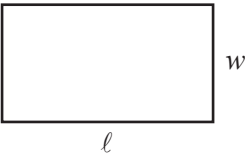
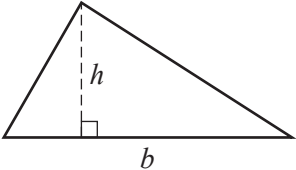
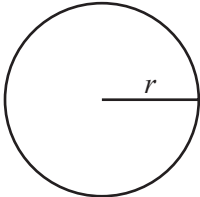
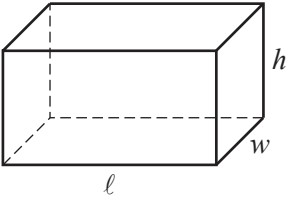
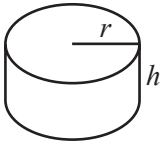
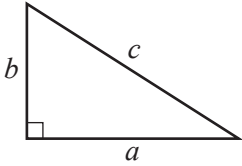




RTCEVÆG"ENTRY LEVEL MATHEMATICS TEST

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Geometry Reference Formulas

<p>Rectangle</p>  <p>A rectangle with a horizontal base labeled ℓ and a vertical right side labeled w.</p>	<p>Area = ℓw Perimeter = $2\ell + 2w$</p>
<p>Triangle</p>  <p>A triangle with a horizontal base labeled b. A dashed vertical line from the top vertex to the base represents the height, labeled h, with a right-angle symbol at the base.</p>	<p>Area = $\frac{1}{2}bh$</p>
<p>Circle</p>  <p>A circle with a center point. A radius is drawn from the center to the circumference, labeled r.</p>	<p>Area = πr^2 Circumference = $2\pi r$</p>
<p>Rectangular Solid</p>  <p>A 3D rectangular solid with a horizontal front edge labeled ℓ, a depth edge labeled w, and a vertical height edge labeled h. Hidden edges are shown as dashed lines.</p>	<p>Volume = ℓwh</p>
<p>Right Circular Cylinder</p>  <p>A right circular cylinder with a radius r from the center of the top circular face to the edge, and a height h from the top face to the bottom face.</p>	<p>Volume = $\pi r^2 h$</p>
<p>Pythagorean Theorem</p>  <p>A right-angled triangle with a right-angle symbol at the bottom-left corner. The vertical leg is labeled b, the horizontal leg is labeled a, and the hypotenuse is labeled c.</p>	<p>$c^2 = a^2 + b^2$</p>

Time— 90 minutes

50 Questions

Directions: Solve each of the following problems and indicate your answer choice in the appropriate space on the answer sheet. You may use the blank space in this test book for scratchwork. However, mark all your answers on the separate answer sheet.

Notes: (1) Unless otherwise specified, the denominators of algebraic expressions appearing in this test are assumed to be nonzero.

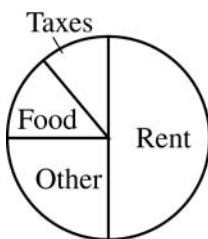
(2) Figures that accompany problems are drawn as accurately as possible EXCEPT when it is stated that a figure is not drawn to scale.

1. Gina earns \$2,000 each month. If she spends \$200 on taxes, \$800 on rent, and \$400 on food each month, which of the following circle graphs best represents how Gina spends her earnings?

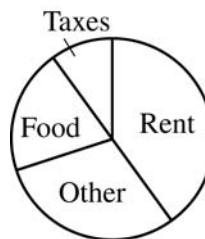
(A)



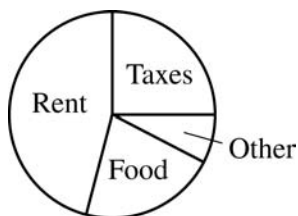
(B)



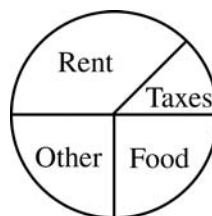
(C)



(D)



(E)



2. If $7a - 7b = 15$, then $a - b =$

- (A) $7 \cdot 15$ (B) $\frac{7}{15}$ (C) $\frac{15}{7}$ (D) $-\frac{7}{15}$ (E) $-\frac{15}{7}$
-

3. $0.215 - 16.215 =$

- (A) 16.43 (B) 16 (C) -14.065 (D) -16 (E) -16.43
-

4. If $a^2 = 3$, then $(2a)^2 =$

- (A) 6 (B) 9 (C) 12 (D) 18 (E) 36
-

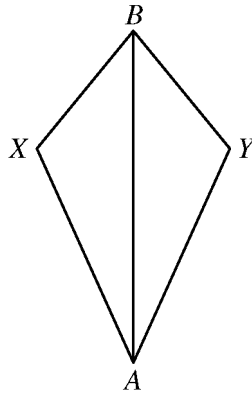
5. What is the value of $\frac{|-x|}{x^2}$ when $x = -3$?

- (A) $-\frac{1}{3}$ (B) $\frac{1}{27}$ (C) $\frac{1}{3}$ (D) 3 (E) -3
-

SALLY'S COMPUTER USE

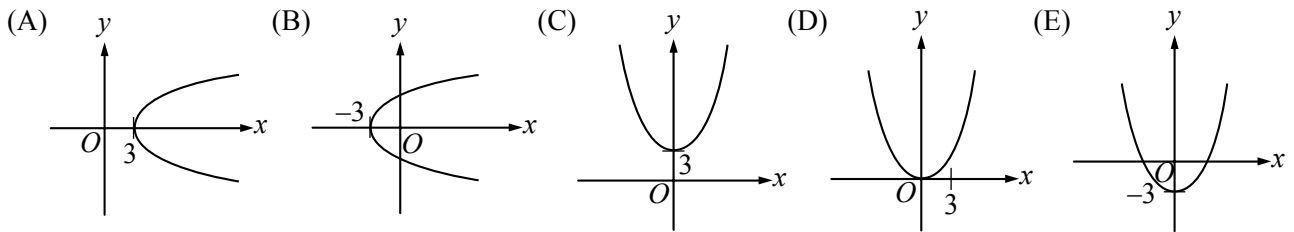
Day	Time (in minutes)
Sunday	31
Monday	36
Tuesday	42
Wednesday	57
Thursday	42
Friday	35
Saturday	23

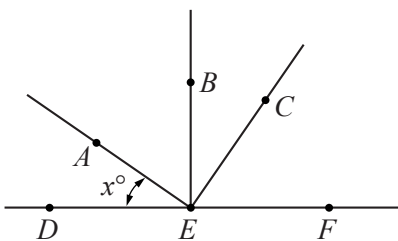
6. The table above shows the time spent by Sally at the campus computer lab each day last week. What is the average time Sally spent at the computer lab for the 7 days shown?
- (A) 36 minutes per day
(B) 38 minutes per day
(C) 40 minutes per day
(D) 42 minutes per day
(E) 57 minutes per day
-



7. In the figure above, $\triangle AXB$ is congruent to $\triangle AYB$. If the measure of $\angle XBY$ is 80° and the measure of $\angle XAY$ is 50° , what is the measure of $\angle AXB$?
- (A) 100° (B) 115° (C) 120° (D) 125° (E) 130°
-

8. Which of the following could be a portion of the graph of $y = x^2 - 3$?





9. In the figure above, $\angle BED$, $\angle BEF$, and $\angle AEC$ are right angles. If the measure of $\angle BEC$ is 32° , what is the value of x ?
- (A) 16 (B) 30 (C) 32 (D) 45 (E) 58
-

10. Leni spends $\frac{1}{3}$ of her income on rent and $\frac{1}{4}$ of her income on car expenses. What fraction of her income is left for other expenses?
- (A) $\frac{1}{2}$ (B) $\frac{1}{5}$ (C) $\frac{5}{7}$ (D) $\frac{5}{12}$ (E) $\frac{11}{12}$
-

11. Beau can process 36 envelopes for a mailing in 24 minutes. At this rate, how many minutes will it take him to process 120 envelopes?
- (A) 48 (B) 72 (C) 80 (D) 180 (E) 300
-

12. What is the radius of a circle that has a circumference of 1 ?
- (A) $\frac{1}{2\pi}$ (B) $\frac{1}{\pi}$ (C) $\frac{1}{\sqrt{\pi}}$ (D) $\frac{1}{\sqrt{2\pi}}$ (E) π
-

STUDENTS AT A
UNIVERSITY CAMPUS

Age (years)	Percent of Students
22 or younger	44.7
23–25	25.2
26–35	20.1
36 or older	10.0

13. The table above shows the percent of students in different age groups at a university campus. The total number of students at the campus is 8,987. Approximately how many of the students at the campus are of age 25 years or younger?

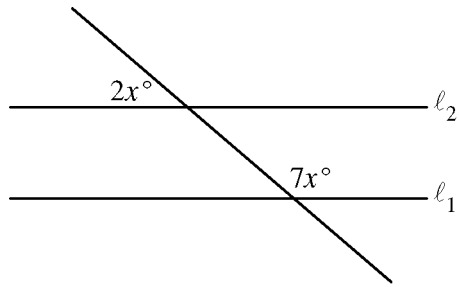
- (A) 2,300 (B) 2,700 (C) 4,000 (D) 5,000 (E) 6,300
-

14. Let f be the function defined by $f(x) = 2^x$. What is the value of $\frac{f(6)}{f(2)}$?

- (A) 2 (B) 4 (C) 8 (D) 16 (E) 32
-

15. There are 2,962,856 people who live in Wonder City, and 39.6 percent of them are registered to vote. Of the following numbers, which best approximates the number of people who live in Wonder City and are registered to vote?
- (A) 120,000
 - (B) 180,000
 - (C) 780,000
 - (D) 1,200,000
 - (E) 1,800,000
-

16. $(x + 1)(x^2 - x + 1) =$
- (A) $x^3 + 1$ (B) $x^3 - 1$ (C) $x^3 + x^2 - x - 1$ (D) $x^3 - x^2 - x - 1$ (E) $x^3 - x^2 - x + 1$
-



17. In the figure above, if $l_1 \parallel l_2$, then $x =$

- (A) 10
- (B) 13
- (C) 20
- (D) 36
- (E) 45

18. $\frac{(x-1)(3x+6)}{(3x-3)} =$

- (A) $x+2$
- (B) $x+6$
- (C) $2(x-1)$
- (D) $-2(x-1)$
- (E) $\frac{(x-1)(x+6)}{(x-3)}$

19. If $\frac{2}{k\sqrt{5}} = \frac{2}{5}$, then $k =$

- (A) $\sqrt{5}$ (B) $\sqrt{10}$ (C) $5\sqrt{2}$ (D) 5 (E) 10
-

20. $\frac{3^{200}}{3^{50}} =$

- (A) 4 (B) 12 (C) 3^4 (D) 3^{150} (E) 3^{250}
-

21. The length of a rectangle is 16 centimeters, and the diagonal of the rectangle is 20 centimeters long. What is the perimeter of the rectangle?

- (A) 24 cm (B) 40 cm (C) 56 cm (D) 68 cm (E) 72 cm
-

$$\frac{7}{6} \quad \frac{6}{7} \quad \frac{8}{9}$$

22. Which of the following lists the three fractions above in order from least to greatest?

- (A) $\frac{6}{7}, \frac{7}{6}, \frac{8}{9}$ (B) $\frac{6}{7}, \frac{8}{9}, \frac{7}{6}$ (C) $\frac{7}{6}, \frac{6}{7}, \frac{8}{9}$ (D) $\frac{8}{9}, \frac{6}{7}, \frac{7}{6}$ (E) $\frac{8}{9}, \frac{7}{6}, \frac{6}{7}$
-

23. During a sale at a furniture store, the discount price of a desk was \$180. The discount price of the desk was obtained by reducing the original price by 40 percent. What was the original price of the desk before the discount was applied?

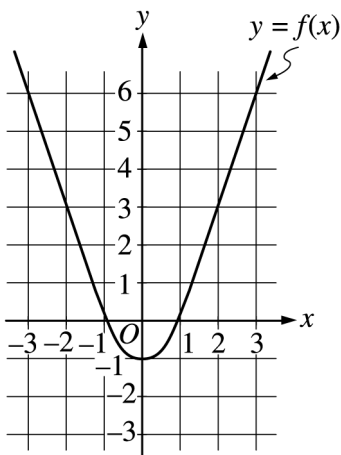
- (A) \$72 (B) \$108 (C) \$300 (D) \$450 (E) \$720
-

TICKET SALES AT FIVE THEATERS

Theater	Total Value of Ticket Sales
<i>A</i>	\$1,600
<i>B</i>	\$2,000
<i>C</i>	\$1,800
<i>D</i>	\$4,800
<i>E</i>	\$3,200

24. The table above shows the total value of the ticket sales for an afternoon show in each of five movie theaters. There were 300 tickets that were sold for each theater. The tickets cost \$8 for each adult and \$4 for each child. In which theater was the number of children twice the number of adults?
- (A) Theater *A* (B) Theater *B* (C) Theater *C* (D) Theater *D* (E) Theater *E*
-

25. The maximum speed at which a certain car can enter a curve without skidding depends on the radius of the curve. The maximum speed, in miles per hour, can be modeled by the function $S(r) = \sqrt{\frac{5r}{2}}$, where r is the radius of the curve, in feet. If a curve has a radius of 250 feet, then based on the model, what is the maximum speed, in miles per hour, at which the car can enter the curve without skidding?
- (A) 25 (B) 50 (C) $2\sqrt{10}$ (D) $25\sqrt{5}$ (E) $\frac{25\sqrt{2}}{2}$
-



26. The figure above shows the graph of the function f . What is the value of $f(3) + f(-2)$?

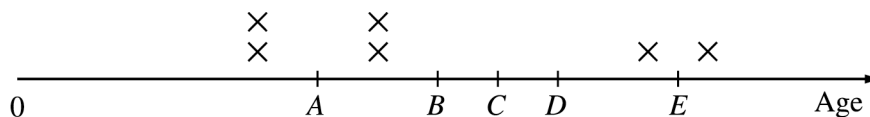
- (A) -9 (B) -3 (C) 0 (D) 3 (E) 9
-

27. If $a\left(x - \frac{1}{a}\right) = 1$, then $x =$

- (A) $-\frac{2}{a}$ (B) $\frac{2}{a}$ (C) $\frac{a}{2}$ (D) $\frac{1+a}{a}$ (E) $\frac{1-a}{a}$
-

28. $\frac{1}{2x} - \frac{2}{3x} =$

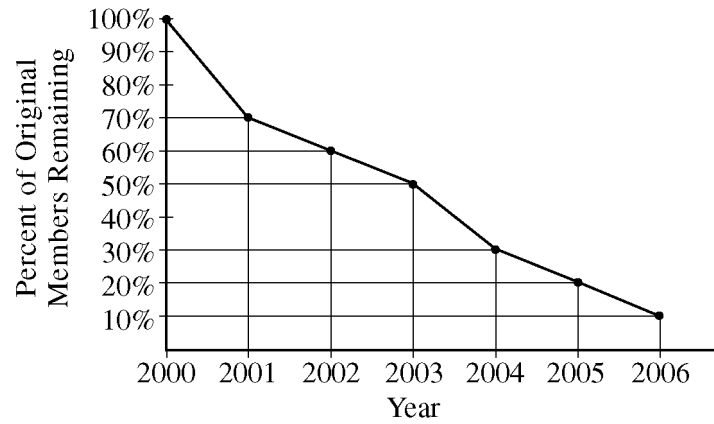
- (A) $-\frac{1}{6x^2}$ (B) $-\frac{1}{6x}$ (C) $-\frac{1}{5x}$ (D) $-\frac{1}{x}$ (E) $\frac{1}{x}$



29. The ages of six people are plotted along the number line above. Which of the following letters corresponds to the average (arithmetic mean) age of these six people?

- (A) *A* (B) *B* (C) *C* (D) *D* (E) *E*

MEMBERSHIP IN A CLUB

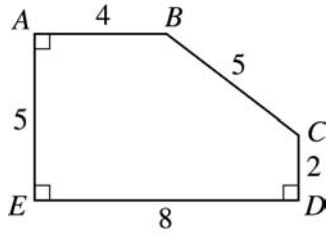


30. A club was originally formed in the year 2000. The line graph above shows the percent of the original members that were still in the club on January 1 of each year from 2000 to 2006. If 25 of the original members were still in the club on January 1, 2006, how many of the original members left the club between 2000 and 2001?

(A) 30 (B) 55 (C) 70 (D) 75 (E) 175

31. A university plans to enroll 1,500 first-year students in the coming year. A random sample of 50 current first-year students found that 40 live more than 10 miles from the university. Based on this sample, how many of the 1,500 first-year students would be expected to live no more than 10 miles from the university?

(A) 150 (B) 300 (C) 600 (D) 750 (E) 900



32. What is the area of polygon $ABCDE$ in the figure above?

- (A) 24 (B) 30 (C) 31 (D) 32.5 (E) 34
-

$x, 2x, 10, 3x, 4x$

33. The five numbers in the list above are arranged in increasing order. If the median of the numbers in the list is equal to the average (arithmetic mean) of the numbers in the list, what is the value of x ?

- (A) 1 (B) 2.5 (C) 3 (D) 3.5 (E) 4
-

34. In the xy -plane, the graph of $y = x(x^2 + 1)(x^2 - 4)$ intersects the x -axis in how many different points?

- (A) One (B) Two (C) Three (D) Four (E) Five
-

x	0	10	20	30	40
$f(x)$	5	15	75	150	8

35. The table above shows selected values for the function f . For which of the following values of x is it true that $f(x) = 5x$?

- (A) 0 (B) 10 (C) 20 (D) 30 (E) 40
-

36. A car with 15 gallons of gasoline in its tank is to be driven at a constant speed. At this speed, the car will travel 20 miles on each gallon of gasoline. Which of the following expresses the number of gallons of gasoline in the tank after the car has traveled a distance of m miles?

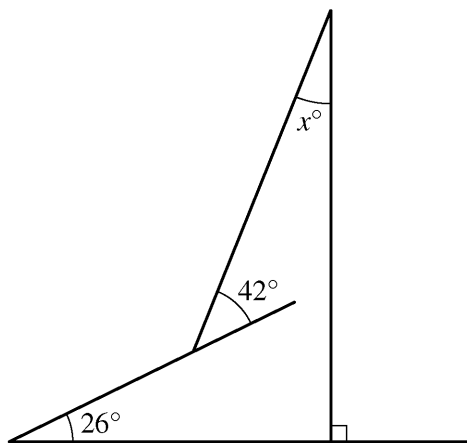
- (A) $15 - 20m$ (B) $15 - \frac{m}{20}$ (C) $15 - \frac{20}{m}$ (D) $20 - 15m$ (E) $20 - \frac{m}{15}$
-

37. An auditorium contains 320 seats. Tickets for a recital were sold for 70 percent of the seats in the auditorium. Each ticket sold for the same amount, and the total of all the ticket sales was \$2,016. What was the price of each ticket?

- (A) \$4.60 (B) \$6.30 (C) \$9.00 (D) \$15.00 (E) \$28.80
-

38. What are all values of x such that $|x - 3| \geq 0$?

- (A) $x \geq 3$ (B) $x \leq 3$ (C) $x \geq -3$ (D) $x \leq -3$ (E) All real values of x
-



39. What is the value of x in the figure above?

- (A) 22 (B) 26 (C) 42 (D) 64 (E) 68
-

40. Which of the following integers is closest to $6\sqrt{10}$?

- (A) 13 (B) 15 (C) 19 (D) 24 (E) 27
-

41. A charter plane has 80 passenger seats. Tickets for the plane cost \$400 per passenger when every seat is sold. When there are unsold seats, each passenger must pay an additional \$9 per unsold seat. If x represents the number of unsold seats on the plane, which of the following expressions represents the total number of dollars collected from passengers on the charter plane?

- (A) $480 - 8x$
 - (B) $480 - 9x^2$
 - (C) $(400 + x)(80 - 9x)$
 - (D) $(400 - x)(80 + 9x)$
 - (E) $(400 + 9x)(80 - x)$
-

42. In the xy -plane, line ℓ passes through the point $(0, 10)$ with a slope of -2 . What is the area of the triangle formed by line ℓ and the coordinate axes?

- (A) 10
 - (B) 20
 - (C) 25
 - (D) 40
 - (E) 50
-

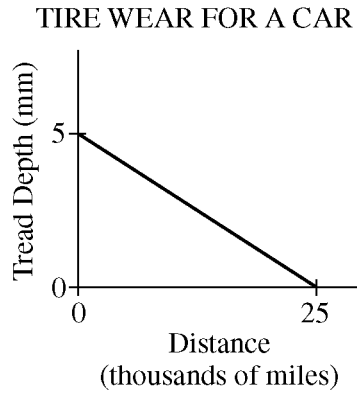
43. If f is the function defined by $f(x) = 2x^2 + 3$, then $f(a + 1) =$

- (A) $2a^2 + 4$ (B) $2a^2 + 5$ (C) $2a^2 + 8$ (D) $2a^2 + 2a + 4$ (E) $2a^2 + 4a + 5$
-

44. If $4x + \frac{9}{x} = 12$, what is the value of x ?

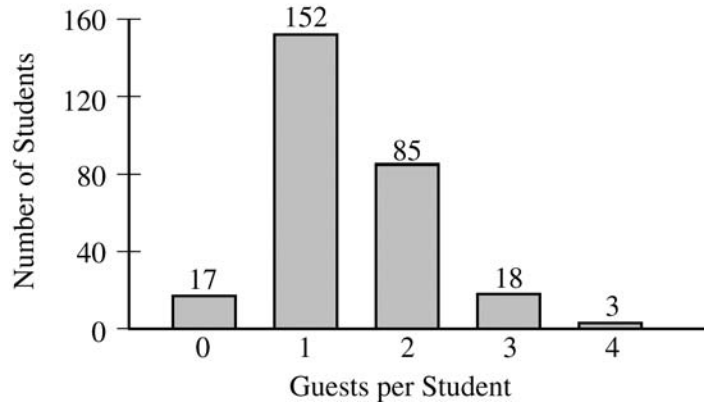
- (A) $\frac{3}{2}$ (B) $\frac{2}{3}$ (C) $-\frac{2}{3}$ (D) $-\frac{3}{4}$ (E) $-\frac{3}{2}$
-

45. The measures of the three angles of a certain triangle are in the ratio 1 to 2 to 3. Which of the following statements is true about the triangle?
- I. It is a right triangle.
 - II. It has one angle that measures 45° .
 - III. It has one angle that measures 60° .
- (A) I only (B) II only (C) I and II (D) I and III (E) II and III
-



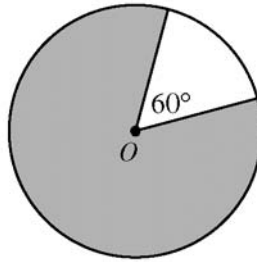
46. As a car travels, its tires begin to wear and lose tread. The graph above shows the tread depth of one tire on a certain car as the distance traveled by the car increases. Based on the graph, how many millimeters of tire tread are lost for each 1,000 miles traveled?
- (A) 0.125 (B) 0.2 (C) 0.25 (D) 0.5 (E) 5
-

GUEST ATTENDANCE AT
A STUDENT LUNCHEON



47. Every spring a school coordinates a luncheon for graduating seniors and their guests. The graph above summarizes how many guests attended the luncheon. Based on the graph, what is the total number of guests who attended the luncheon?

- (A) 202 (B) 258 (C) 275 (D) 388 (E) 400
-



48. In the figure above, point O is the center of the circle. If the circumference of the circle is 12π inches, what is the area of the shaded region, in square inches?

- (A) 30π (B) 24π (C) 18π (D) 15π (E) 12π
-

49. A garden shop charges \$72 for 3 rose bushes and 2 lilac bushes. It also charges \$114 for 5 rose bushes and 3 lilac bushes. At these same rates, how much would the garden shop charge for 1 rose bush and 1 lilac bush?
- (A) \$24 (B) \$30 (C) \$36 (D) \$38 (E) \$42
-

50. Two weather balloons are collecting meteorological data. At $t = 0$ seconds, balloon A is 310 meters above the ground and balloon B is 100 meters above the ground. Balloon A is falling at a constant rate of 8 meters per second and balloon B is rising at a constant rate of 12 meters per second. After how many seconds will the two balloons be the same height above the ground?
- (A) 10.5 (B) 16.5 (C) 21 (D) 33 (E) 52.5
-

ANSWER KEY

Item Number	KEY
1	C
2	C
3	D
4	C
5	C
6	B
7	B
8	E
9	C
10	D
11	C
12	A
13	E
14	D
15	D
16	A
17	C
18	A
19	A
20	D
21	C
22	B
23	C
24	A
25	A
26	E
27	B
28	B
29	B
30	D
31	B
32	E
33	E
34	C
35	D
36	B
37	C
38	E
39	A
40	C
41	E
42	C
43	E
44	A
45	D
46	B
47	D
48	A
49	B
50	A