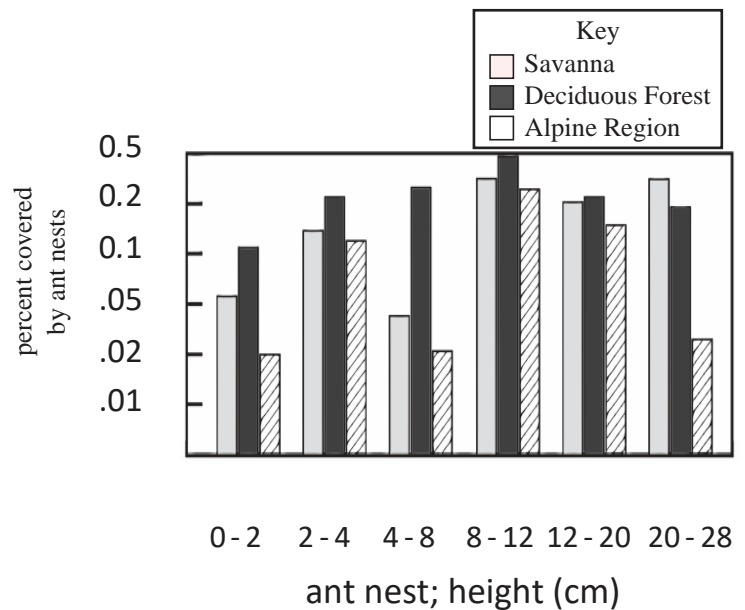


Figure 3

1. Suppose that 5,055 ants are found in a particular nest, under climatic Conditions A, in the rainforest. According to Figure 1, the diameter of the ant nest is most likely closest to which of the following?
  - A. 16 cm
  - B. 24 cm
  - C. 32 cm
  - D. 48 cm
  
2. According to Figure 2, for progressively larger ant nests, the average distance between neighboring nests:
  - A. increases only.
  - B. decreases only.
  - C. varies, but with no general trend.
  - D. remains the same.
  
3. Assume that an ant nest with a diameter of 64 cm was found in the rainforest 45 meters north of a field station. Also, assume that another 64-cm ant nest is located directly south of the field station. If the distance between these two ant nests is equal to the average distance between neighboring ant nests as given by Figure 2, the southern 64-cm ant nest should be located approximately:
  - A. 45 meters south of the field station.
  - B. 55 meters south of the field station.
  - C. 100 meters south of the field station.
  - D. 145 meters south of the field station.



## Passage 2

A sterile petri dish (Dish 1) containing a nutrient agar lacking histidine was prepared. Then,  $1 \times 10^8$  cells of His<sup>-</sup> *S. typhimurium* were added to Dish 1 and evenly spread over the surface of the nutrient agar. These procedures were repeated for 4 more nutrient agar dishes (Dishes 2–5), except that the bacteria were mixed with 1 of the 4 suspected mutagens before being spread over the surface of the nutrient agar. Table 1 lists, for each of Dishes 2–5, the substance that was mixed with the bacteria before they were added to the dish.

Dish	Substance
2	L
3	M
4	N
5	P

The 5 dishes were incubated at 37°C for 2 days. At the end of the incubation period, the number of colonies growing on the nutrient agar in each dish was determined (see Table 2).

Dish	Number of colonies
1	2
2	14
3	25
4	107
5	6

4. Based on the results of the study, which of the suspected mutagens resulted in the greatest number of His<sup>+</sup> revertants in a dish?

- A. Substance M
- B. Substance N
- C. Substance L
- D. Substance P

In the study, the scientists tested the effect of Substance P at a concentration of  $5 \times 10^{-9}$  g/mL. After the study, the scientists repeated their test of the effect of Substance P, but at 3

other concentrations. The 3 concentrations and their corresponding results are shown in the table below.

Concentration of Substance P	Number of colonies
$10 \times 10^{-9}$ g/mL	14
$50 \times 10^{-9}$ g/mL	54
$100 \times 10^{-9}$ g/mL	114

5. What is the relationship, if any, between the concentration of Substance P and its potential to cause mutations?

- A. There is no relationship between the concentration of Substance P and its potential to cause mutations.
- B. As the concentration of Substance P increases, its potential to cause mutations first decreases and then increases.
- C. As the concentration of Substance P increases, its potential to cause mutations decreases only.
- D. As the concentration of Substance P increases, its potential to cause mutations increases only.

## Answers

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### Math

1. C
2. D
3. B
4. E
5. A

### Reading

1. B
2. C
3. A
4. B
5. C

### Science

1. B
2. A
3. B
4. B
5. D