



Math Test 6 – No Calculator



25 MINUTES, 20 QUESTIONS

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

DIRECTIONS

For questions 1 – 15, find the solution to each problem and select the most appropriate answer from the choices provided. For questions 16 – 20, find the solution to each problem and write your answer in the space provided. You may use the blank space in your test booklet for scratch work.

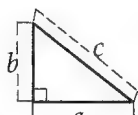
NOTES

1. The use of a calculator on any part of this section is allowed.
2. Unless otherwise indicated, all variables and expressions used in this test represent real numbers.
3. Unless otherwise indicated, all figures used in this test are drawn to scale.
4. Unless otherwise indicated, all figures used in this test lie on a plane.
5. Unless specified otherwise, a given function, f , has the domain the set of all real numbers x for which $f(x)$ is a real number.

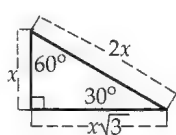
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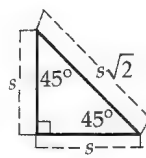
$$A = \frac{1}{2}bh$$



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

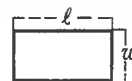


Special Right Triangles



$$A = \pi r^2$$

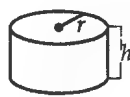
$$C = 2\pi r$$



$$A = lw$$



$$V = lwh$$



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



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



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



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

The arc of a circle is 360 degrees or 2π radians.
A triangle has angles that sum to 180 degrees.

1. Find all values of x that satisfy following inequality:
- $$\frac{x}{2} - 1 \leq 1 - \frac{x}{2}$$
- (A) $x \leq -2$
(B) $x \leq 0$
(C) $x \leq 2$
(D) All real numbers
2. George is mailing a Christmas gift to each member family. Three family members live in California, and eight live in New York. If the cost of sending a package to California, x , is three times the cost of sending a package to New York, which of the following represents the total cost of shipping?
- (A) $\frac{11}{3}x$
(B) $\frac{17}{3}x$
(C) $9x$
(D) $11x$
3. If $f(x) = ax^2 + bx + c$ is concave downward, which of the following must be true?
- (A) $a < 0$
(B) $a > 0$
(C) $b^2 - 4ac > 0$
(D) $b^2 - 4ac < 0$
4. It takes about 4 joules of energy to raise the temperature of 1 milliliter of water by one degree Celsius. How many joules of energy will it take to raise the temperature of 3 liters of water by 8 degrees Celsius? (1 liter = 1,000 milliliters)
- (A) 9.6
(B) 960
(C) 9,600
(D) 96,000
5. Four consecutive integers are summed, and the total is assigned the variable x . What is the sum of the next four consecutive integers in terms of x ?
- (A) $x + 16$
(B) $x + 4$
(C) $4x + 4$
(D) $4x + 16$
6. Carol is catering an office Super Bowl party. She plans to serve macaroni and cheese as well as pizzas. She figures that one pizza will feed two people, and one pan of macaroni and cheese will feed six people. If she expects at least 30 and at most 60 attendees, and cannot exceed a ratio, in favor of either food, of 2 to 1, what is the maximum number of pizzas she can order?
- (A) 4
(B) 6
(C) 12
(D) 15
7. Kim's Fruit Market prices fruit by the piece. A small bag of three apples and two pears costs \$3.30. A large bag of nine apples and five pears costs \$9.15. What is the cost of a pear?
- (A) \$0.60
(B) \$0.75
(C) \$0.80
(D) \$1.05





8. The current population of a town is 10,000. If the population, P , increases by 20% each year, which equation could be used to find the population after t years?
- (A) $P = 10,000(0.2)^t$
(B) $P = 10,000(1.2)^t$
(C) $P = 10,000(0.8)^t$
(D) $P = 10,000(1.8)^t$
9. Solve for x : $\frac{5}{x+1} \geq 1$
- (A) $x \leq -4$ or $x > 1$
(B) $-1 < x \leq 4$
(C) $x \leq -1$ or $x > 4$
(D) $-4 < x \leq 1$
10. Which of the following is equal to $x^{\frac{3}{2}}$ for all values of x ?
- (A) $x^3 - x^2$
(B) $\frac{x^3}{2x}$
(C) $\sqrt[3]{x^2}$
(D) $\sqrt{x^3}$
11. What is the range of $f(x) = \sqrt{4 - x^2}$?
- (A) $y \geq 0$
(B) $y \geq 2$
(C) $-2 \leq y \leq 2$
(D) $0 \leq y \leq 2$
12. If a is any positive integer, then which of the following is NOT a true statement?
- (A) $2a + 1$ is always an odd integer.
(B) \sqrt{a} is always a real number.
(C) $\sqrt{-a}$ is always an imaginary number.
(D) a^3 is always an odd integer.
13. Which of the following is NOT true concerning the line containing the points $(4, 3)$ and $(-2, -6)$?
- (A) It has an x -intercept greater than its slope.
(B) It is parallel to the line $y = \frac{3}{2}x + 10$.
(C) It is perpendicular to $2x + 3y = 10$.
(D) It has y -intercept 3.
14. Which of the following has the greatest absolute value of x for $y = 0$?
- (A) $y = |x - 9|$
(B) $y = x^2 - 6$
(C) $y = \left(\frac{2x}{3}\right)^2$
(D) $x^3 = y$
15. $f(x) = \frac{rx}{4} + x^2 - 16$
- If r is a real number coefficient, and $f(4) = 4$, which value is equal to $f(2)$?
- (A) 24
(B) 8
(C) -10
(D) -16



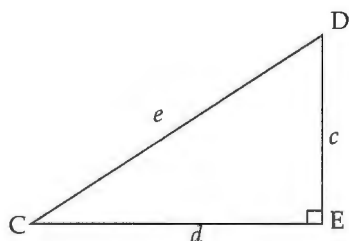
16. The sum of two numbers is $2\frac{1}{2}$. The sum of twice the first number plus three times the second number is seven. What is their product?

ANSWER: _____

17. The lines of $x + 2y = 7$ and $2x - ky = 5$ are perpendicular if the value of k is

ANSWER: _____

18.



NOTE: figure not drawn to scale

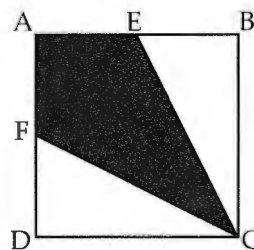
For the right triangle $\triangle CDE$ above, $\cos C = \frac{1}{2}$.
If the hypotenuse is 10 centimeters long, what is the length of side d ?

ANSWER: _____

19. An opinion poll asked which of two candidates, A or B, would make a good mayor. Of respondents, 70% chose candidate A and 60% chose candidate B. Each person polled chose at least one candidate, and 900 of them chose both candidates. How many people were polled?

ANSWER: _____

20.



In the figure, ABCD is a square with side of length 2. If E is the midpoint of line segment AB and F is the midpoint of line segment AD, the area of quadrilateral CFAE, in units squared, is

ANSWER: _____

