Math Test – No Calculator

15 MINUTES, 10 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.
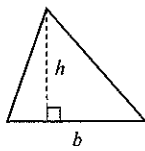

DIRECTIONS

Questions **1-7** ask you to solve a problem, select the best answer among four choices, and fill in the corresponding circle on your answer sheet. Questions **8-10** ask you to solve a problem and enter your answer in a grid provided on your answer sheet. There are detailed instructions on entering answers into the grid on the following page. You may use your test booklet for scratch work.
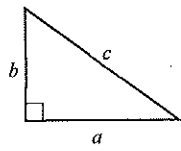
NOTES

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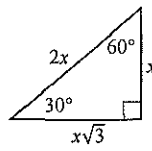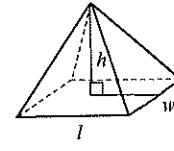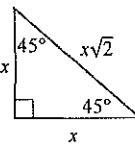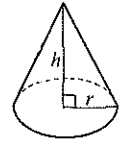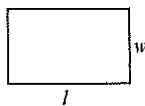
REFERENCE

$$A = \frac{1}{2}bh$$

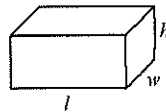$$a^2 + b^2 = c^2$$

Special Triangles
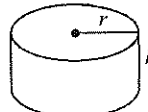
$$V = \frac{1}{3}lwh$$
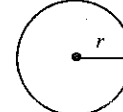
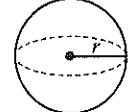$$V = \frac{1}{3}\pi r^2 h$$

$$A = lw$$

$$V = lwh$$

$$V = \pi r^2 h$$

$$A = \pi r^2$$
$$C = 2\pi r$$

$$V = \frac{4}{3}\pi r^3$$

There are 360° in a circle.

The sum of the angles in a triangle is 180°.

The number of radians of arc in a circle is 2π.

CONTINUE

1

If $42 = 3(x - 4)$, what is the value of x?

A)   4

B)   10

C)   18

D)   20

2

For what value of k does $x^2 + kx + 9 = (x + 3)^2$?

A)   0

B)   3

C)   6

D)   9

3

A barrel of crude oil is extracted from shale at a cost of $51, and then transported to and from the refinery at a cost of $6 each direction. Oil is processed three times at the refinery plant, at a cost of $9 each time. What is the profit, in dollars per barrel, if one barrel is sold for $93? (Profit is equal to revenue minus expenses.)

A)   1

B)   2

C)   3

D)   4

4
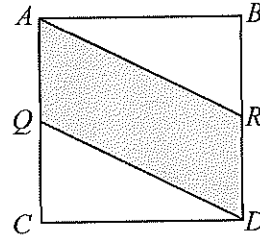
The square above has an area of 100. If Q is the midpoint of $\overline{AC}$ and R is the midpoint of $\overline{BD}$, what is the area of the shaded area?

A)   40

B)   50

C)   60

D)   75

5

$$\frac{2x}{x-1} - \frac{3x}{x+1}$$

Which of the following expressions is equivalent to the expression above?

A) $-\dfrac{x}{x^2 - 1}$

B) $\dfrac{5x - x^2}{x^2 - 1}$

C) $-\dfrac{x}{x - 1}$

D) $-\dfrac{6x}{x^2 - 1}$

CONTINUE

6

$$| x - 3 | \leq 5$$

Which of the following inequalities is equivalent to the absolute value inequality above?

A) $-2 \leq x \leq 8$

B) $-8 \leq x \leq 2$

C) $x \leq -2$ or $x \geq 8$

D) $x \leq -8$ or $x \geq 2$

7

The sum of a and b is 132. If a is the square of b and the product of a and b is negative, what is a?

A) -12

B) 11

C) 121

D) 144

CONTINUE

DIRECTIONS

Questions **8-10** ask you to solve a problem and enter your answer in the grid provided on your answer sheet. When completing grid-in questions:

1. You are required to bubble in the circles for your answers. It is recommended, but not required, that you also write your answer in the boxes above the columns of circles. Points will be awarded based only on whether the circles are filled in correctly.

2. Fill in only one circle in a column.

3. You can start your answer in any column as long as you can fit in the whole answer.

4. For questions 8-10, no answers will be negative numbers.

5. **Mixed numbers,** such as $4\frac{2}{5}$, must be gridded as decimals or improper fractions, such as 4.4 or as 22/5. "42/5" will be read as "forty-two over five," not as "four and two-fifths."

6. If your answer is a **decimal** with more digits than will fit on the grid, you may round it or cut it off, but you must fill the entire grid.

7. If there are **multiple correct solutions** to a problem, all of them will be considered correct. Enter only **one** on the grid.

CONTINUE

8

A stone is dropped from a height of 9 meters above the ground. If the height function can be modeled by the equation $h(t) = a - t^2$, where t is time in seconds, h is height in meters, and a is the initial height, how many seconds does it take for the stone to hit the ground?

10

The imaginary number i is defined such that $i^2 = -1$. What is the value of $(1 - i\sqrt{5})(1 + i\sqrt{5})$?

9
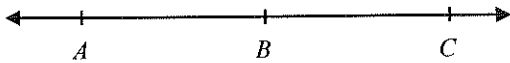
A, B and C lie on a line, as shown above. The length of $\overline{AB}$ is $x - 4$ and the length of $\overline{AC}$ is $x + 6$. What is the length of $\overline{BC}$?

STOP

If you complete this section before the end of your allotted time, check your work on this section only. Do NOT use the time to work on another section.

Math Test – Calculator

30 MINUTES, 20 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

DIRECTIONS

Questions **1-16** ask you to solve a problem, select the best answer among four choices, and fill in the corresponding circle on your answer sheet. Questions **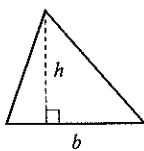17-20** ask you to solve a problem and enter your answer in a grid provided on your answer sheet. There are detailed instructions on entering answers into the grid on the following page. You may use your test booklet for scratch work.

NOTES

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REFERENCE

$$A = \frac{1}{2}bh$$

$$a^2 + b^2 = c^2$$

Special Triangles

$$V = \frac{1}{3}lwh$$

$$V = \frac{1}{3}\pi r^2 h$$

$$A = lw$$

$$V = lwh$$

$$V = \pi r^2 h$$

$$A = \pi r^2$$
$$C = 2\pi r$$
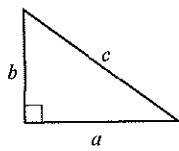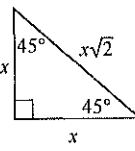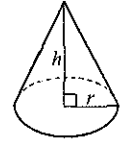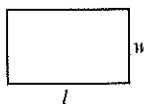
$$V = \frac{4}{3}\pi r^3$$

There are 360° in a circle.

The sum of the angles in a triangle is 180°.

The number of radians of arc in a circle is 2π.

CONTINUE

1

If $y = x - 2$, and $x = 2y + 4$, what is the value of x?

A) 1

B) 0

C) -2

D) -6

2

x	0	2	4	6
$f(x)$	3	4	5	6

Which of the following expressions defines $f(x)$ in the table above?
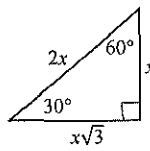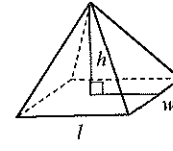
A) $f(x) = x + 3$

B) $f(x) = \frac{1}{2}x + 3$

C) $f(x) = x$

D) $f(x) = 2x$

3

If a farmer in Kansas purchases 8 pigs for every 1.5 acres of land and has 6 acres of land set aside for pigs, how many pigs will she purchase?

A) 20

B) 32

C) 40

D) 48

4

$$\frac{x-1}{3} = \frac{2x-6}{4}$$

What is the value of x that satisfies the equation above?

A) 5

B) 7

C) 8

D) 16

5

The population of an invasive species of moth doubles every 5 years. If the initial population is 300, what will be the population after 15 years?

A) 900

B) 1200

C) 2000

D) 2400

CONTINUE

6
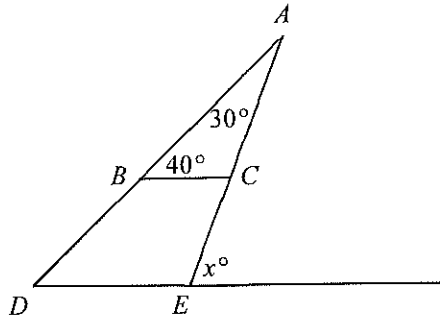
In the figure above, if $\overline{BC} \parallel \overline{DE}$, what is the value of x?

A) 30

B) 40

C) 70

D) 110

7

Ali buys 10 burgers and 7 chocolate milkshakes for $50.95. If the price of a chocolate milkshake is $0.25 cheaper than the price of a burger, what is the price of a chocolate milkshake?

A) $2.85

B) $3.10

C) $4.05

D) $5.09

8

The acute angles of a right triangle have a ratio of 12 to 3. What is the difference between the two angle measures?

A) 42 degrees

B) 54 degrees

C) 64 degrees

D) 72 degrees

9

$$x^2 - 1 < x^3$$

For which of the following values is the above inequality true?

A) $x = -3$

B) $x = -2$

C) $x = -1$

D) $x = 0$

10

$$x = 12$$

$$3x = 4y^2$$

In the system of equations above, if $y > 0$, what is the value of $x^2 y$?

A)   36

B)   108

C)   432

D) 1296

CONTINUE

11

Three different integers are randomly selected from a group of five unique integers consisting of 1 through 5. What is the probability that these numbers are 1, 2, and 3?

A) One in five

B) One in ten

C) One in twenty

D) One in sixty

12

The ratio of d:c is 3:1. If the sum of d and c is s, what is the value for d, in terms of s?

A) $\frac{4}{3}s$

B) $\frac{3}{4}s$

C) $s-3$

D) $s-4$

13

Cups of Coffee (Per Day)				
Student Year	0	1	2 or more	Total
Freshman	25	9	16	50
Sophomore	5	19	26	50
Junior	10	6	50	66
Senior	0	2	32	34
Total	40	36	124	200

A survey on coffee consumption was conducted among a random sample of students at a university. The results are shown in the table above. Which of the following statements about the students surveyed is NOT supported by the table?

A) A higher percentage of juniors than sophomores drink 2 or more cups of coffee per day.

B) A higher percentage of juniors than seniors drink 2 or more cups of coffee per day.

C) 20% of all students surveyed do not drink coffee.

D) 50% of the freshmen do not drink coffee.

14

Number of Passengers Using the
Commuter Line
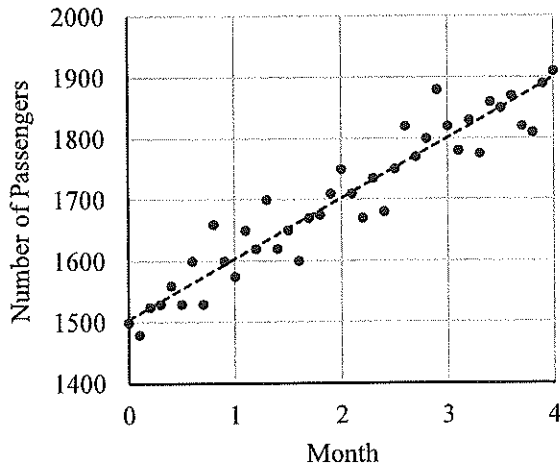
Month

The graph above shows the number of passengers on a train line over 4 months. If m is the number of months, which of the following functions best represents the graph's line of best fit?

A) $f(m) = 200 + 1500m$

B) $f(m) = 150 + 100m$

C) $f(m) = 1500 + 100m$

D) $f(m) = 150m + 1500$

15

j is equal to 925 and k is equal to 5,550. A number, n, is added to j, such that the ratio of $j + n$ to k is 1:3. What is the ratio of n to $j + n$, expressed as a percentage of $j + n$?

A) 30%

B) 40%

C) 50%

D) 60%

16

Number of Foreign Languages
Offered in a High School Curriculum

Number of Languages
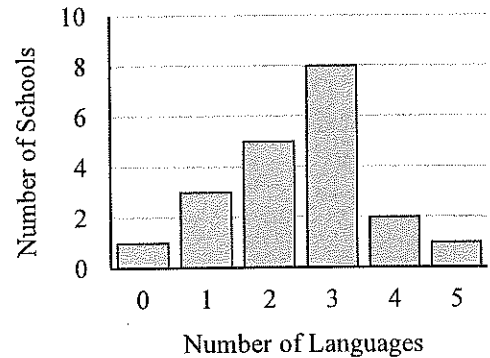
20 high schools were surveyed on the number of languages offered in their curriculum. The results are shown in the chart above. How many schools offer fewer languages than average across the 20 schools?

A) 9

B) 10

C) 11

D) 17

CONTINUE

DIRECTIONS

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CONTINUE

17

$$-15(2 + n) = -16(n - 7)$$

What is the value of n in the equation above?

18
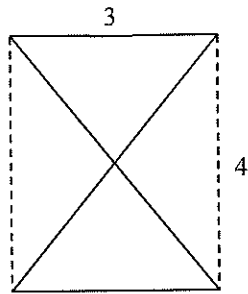
A rectangle has side lengths 3 and 4 as shown in the figure above. What is the total length of the solid lines?

Questions 19 and 20 refer to the following information.

Susan is training for a marathon. To track her progress, she has been keeping a record of her recent practice runs. The table below summarizes her training progress.

Time For Practice Runs		
Week	Distance (in miles)	Time (in minutes)
1	10	100
2	12	108
3	8	68
4	10	87
5	12	105

19

How much faster, in seconds, did Susan run each mile in Week 3 compared to Week 4?

20

Susan would like to run 26 miles in 3 hours and 54 minutes. Currently, she can run 26 miles at a pace of 11 minutes/mile. If she plans on improving her pace by 15 seconds/mile every week, how many weeks will it take Susan to reach her goal?

STOP

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Answers

Part 1

Section 1

1. B	7. B	13. A	19. A	25. A
2. B	8. B	14. B	20. B	26. B
3. C	9. C	15. A	21. B	27. C
4. A	10. D	16. B	22. B	28. D
5. A	11. D	17. C	23. A	29. D
6. C	12. D	18. C	24. C	30. C

Section 2

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

Section 3

1. C	3. C	5. B	7. D	9. 10
2. C	4. B	6. A	8. 3	10. 6

Section 4

1. B	5. D	9. D	13. B	17. 142
2. B	6. C	10. C	14. C	18. 16
3. B	7. A	11. B	15. C	19. 12
4. B	8. B	12. B	16. A	20. 8

For Answer Explanations please visit **ivyglobal.com/study**

Scoring Your Test
Part 2

To score your tests, first use the answer key to mark each of your responses right or wrong. Then, calculate your **raw score** for each section by counting up the number of correct responses. Use the tables below to help you calculate your scores:

Raw Score

Section	# of Questions Correct
Reading (Section 1)	_____
Writing (Section 2)	_____
Math: No-Calculator (Section 3)	_____
Math: Calculator (Section 4)	_____

Raw Score for Reading (Section 1): _____

Raw Score for Writing (Section 2): _____

Raw Score for Math (Sections 3 & 4): _____

Scaled Scores

Once you have found your raw score for each section, convert it into an approximate **scaled test score** using the charts below. To find a scaled score for each test, find the row in the Raw Score column which corresponds to your raw score for that test, then check the column for the section you are scoring in the same row. For example, if you had a raw score of 23 for Math, then your scaled Math Test score would be 520. For your Reading & Writing Test score, add your scaled scores for Reading & Writing together and multiply the sum by 10. For example, if you had a raw score of 15 for Reading and 18 for Writing, your scaled Reading score would be 25 and your scaled Writing score would be 21. The two give you a total score of 46 which would be multiplied by 10 to give you a scaled Reading & Writing Test score of 460.

Raw Score	Math	Reading	Writing	Raw Score	Math	Reading	Writing
0	200	10	10	23	650	32	25
1	210	10	10	24	670	33	25
2	240	12	10	25	680	35	26
3	280	14	10	26	700	36	26
4	310	15	11	27	710	37	27
5	330	16	12	28	750	38	28
6	340	17	13	29	770	39	29
7	380	18	13	30	800	40	29
8	390	19	14	31			30
9	430	20	15	32			30
10	440	21	16	33			31
11	470	22	16	34			32
12	480	23	17	35			32
13	500	24	18	36			33
14	510	25	19	37			34
15	520	26	19	38			34
16	540	26	20	39			35
17	550	27	21	40			36
18	570	28	21	41			37
19	580	29	22	42			38
20	600	30	23	43			39
21	610	31	23	44			40
22	630	32	24				