CHS Mathematics Test - Fall 2017

INSTRUCTIONS: Solve each problem, choose the correct answer, and then note your answer choice on your answer sheet. Be careful not to spend too much time on specific problems. Solve all the problems you can, and then come back to the ones you skipped in the time you have left. You should always make a best guess instead of leaving a question blank.
You CAN use a calculator on this test, but some problems are better done without a calculator

NOTE: Unless otherwise noted, all of the following assumptions are true:
1. Illustrated figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word “line” means a straight line.
4. The word “average” indicates arithmetic mean.

* Required

Begin by filling in your information.

1. **Fill in your name (first and last).** *

2. **What is your school student ID number?** *

3. **Please select your math teacher.** *
Mark only one oval.

- Clinch
- Goody
- Bruski
- McCarvel
- Warner
- Long
- Peterson
- Chart

4. **Please select your grade level.** *
Mark only one oval.

- 9th grade
- 10th grade
- 11th grade
- 12th grade

5. **Please select your math class.** *
Mark only one oval.

- AP Calculus
- College Algebra
- Algebra 2
- Tech Math
- Pre-Calculus
- Honors Pre-Calculus

6. **Please select your class period.** *
Mark only one oval.

- Period 0
- Period 1
- Period 2
- Period 3
- Period 4
- Period 5
- Period 6
- Period 7

You may now begin the assessment.

7. **1** *

Which of the following numbers is between $^3/_5$ and $^5/_7$?

A. $^1/_2$

B. $^3/_7$

C. $^8/_9$

D. $^{19}/_{35}$

E. $^{47}/_{70}$

Mark only one oval.

- A
- B
- C
- D
- E

8. **2** *

$x + 2y = 5$

$2x + y = 16$

What does $x + y$ equal?

A. -4

B. -2

C. 4

D. 7

E. 9

Mark only one oval.

- A
- B
- C
- D
- E

9. **3** *

To reach her destination, Jeanette must drive 90 miles. If she drives 5 miles every 7 minutes, how long will it take her to reach her destination?

A. 2 hours and 2 minutes

B. 2 hours and 6 minutes

C. 2 hours and 10 minutes

D. 2 hours and 12 minutes

E. 2 hours and 15 minutes

Mark only one oval.

- A
- B
- C
- D
- E

10. **4** *

After receiving a 25% discount, Sue paid $180 for a lawnmower. What is the original price of the lawnmower before the discount?

A. $215

B. $220

C. $225

D. $240

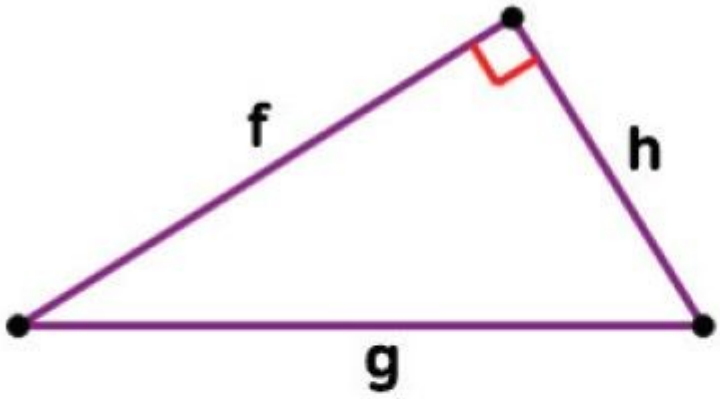
E. $245

Mark only one oval.

- A
- B
- C
- D
- E

11. **5** *

In the figure below



If $f = 6$ and $g = 8$, what does h equal?

A. $2\sqrt{7}$

B. $3\sqrt{5}$

C. 4

D. 10

E. 14

Mark only one oval.

- A
- B
- C
- D
- E

12. **6** *

If $J \div 24 = K$, then $J \div 6 =$

A. $4K$

B. $2K$

C. K

D. $K/2$

E. $K/4$

Mark only one oval.

- A
- B
- C
- D
- E

13. **7** *

In the Antares Corporation, $^3/_7$ of the managers are female. If there are 42 female managers, how many managers in total are there?

A. 18

B. 24

C. 60

D. 66

E. 98

Mark only one oval.

- A
- B
- C
- D
- E

14. **8** *

If $R = 10b^2$ and $b = 5$, then $R =$

A. 25

B. 50

C. 100

D. 250

E. 500

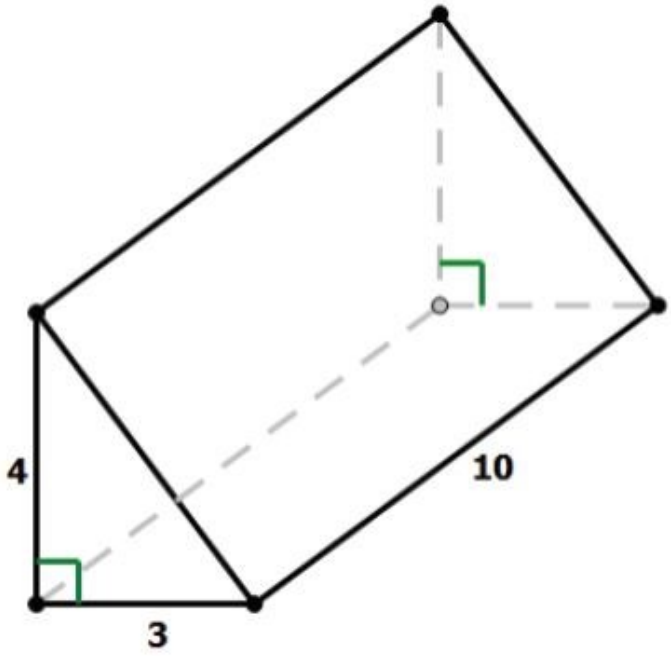
Mark only one oval.

- A
- B
- C
- D
- E

15. **9** *

A prism with dimensions given in centimeters is shown below. If the volume of a prism is the area of a triangular base times the length of a rectangular base, what is the volume of this prism, in cubic cm?

A. 30
B. 40
C. 50
D. 60
E. 120



Mark only one oval.

- A
- B
- C
- D
- E

16. **10** *

On a certain high school athletic team, the ratio of freshmen to sophomores to juniors to seniors is 1:3:4:6. If there are 60 juniors on the team, how many students in total are on the team?

A. 90

B. 140

C. 150

D. 180

E. 210

Mark only one oval.

- A
- B
- C
- D
- E

17. **11** *

A group of employees and their spouses are dining out at a fancy restaurant. When the bill for the meal comes, they initially decide to split it equally among the eight employees of the same company. Then, a spouse insists on paying a share, so they split the bill equally among nine people: this reduces the per-person share by $5. What was the total price of the bill?

A. $135

B. $180

C. $360

D. $450

E. $720

Mark only one oval.

- A
- B
- C
- D
- E

18. **12** *

In trapezoid ABCD, $BC = EF = 6$, $AF = DE = 3$, and $AB = CD = 5$. If the area of a trapezoid is given by

$$A = \left(\frac{b_1 + b_2}{2}\right)h$$

then which of the following is the area of trapezoid ABCD?

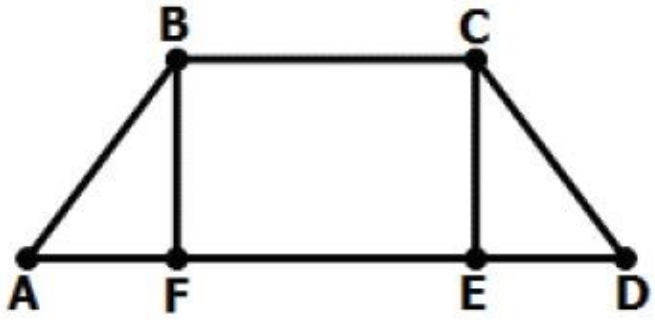
A. 12

B. 24

C. 36

D. 45

E. 54



Mark only one oval.

- A
- B
- C
- D
- E

19. **13** *

In 2004, Cindy had $4000 in a mutual fund account. In 2005, the amount in the same account was $5000. If the percent increase from 2004 to 2005 was the same as the percent increase from 2005 to 2006, how much did Cindy have in this account in 2006?

A. $5800

B. $6000

C. $6250

D. $7500

E. $9000

Mark only one oval.

- A
- B
- C
- D
- E

20. **14** *

Which of the following inequalities is equivalent to $12 - 3x < -18$?

A. $x > 10$

B. $x < 10$

C. $x > -10$

D. $x < -10$

E. $x > 2$

Mark only one oval.

- A
- B
- C
- D
- E

21. **15** *

If $f(x) = x^2 + 4$ and $f(2k) = 36$, then which of the following is one possible value of k?

A. $\sqrt{2}$

B. 2

C. 4

D. $2\sqrt{2}$

E. $\sqrt{14}$

Mark only one oval.

- A
- B
- C
- D
- E

22. **16** *

A municipal water tank is a large cylinder with a radius of 20 feet and a height of 30 feet. Assuming that the tank is filled with water, what is the approximate volume of the water in cubic feet?

A. 6,000

B. 12,000

C. 18,000

D. 36,000

E. 54,000

Mark only one oval.

- A
- B
- C
- D
- E

23. **17** *

The average of x and t is y. If $s = 2y$, what is the average of s, x, and t in terms of y?

A. $3y$

B. $2y$

C. $^{5y}/_{3}$

D. $^{4y}/_{3}$

E. y

Mark only one oval.

- A
- B
- C
- D
- E

24. **18** *

Suppose that 10 US dollars is equivalent to 9 euros. How do you convert from euros to US dollars?

A. add 1

B. multiply by 9

C. multiply by 10

D. multiply by $^{9}/_{10}$

E. multiply by $^{10}/_{9}$

Mark only one oval.

- A
- B
- C
- D
- E

25. **19** *

$(3 \times 10^{20}) \cdot (8 \times 10^{30}) =$

A. 2.4×10^{50}

B. 2.4×10^{51}

C. 2.4×10^{60}

D. 2.4×10^{61}

E. 2.4×10^{301}

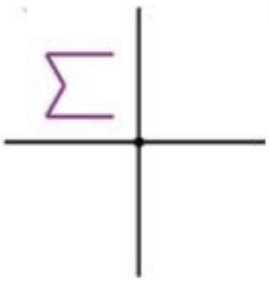
Mark only one oval.

- A
- B
- C
- D
- E

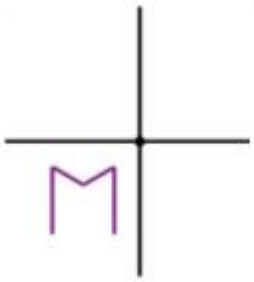
26. **20** *

The figure shown below in the standard *x-y* coordinate plane is to be rotated 180° about the origin. One of the following graphs is the result of this rotation. Which one is it?

A.



C.



E.

B.

D.

Mark only one oval.

- A
- B
- C
- D
- E

27. **21** *

Students in an 11th grade history class are randomly divided into three teams of five students for a history trivia contest. Each student takes a trivia test with 100 total points, and their scores are posted below. The team with the highest average score (rounded to the nearest whole number) wins the contest.

	Team 1	Team 2	Team 3
	74	64	77
	80	76	91
	93	81	92
	94	85	90
	74	89	85
Average Score	83	79	87

Which of the following is closest to the percent of individual trivia test scores that are at or above 80 points?

A. 10%

B. 33%

C. 60%

D. 67%

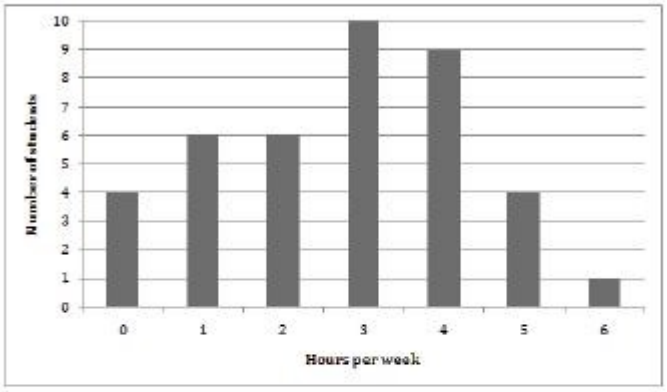
E. 80%

Mark only one oval.

- A
- B
- C
- D
- E

28. **22 (note: y-axis title is "Number of students" and x-axis title is "Hours per week")** *

A survey of a high school track team asked the 40 members how many hours per week (rounded to the nearest hour) they spend running outside of team practices. The 40 responses are summarized in the histogram below.



To the nearest hundredth of an hour, what is the average number of hours spent running for the 40 respondents?

A. 2.75

B. 2.90

C. 3.25

D. 3.40

E. 6.00

Mark only one oval.

- A
- B
- C
- D
- E

29. **23** *

In the standard (x,y) coordinate plane, what is the slope of a line that is perpendicular to $4x - 6y = 14$?

A. -4

B. $-3/2$

C. $-2/3$

D. $3/2$

E. 4

Mark only one oval.

- A
- B
- C
- D
- E

30. **24** *

In the *xy*-coordinate system, line k passes through points (-5*m*, 0) and (0, 2*m*). Which of the following is a possible equation of line *k*?

A. $y = -\frac{5}{2}x + 2m$

B. $y = \frac{2}{5}x - 5m$

C. $y = \frac{5}{2}x + 2m$

D. $y = \frac{2}{5}x + 2m$

E. $y = -\frac{2}{5}x - 5m$

Mark only one oval.

- A
- B
- C
- D
- E

31. **25** *

. A straight 16-foot-tall ladder is leaning against an apartment building at an angle of 50°, as shown in the figure below. Which of the following expressions gives the distance, in feet, from the base of the ladder to the building?

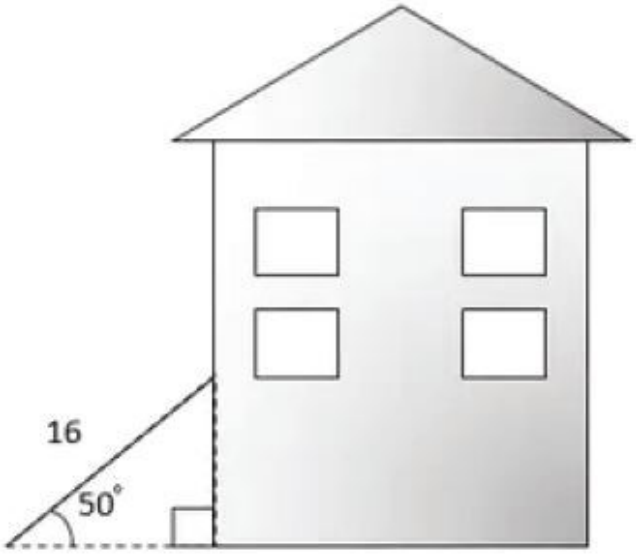
A. $16 \cos 50°$

B. $16 \sin 50°$

C. $16 \tan 50°$

D. $\frac{16}{\sin 50°}$

E. $\frac{16}{\cos 50°}$



Mark only one oval.

- A
- B
- C
- D
- E

32. **26** *

In the standard (x,y) coordinate plane, when $a \neq 0$ and $b \neq 0$, the graph of $y = \frac{2b}{x + a}$ has a vertical asymptote at:

A. $y = -a$

B. $y = a$

C. $x = -1$

D. $x = {}^{-a}/_{2}$

E. $x = -a$

Mark only one oval.

- A
- B
- C
- D
- E

33. **27** *

Which of the following angles has the same terminal side as 1,105°?

A. 15°

B. 25°

C. 45°

D. 105°

E. 335°

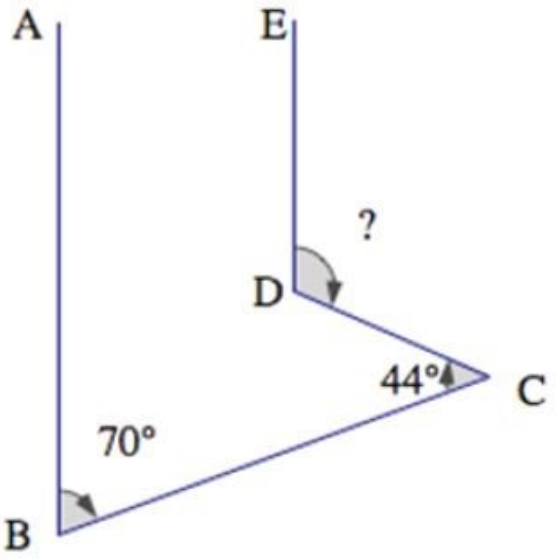
Mark only one oval.

- A
- B
- C
- D
- E

34. **28** *

In the two-dimensional figure below, *AB* is parallel to *ED*, the measure of *DCB* is 44°, and the measure of *ABC* is 70°. What is the measure of *EDC*?

A. 100°
B. 114°
C. 118°
D. 124°
E. 136°



Mark only one oval.

- A
- B
- C
- D
- E

35. **29** *

A bag contains x blue chips and y red chips. If the probability of selecting a red chip at random is $3/7$, then x/y =

A. $7/11$

B. $3/4$

C. $7/4$

D. $4/3$

E. $11/7$

Mark only one oval.

- A
- B
- C
- D
- E

36. **30** *

The equation $y = x^2$ is graphed in the standard (x,y) coordinate plane. In which of the following equations is the graph of the parabola shifted 4 units to the left and 2 units up?

A. $y = (x - 4)^2 + 2$

B. $y = (x - 4)^2 - 2$

C. $y = (x - 2)^2 + 4$

D. $y = (x + 4)^2 + 2$

E. $y = (x + 4)^2 - 2$

Mark only one oval.

- A
- B
- C
- D
- E

37. **31** *

A square in the standard (x,y) coordinate plane has vertices at (1,0), (0,2), (2,3), and (3,1). Where do the diagonals of the square intersect?

A. $\left(2, \frac{3}{2}\right)$

B. $\left(1, \frac{3}{2}\right)$

C. $\left(\frac{5}{3}, \frac{5}{3}\right)$

D. $\left(\frac{4}{3}, \frac{4}{3}\right)$

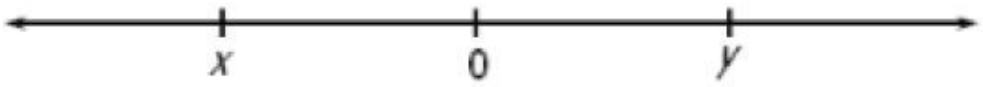
E. $\left(\frac{3}{2}, \frac{3}{2}\right)$

Mark only one oval.

- A
- B
- C
- D
- E

38. **32** *

Note: Figure not drawn to scale.



If x and y are numbers on the number line above, which of the following statements must be true?

I. $|x + y| < y$
II. $x + y < 0$
III. $xy < 0$

A. I only
B. III only
C. I and II
D. I and III
E. II and III

Mark only one oval.

- A
- B
- C
- D
- E

39. **33** *

If the circle with center *O* has area 9π, what is the area of equilateral triangle *ABC*?

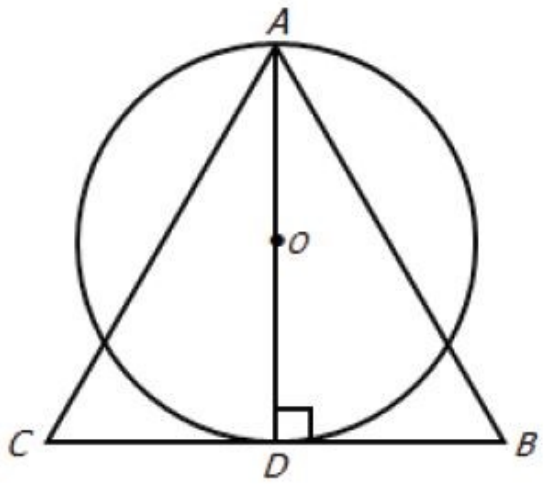
A. $9\sqrt{3}$

B. 18

C. $12\sqrt{3}$

D. 24

E. $16\sqrt{3}$



Mark only one oval.

- A
- B
- C
- D
- E

40. **34** *

Bryce is building a ramp up to a platform in a skate park. The ramp is 11.5 feet long, and the end of the ramp that meets the platform is 3 feet above the level ground. Which of the following gives the angle of inclination of the ramp?

A. $\sin^{-1}\left(\frac{3}{11.5}\right)$

B. $\cos^{-1}\left(\frac{3}{11.5}\right)$

C. $\tan^{-1}\left(\frac{3}{11.5}\right)$

D. $\sin^{-1}\left(\frac{11.5}{3}\right)$

E. $\cos^{-1}\left(\frac{11.5}{3}\right)$

Mark only one oval.

- A
- B
- C
- D
- E

41. **35** *

A circle has an area of x. If the diameter is increased by 50%, what is the area of the resulting circle in terms of x?

A. $1.25x$

B. $1.5x$

C. $2x$

D. $2.25x$

E. $3x$

Mark only one oval.

- A
- B
- C
- D
- E

42. **36** *

If $2^{2n} + 2^{2n} + 2^{2n} + 2^{2n} = 4^{24}$, then $n =$

A. 3

B. 6

C. 12

D. 23

E. 24

Mark only one oval.

- A
- B
- C
- D
- E

43. **37** *

For quadrant 1 angles α and β,

$\sin(\alpha) = \frac{3}{5}$ and $\cos(\beta) = \frac{12}{13}$.

Given that $\cos(\alpha + \beta) = \cos(\alpha)\cos(\beta) - \sin(\alpha)\sin(\beta)$

which of the following equals $\cos(\alpha + \beta)$?

A. $\frac{33}{65}$

B. $\frac{48}{65}$

C. $\frac{56}{65}$

D. $\frac{63}{65}$

E. $\frac{99}{65}$

Mark only one oval.

- A
- B
- C
- D
- E

44. **38** *

The expression $\log_3(63) + \log_3(5) - \log_3(35)$ equals which of the following?

A. 2

B. 3

C. 6

D. $\log_3(33)$

E. $\log_3(56)$

Mark only one oval.

- A
- B
- C
- D
- E

45. **39** *

Which of the following complex numbers equals $(2 - i\sqrt{3})(\sqrt{2} + i)$?

A. $(2\sqrt{2} + \sqrt{3}) + i(2 - \sqrt{6})$

B. $(2\sqrt{3} - \sqrt{2}) + i(2 + \sqrt{6})$

C. $(2\sqrt{2} + \sqrt{6}) + i(2 - \sqrt{3})$

D. $(2 + \sqrt{2}) + i(2\sqrt{2} - \sqrt{6})$

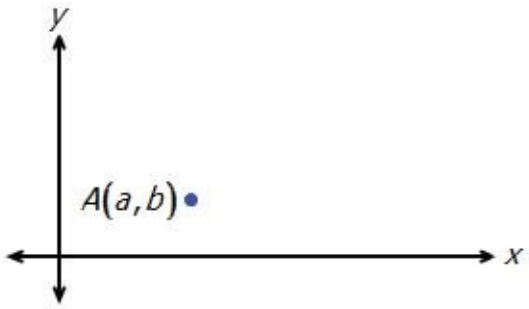
E. $(2 - \sqrt{3}) + i(2\sqrt{2} + \sqrt{3})$

Mark only one oval.

- ◯ A
- ◯ B
- ◯ C
- ◯ D
- ◯ E

46. **40** *

Point A in the xy-coordinate system is shown below. Given two other points $B\,(4a, b)$ and $C\,(2a, 5b)$, what is the area of triangle ABC in terms of a and b?



A. $\frac{7ab}{2}$

B. $\frac{9ab}{2}$

C. $\frac{15ab}{2}$

D. $4ab$

E. $6ab$

Mark only one oval.

- A
- B
- C
- D
- E

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