

## Honors Review

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Which table represents  $y$  as a function of  $x$ ?

A. 

$x$	1	2	3	2	1
$y$	1	2	3	4	5

B. 

$x$	4	5	4	3	2
$y$	-6	-5	-4	-3	-2

C. 

$x$	8	7	6	5	4
$y$	-1	2	-1	2	-1

D. 

$x$	3	4	3	2	3
$y$	0	1	2	1	3

2. Which relation is a function?

A. 

Input	Output
1	2
2	2
3	3
4	3

B. 

Input	Output
2	6
2	5
6	4
6	3

C. 

Input	Output
1	2
2	4
4	6
4	8

D. 

Input	Output
0	1
0	2
1	3
1	3

3. Which set of ordered pairs models a function?

A.  $\{(2, 9), (7, 5), (3, 14), (2, 6)\}$

B.  $\{(5, 10), (5, 15), (5, 20), (5, 25)\}$

C.  $\{(-\frac{1}{2}, -\frac{1}{3}), (\frac{1}{2}, -\frac{1}{4}), (-\frac{1}{2}, -\frac{1}{5}), (\frac{1}{2}, -\frac{1}{6})\}$

D.  $\{(-10, 20), (-20, 30), (-30, 40), (-40, 10)\}$

4. Which set of ordered pairs does *not* represent a function?

A.  $\{(1, 1), (2, 2), (3, 3), (4, 4)\}$

B.  $\{(1, 2), (2, 3), (2, 4), (3, 8)\}$

C.  $\{(1, 3), (2, 7), (3, 6), (4, 5)\}$

D.  $\{(2, 5), (3, 5), (6, 7), (8, 7)\}$

5. Which expression represents  $f(g(x))$  if  $f(x) = x^2 - 1$  and  $g(x) = x + 3$ ?

A.  $x^3 + 3x^2 - x - 3$       B.  $x^2 + 6x + 8$

C.  $x^2 + x + 2$               D.  $x^2 + 8$

6. If  $h(x) = 2x$  and  $g(x) = 3x^2 + 1$ , what is  $h(g(x))$ ?

- A.  $6x^2 + 1$                       B.  $6x^2 + 2$   
C.  $12x^2 + 1$                      D.  $12x^2 + 2$

7. If  $f(x) = x^2 + 4x - 12$ , find  $f(2)$ .

8. If  $f(x) = 2x^3 - 2$ , what is the value of  $f(2)$ ?

- A. 6            B. 10            C. 14            D. 62

9. Which of the following is the inverse of

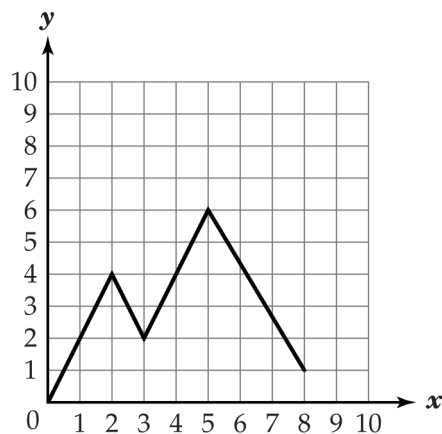
$$f(x) = \frac{2x - 3}{5} ?$$

- A.  $f^{-1}(x) = \frac{5x + 3}{2}$             B.  $f^{-1}(x) = \frac{-2x + 3}{5}$   
C.  $f^{-1}(x) = \frac{2y - 3}{5}$             D.  $f^{-1}(x) = \frac{-5y - 3}{2}$

10. Which is the inverse of the function  $f(x) = x - 9$ ?

- A.  $f^{-1}(x) = \frac{1}{x + 9}$             B.  $f^{-1}(x) = x + 9$   
C.  $f^{-1}(x) = 9 - x$             D.  $f^{-1}(x) = \frac{1}{x - 9}$

11.



What is the domain of this function?

- A.  $0 \leq x \leq 5$                       B.  $0 \leq x \leq 8$   
C.  $0 \leq y \leq 1$                       D.  $0 \leq y \leq 6$

12. If  $17^m = 6$ , what is  $m$ ?

- A.  $m = \frac{\log 6}{\log 17}$                       B.  $m = \log 6 - \log 17$   
C.  $m = \frac{\log 17}{\log 6}$                       D.  $m = \log \frac{6}{17}$

13. Which of the following is a simplified form of the expression  $\log_{21} 5 + \log_{21} 4 - \log_{21} 2$ ?

- A.  $\log_{21} 10$                       B.  $\log_{10} 21$   
C.  $\log_{21} 7$                         D.  $\log_7 21$

14. If  $y = 4(1.6)^x$ , what is the *approximate* value of  $x$  when  $y = 12$ ?

- A. 2.5    B. 2.3    C. 2.1    D. 1.9

15. What is the solution to the equation  $5^x = 17$ ?

- A.  $x = 2$   
B.  $x = \log_{10} 2$   
C.  $x = \log_{10} 17 + \log_{10} 5$   
D.  $x = \frac{\log_{10} 17}{\log_{10} 5}$

16. Solve for  $200e^{0.04t} = 450$  for  $t$ .

17. What is the value of  $\log_3 27$ ?

- A. 2            B. 3            C. 6            D. 9

18. What is the solution to the equation?

$$\log_2 8 + \log_2 32 = x$$

- A. 4            B. 8            C. 40            D. 256

19. Which of the following functions will represent \$500 placed into a mutual fund yielding 10% per year for 4 years.

- A.  $A = 500(.10)^4$                       B.  $A = 500(1.1)^4$   
C.  $A = 500(4)(.10)$                       D.  $A = 500(1.04)^{10}$

20. The population of a small town in North Carolina is 4,000, and it has a growth rate of 3% per year. Which expression can be used to calculate the town's population  $x$  years from now?

- A.  $3(4,000)^x$                       B.  $4,000(1.03)^x$   
C.  $4,000x^{1.03}$                       D.  $4,000x^3$

21. In 1984, the population of Greensboro, N.C. was 197,910. According to the U.S. Census Bureau, Greensboro has been growing at the rate of 6.9% annually since 1984. What equation models the population of Greensboro  $t$  years after 1984?

- A.  $y = 197,910(1 + 0.69)^t$
- B.  $y = 197,910(1 + 69)^t$
- C.  $y = 197,910(1 + 6.9)^t$
- D.  $y = 197,910(1 + 0.069)^t$

22. The manager of an apartment building increases the monthly rent of each apartment in the building by 3% each year. At the beginning of year 1, the monthly rent of an apartment was \$500.

What was the monthly rent of the apartment at the beginning of year 3?

- A. \$546.36
- B. \$530.45
- C. \$530.00
- D. \$515.00

23. An \$18,000 car depreciates at a rate of 16% per year. How old will the car be when it is worth \$12,000?

- A. 0.2 years
- B. 2.3 years
- C. 2.6 years
- D. 3 years

24. When interest is compounded  $n$  times a year, the accumulated amount ( $A$ ) after  $t$  years is given by the formula

$$A = P \left( 1 + \frac{r}{n} \right)^{nt}$$

where  $P$  is the initial principal and  $r$  is the annual rate of interest. *Approximately* how long will it take \$2,000 to double at an annual interest rate of 5.25% compounded monthly?

- A. 13.98 years
- B. 13.71 years
- C. 13.23 years
- D. 13.08 years

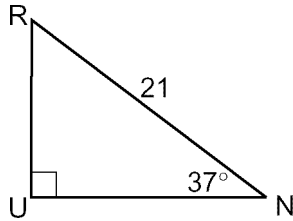
25. Anna and Zach each have \$600 to invest. Anna's investments earn a rate of 10.5%, and Zach's investments earn a rate of 6.5%. *Approximately*, how much more money will Anna have than Zach when Zach's investments are worth \$900? (Assume continuous compounding.)

- A. \$184
- B. \$241
- C. \$255
- D. \$264

26. In right triangle  $ABC$ ,  $m\angle C = 90$ ,  $m\angle A = 55$ , and  $CA = 10$ . What is the length of  $\overline{AB}$  to the *nearest integer*?

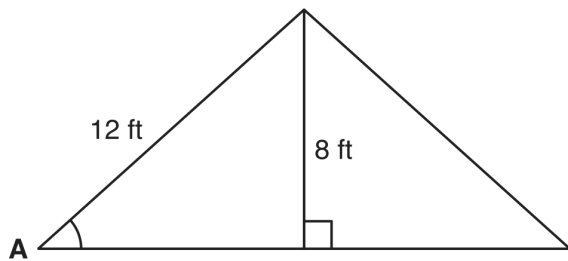
- A. 6
- B. 14
- C. 17
- D. 24

27. In the accompanying diagram of right triangle  $RUN$ ,  $m\angle U = 90$ ,  $m\angle N = 37$ , and  $RN = 21$ .



What is the length of  $\overline{RU}$ , expressed to the *nearest tenth*?

- A. 12.6    B. 15.8    C. 16.8    D. 34.9
28. The center pole of a tent is 8 feet long, and a side of the tent is 12 feet long as shown in the diagram below.



If a right angle is formed where the center pole meets the ground, what is the measure of angle A to the *nearest degree*?

- A. 34    B. 42    C. 48    D. 56
29. In a circle, a central angle containing 1.5 radians intercepts an arc whose measure is 18 centimeters. The length of the radius is
- A. 6 cm    B. 12 cm    C. 24 cm    D. 27 cm

30. In a circle whose radius is 8, the length of an arc of the circle is  $2\pi$ . What is the number of radians in the central angle subtended by the arc?

A.  $16\pi$     B.  $\frac{\pi}{2}$     C.  $\frac{\pi}{4}$     D.  $4\pi$

31. In a circle, a central angle whose measure is  $\frac{\pi}{2}$  radians intercepts an arc whose length is  $\frac{3\pi}{2}$  centimeters. How many centimeters are in the radius of the circle?

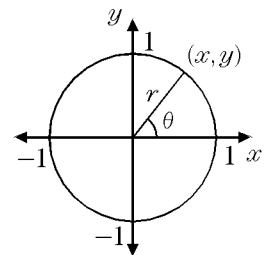
A. 1    B. 2    C. 3    D. 4

32. If the terminal side of angle  $\theta$  passes through the point  $(-4, 3)$ , what is the value of  $\cos \theta$ ?

A.  $\frac{3}{5}$     B.  $-\frac{3}{5}$     C.  $\frac{4}{5}$     D.  $-\frac{4}{5}$

33. In the accompanying diagram of a unit circle, the ordered pair  $(x, y)$  represents the locus of points forming the circle. Which ordered pair is equivalent to  $(x, y)$ ?

A.  $(\sin \theta, \cos \theta)$   
 B.  $(\cot \theta, \tan \theta)$   
 C.  $(\tan \theta, \cot \theta)$   
 D.  $(\cos \theta, \sin \theta)$



34. The value of  $\sin(-210^\circ)$  is
- A.  $\frac{\sqrt{3}}{2}$     B.  $-\frac{\sqrt{3}}{2}$     C.  $\frac{1}{2}$     D.  $-\frac{1}{2}$
35. The value of  $\sin \frac{7\pi}{6}$  is
- A.  $\frac{1}{2}$     B.  $-\frac{1}{2}$     C.  $\frac{\sqrt{3}}{2}$     D.  $-\frac{\sqrt{3}}{2}$
36. If  $\sin \theta = \frac{2}{3}$  and  $\theta$  is in Quadrant I, what is the value of  $(\tan \theta)(\cos \theta)$ ?
- A.  $\frac{2}{3}$     B.  $\frac{\sqrt{5}}{3}$     C.  $\frac{3\sqrt{5}}{5}$     D.  $\frac{2\sqrt{5}}{3}$
37. What is the value of  $\cos(-240^\circ)$ ?
- A.  $\frac{\sqrt{3}}{2}$     B.  $-\frac{\sqrt{3}}{2}$     C.  $\frac{1}{2}$     D.  $-\frac{1}{2}$
38. If  $\sin A = \frac{4}{5}$ ,  $\tan B = \frac{5}{12}$ , and  $A$  and  $B$  are first quadrant angles, what is the value of  $\sin(A+B)$ ?
- A.  $\frac{63}{65}$     B.  $-\frac{33}{65}$     C.  $\frac{33}{65}$     D.  $-\frac{63}{65}$

39. Since  $\sin 75^\circ = \sin(30^\circ + 45^\circ)$ , then  $\sin 75^\circ$  equals
- A.  $\frac{\sqrt{6} - \sqrt{2}}{4}$     B.  $\frac{-\sqrt{6} + \sqrt{2}}{4}$   
 C.  $\frac{-\sqrt{2} - \sqrt{6}}{4}$     D.  $\frac{\sqrt{2} + \sqrt{6}}{4}$
40. For all values of  $\theta$  for which the expression is defined,  $\frac{\cot \theta}{\csc \theta}$  is equivalent to
- A.  $\cos \theta$     B.  $\sin \theta$     C.  $\csc \theta$     D.  $\tan \theta$
41. The expression  $(\sec^2 \theta)(\cot^2 \theta)(\sin \theta)$  is equivalent to
- A.  $\sin \theta$     B.  $\cos \theta$     C.  $\csc \theta$     D.  $\sec \theta$
42. The expression  $\frac{\cos^2 x + \sin^2 x}{\sin x}$  is equivalent to
- A.  $\sin x$     B.  $\cos x$     C.  $\sec x$     D.  $\csc x$

43. A 100-foot wire is extended from the ground to the top of a 60-foot pole, which is perpendicular to the level ground. To the *nearest degree*, what is the measure of the angle that the wire makes with the ground?

- A. 31      B. 37      C. 53      D. 59

44. In  $\triangle ABC$ ,  $a = 4$ ,  $b = 3$ , and  $\cos C = -\frac{1}{2}$ . What is the length of  $c$ ?

- A. 7      B.  $\sqrt{13}$       C.  $\sqrt{37}$       D.  $\sqrt{19}$

45. The probability of 2 people in any given group of 13 people having the same birthday is about 15%. Based on this information, what is the probability of 2 people in any given group of 13 *not* having the same birthday?

- A. 2%      B. 13%      C. 50%      D. 85%

46. There is a  $\frac{2}{3}$  probability that you will have homework in math class. What is the probability you will *not* have homework?

- A. 0      B.  $\frac{1}{3}$       C.  $\frac{2}{3}$       D. 1

47. Fran has been assigned the task of determining the probability of drawing 3 spades from a standard deck of 52 cards. Recall there are 4 suits (diamonds, hearts, spades, and clubs) of 13 cards each, in a deck. Each card is drawn one at a time and held until the remaining cards of the hand are drawn.

How many ways are there to draw the first card?

- A. 1      B. 4      C. 13      D. 52

48. Alexis advertised that 25 percent of the cars that she sold were red. Which of these could *not* be used to simulate the number of red cars that Alexis sold?

- A. Toss a fair coin once.  
B. Spin a spinner with 4 equally-sized sections.  
C. Draw a card from a deck of cards numbered 1 through 24.  
D. Use a random number generator to generate the digits 1 through 8.

49. John flipped a fair coin 5 times and got 3 heads and 2 tails. Which is true about the result of the next flip of that coin?

- A. Heads or tails is equally likely.  
B. Tails is more likely.  
C. Heads is more likely.  
D. The result must be tails.

50. Two brothers and four friends will be going on a canoe trip. They will rent 2 canoes that seat three people each. What are the chances that the two brothers will be in a canoe together?

- A.  $\frac{1}{10}$     B.  $\frac{1}{2}$     C.  $\frac{1}{3}$     D.  $\frac{2}{5}$

51. A 2-member committee will be selected from 6 members of the high school student council to attend a rally in Washington, D.C. How many different 2-member committees are possible?

- A. 12    B. 15    C. 30    D. 90

52. There are 12 candidates in a city election. The winner will be the mayor, and the runner-up will be the vice-mayor. How many different combinations of mayor and vice-mayor are possible?

- A. 22    B. 24    C. 132    D. 144

53. The principal wants to read the list of candidates for prom queen. There are 6 candidates. How many ways can the principle introduce the candidates?

- A. 2160    B. 720    C. 21    D. 6

54. Caroline and 2 friends are going to the mall on a bus. In how many different orders can the girls get into the front of the bus?

- A. 3    B. 6    C. 9    D. 12

55. Each member of a computer club picks a password that is three characters long.

- The first character in each password is a vowel (A, E, I, O, U).
- The second and third characters are digits from 1 through 3.
- A digit can be repeated.

How many different passwords are possible?

- A. 8    B. 15    C. 30    D. 45

56. There are 4 students who will form a line.

In how many different orders could the 4 students form the line?

- A. 4    B. 8    C. 16    D. 24



57. Delia and three of her classmates are creating computer passwords using combinations of one-digit numbers and capital letters.
- Delia's password will use 2 letters and 1 number.
  - Frank's password will use 1 letter and 2 numbers
  - Jamai s password will use 3 letters and no numbers.
  - Sandi's password will use no letters and 3 numbers.

Which student can create the *greatest* number of possible passwords?

- A. Delia   B. Frank   C. Jamal   D. Sandi

58. A small-business owner must hire seasonal workers as the need arises. The following list shows the number of employees hired monthly for a 5-month period.

4, 13, 5, 6, 9

If the mean of these data is approximately 7, what is the population standard deviation for these data? (Round the answer to the nearest tenth.)

- A. 3.3   B. 7.4   C. 10.8   D. 13.5

59. Mr. Jenkins graded a 23-point history quiz. His class had a mean score of 18 and a standard deviation of 2. He decided the quiz should have been worth 100 points. To fix the scores, he added 2 to every score and then multiplied by 4. What are the new mean and standard deviation?

- A. mean = 72; standard deviation = 8  
B. mean = 80; standard deviation = 8  
C. mean = 74; standard deviation = 10  
D. mean = 80; standard deviation = 16

60. For a set of scores, 80 is the score for the 75th percentile. Which statement is true?

- A. Eighty scores are at or below 75.  
B. Seventy-five scores are at or below 80.  
C. Seventy-five percent of the scores are at or below 80.  
D. Eighty percent of the scores are at or below 75.

61. Which measure is always the same as the 25th percentile?

- A. mean                      B. median  
C. upper quartile        D. lower quartile

62. On a quiz taken by 28 students, a score of 74 is at the 25th percentile. How many students scored 74 or less?

- A. 7      B. 14      C. 21      D. 24

63. On a standardized test with a normal distribution, the mean is 20 and the standard deviation is 2.6. In which interval would the greatest number of scores occur?

- A. 12.2–14.8      B. 17.4–20.0  
C. 22.6–25.2      D. 27.8–30.4

64. The mean of a normally distributed set of data is 52 and the standard deviation is 4. Approximately 95% of all the cases will lie between which measures?

- A. 44 and 52      B. 44 and 60  
C. 48 and 56      D. 52 and 64

65. During a half hour of television programming, eight minutes is used for commercials. If a television set is turned on at a random time during the half hour, what is the probability that a commercial is *not* being shown?

- A. 0      B. 1      C.  $\frac{11}{15}$       D.  $\frac{4}{15}$

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1.		15.	
Answer:	C	Answer:	D
Points:	1	Points:	1
2.		16.	
Answer:	A	Answer:	$t \approx 20.3$
Points:	1	Points:	1
3.		17.	
Answer:	D	Answer:	B
Points:	1	Points:	1
4.		18.	
Answer:	B	Answer:	B
Points:	1	Points:	1
5.		19.	
Answer:	B	Answer:	
Points:	1	Points:	1
6.		20.	
Answer:	B	Answer:	B
Points:	1	Points:	1
7.		21.	
Answer:		Answer:	
Points:	1	Points:	1
8.		22.	
Answer:		Answer:	B
Points:	1	Points:	1
9.		23.	
Answer:		Answer:	
Points:	1	Points:	1
10.		24.	
Answer:	B	Answer:	C
Points:	1	Points:	1
11.		25.	
Answer:	B	Answer:	C
Points:	1	Points:	1
12.		26.	
Answer:		Answer:	C
Points:	1	Points:	1
13.		27.	
Answer:	A	Answer:	A
Points:	1	Points:	1
14.		28.	
Answer:		Answer:	B
Points:	1	Points:	1
		29.	
		Answer:	B
		Points:	1

30.  
Answer: C  
Points: 1

31.  
Answer: C  
Points: 1

32.  
Answer: D  
Points: 1

33.  
Answer: D  
Points: 1

34.  
Answer: C  
Points: 1

35.  
Answer: B  
Points: 1

36.  
Answer: A  
Points: 1

37.  
Answer: D  
Points: 1

38.  
Answer: A  
Points: 1

39.  
Answer: D  
Points: 1

40.  
Answer: A  
Points: 1

41.  
Answer: C  
Points: 1

42.  
Answer: D  
Points: 1

43.  
Answer: B  
Points: 1

44.  
Answer: C  
Points: 1

45.  
Answer: D  
Points: 1

46.  
Answer: B  
Points: 1

47.  
Answer: C  
Points: 1

48.  
Answer: A  
Points: 1

49.  
Answer: A  
Points: 1

50.  
Answer: D  
Points: 1

51.  
Answer: B  
Points: 1

52.  
Answer: C  
Points: 1

53.  
Answer: B  
Points: 1

54.  
Answer: B  
Points: 1

55.  
Answer: D  
Points: 1

56.  
Answer: D  
Points: 1

57.  
Answer: C  
Points: 1

58.  
Answer: A  
Points: 1

59.  
Answer: B  
Points: 1

60.  
Answer: C  
Points: 1

61.  
Answer: D  
Points: 1

62.  
Answer: A  
Points: 1
63.  
Answer: B  
Points: 1
64.  
Answer: B  
Points: 1
65.  
Answer: C  
Points: 1