2 Module 1 2

Math

35 MINUTES, 22 QUESTIONS

DIRECTIONS

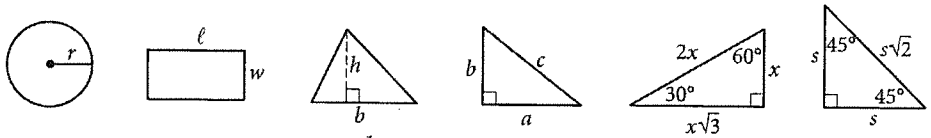
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



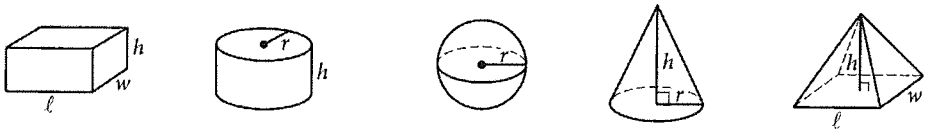
$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

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

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

Special Right Triangles



$V = \ell wh$

$V = \pi r^2 h$

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

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

$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

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For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find more than one correct answer, write and circle only one answer.
- Your answer can be up to 5 characters for a positive answer and up to 6 characters (including the negative sign) for a negative answer, but no more.
- If your answer is a fraction that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a decimal that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a mixed number (such as $3\frac{1}{2}$), write it as an improper fraction (7/2) or its decimal equivalent (3.5).
- Don't include symbols such as a percent sign, comma, or dollar sign in your circled answer.

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1

If $\frac{1}{2}x + \frac{2}{3}x = 7$, what is the value of $\frac{5}{6}x$?

A) 5

B) 1

C) 6

D) $\frac{7}{6}$

2

$$|m - 3| < 6$$

How many integers m satisfy the inequality above?

A) 10

B) 12

C) 11

D) 13

3

$f(x) = \frac{(x^2 - 2x + 1)}{x - 1}$, where $x \neq 1$. Which of the following statements is true?

A) $f(138) = 139$

B) $f(138) = 137$

C) $f(138) = 2567$

D) $f(138) = \frac{5}{137}$

4

Anne reads books every day. She reads x pages each weekday. Every Saturday and Sunday, she reads 4 times the number of pages she reads on each weekday. If Anne read for 30 days, of which 8 days were Saturdays and Sundays, how many pages, y, did Anne read?

A) $y = 38x$

B) $y = 30x$

C) $y = 22x$

D) $y = 54x$

5

If $g(x) = 3x^3 - 8x + 1$ and $f(x) = g(3x)$, what is $f(1)$?

A) -12

B) 58

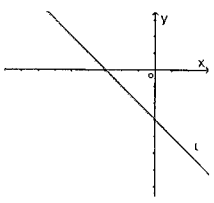
C) 106

D) 56

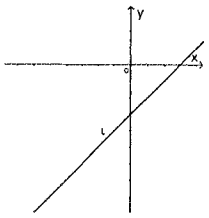
6

Which of the following graphs represent $y = kx - 2$, where $k < 0$?

A)



C)



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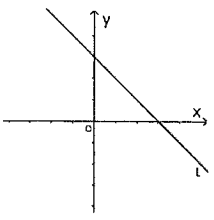
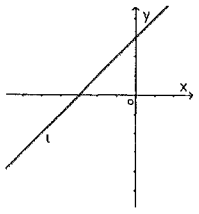


D)



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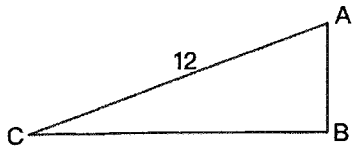
7



In the right triangle ABC above, AC=12. Which of the following expressions represents the length of AB ?

A) $\frac{\cos(A)}{12}$

B) $12 \cdot \tan(A)$

C) $12 \cdot \cos(A)$

D) $12 \cdot \sin(A)$

8

x	$f(x)$
2	2
6	6
8	14

Some values of $f(x)$ and their corresponding values of x are provided in the table shown above, If $f(x)$ is a quadratic function $f(x) = ax^2 + bx + c$, which of the following equations defines $f(x)$?

A) $f(x) = \frac{1}{2}x^2 + 3x + 6$

B) $f(x) = \frac{1}{2}x^2 - 3x + 6$

C) $f(x) = \frac{1}{2}x^2 - 3x - 6$

D) $f(x) = -\frac{1}{2}x^2 + 3x + 6$

9

Line l intersects circle $x^2 + y^2 = r^2$ and $(3, 4)$ is a point on the circle. What is the diameter of the circle?

10

Item	Price (each)
A bottle of wine	30
A bar of chocolate	5
A papaya	15
A basket	5

A grocery store sells holiday baskets with various products. The table above shows the regular price of each of the items. Each basket contains 2 bottles of wine, 4 bars of chocolate, and 5 papayas. If the price of the basket was 15% off the sum of each of the items' prices, what is the sale price for each basket?

11

It takes Clark 30 minutes to walk from his house to school. His speed for the first half of his walk is 100 meters per minute, and his speed for the second half his walk is 150 meters per minute. What is the total distance, in meters, between Clark's house and the school?

A) 3600

B) 1800

C) 900

D) 2400

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12

	Bachelor's	Master's	Total
Java	300	61	361
Python	280	57	337
Github	84	18	102
Total	664	136	800

A tech company posted information regarding their employees' software preferences and the post-secondary degrees they have. If one employee is chosen at random, what is the probability that the employee prefers using Java and has a bachelor's degree?

A) $\frac{300}{361}$

B) $\frac{75}{156}$

C) $\frac{3}{8}$

D) $\frac{83}{100}$

13

Andrew wants to purchase a precisely 8.5 feet long ladder. When he arrives at the store, he realizes that the marked lengths of all the ladders are in inches. How many inches long should the ladder he purchases be?

14

$$3y + x = 0$$

If (x, y) is a solution to the equation above and $y \neq 0$, what is the ratio of $\frac{x}{y}$?

A) 3

B) $\frac{1}{3}$

C) -3

D) $-\frac{1}{3}$

15

$$3x^2 - 5x - 12 = 0$$

How many solutions does the given equation have?

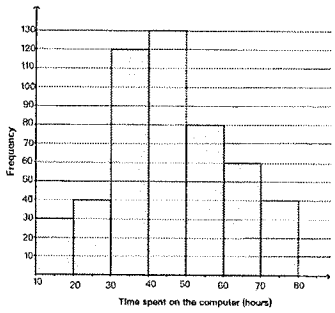
A) One

B) Two

C) Three

D) None

16



In a recent survey, 500 college students were asked how many hours they spent on their computers each week. The results are shown in the histogram above. How many of the 500 students spend more than 40 hours on their computer each week?

A) 130

B) 310

C) 250

D) 120

17

There are two types of guest rooms in a hotel. The triple room charges \$25 per person per night and double rooms charge \$35 per person per night. A tourist group of 50 people stayed in the hotel and paid a total of \$1510 for one night. How many double rooms were booked? (assume each room they booked was full)

A) 8

B) 21

C) 13

D) 15

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A company gave holiday gifts to its clients. 40% of the gifts, 20 gifts, were given to VIP clients. How many gifts were given in total?

19

$$\frac{2x(2x-3)+3(2x-3)}{(4x^2-9)}$$

If $x^2 \neq \frac{9}{4}$, which expression is equivalent to the equation above?

A) $\frac{2x-3}{2x+3}$

B) 1

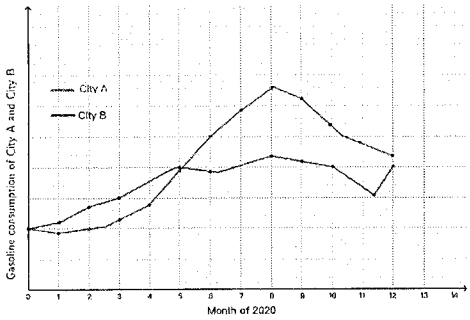
C) 2

D) $\frac{4x^2+12x-9}{4x^2-9}$

20

Triangles ABC and EFG are similar, where side AB of triangle ABC corresponds to side EF of triangle EFG and $\frac{AB}{EF} = 3$. The area of triangle ABC is how many times the area of triangle EFG?

21



The graph above shows gasoline consumption of City A and City B from Jan, 2020 to Dec, 2020. In which month did the two city have the greatest difference in gasoline consumption?

A) Sept., 2020

B) Mar., 2020

C) Aug., 2020

D) Nov., 2020

22

$$y = 4900 - 70x$$

An assistant was asked to type up a handwritten report with a total of 4900 words. If the assistant types the same number of words every hour, there would be y words left to type after x hours, where $0 \leq x \leq 70$. Which of the following statements best describes the meaning of 70 in the context?

A) The number of words left after x hours

B) The average number of words the assistant typed each hour

C) The decreasing number of words the assistant typed

D) The total number of words the assistant typed in x hours

No Test Material On This Page