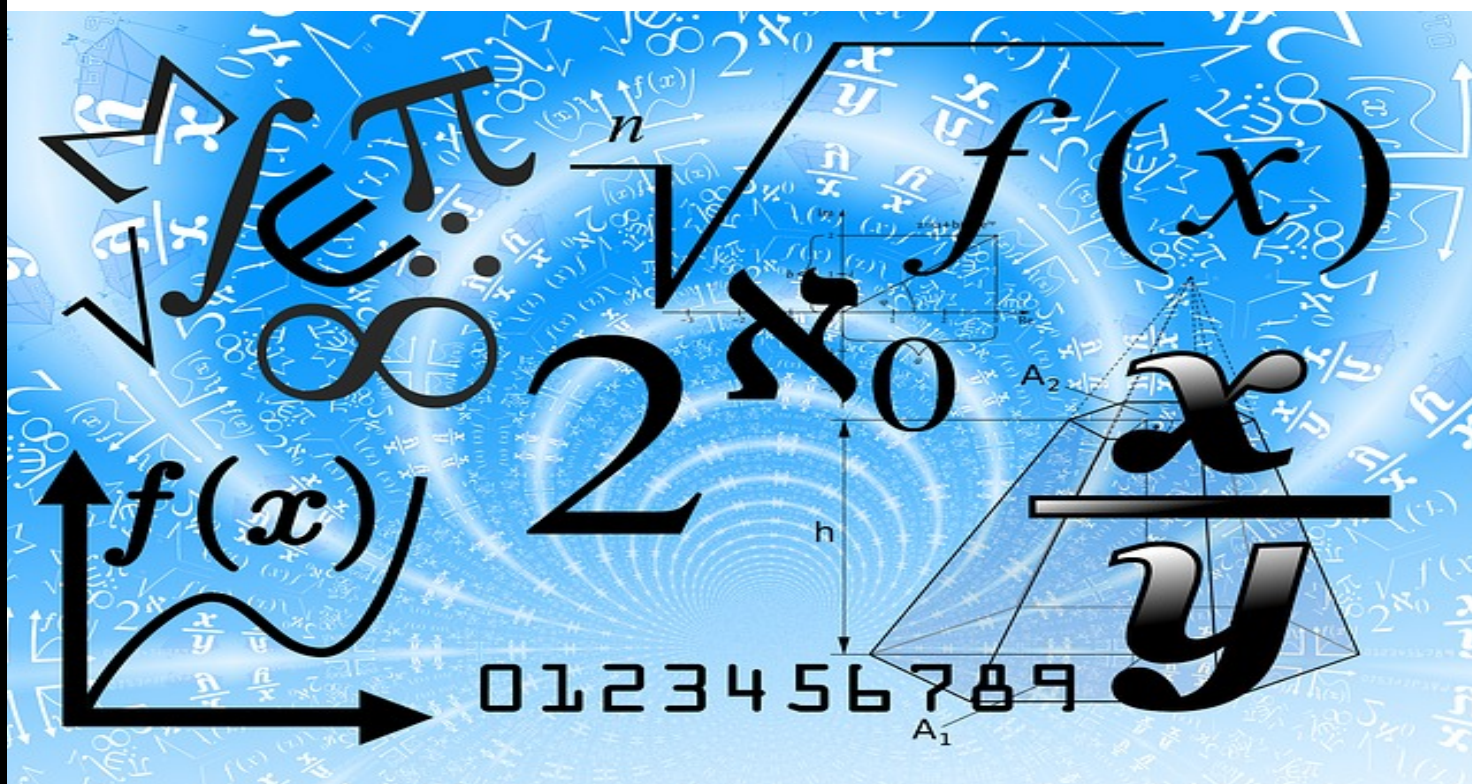


# THE VIRTUAL MEET EXPERIENCE

2022-2023

## HS VIRTUAL CHALLENGE MEET #4

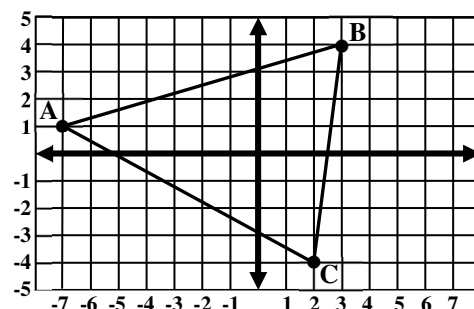


# MATHEMATICS

DO NOT OPEN TEST UNTIL TOLD TO DO SO

*The Virtual Challenge Meets™*

1. Carla treated her friend to lunch at Joey's in Wichita Falls. They ordered the #14 special plate for \$8.95, the #11 special plate for \$8.75, guacamole to share for \$4.65, and two drinks for \$2.25 each. The tax rate in Wichita Falls is 8.125%, Carla tipped 20% on the pre-tax total, and she paid with a \$50 bill. How much change did she receive?
- (A) \$15.16      (B) \$15.29      (C) \$17.14      (D) \$15.60      (E) \$15.48
2. Consider the line segment with endpoints  $A(-5, 3)$  and  $B(6, 1)$ . Which of the following is an equation of the perpendicular bisector of  $\overline{AB}$ ?
- (A)  $2x + 11y = 21$    (B)  $22x - 4y = 3$    (C)  $2x + 11y = 23$    (D)  $22x - 4y = 19$    (E)  $2x - 11y = 23$
3. Lynn pilots her plane for 320 miles against the wind in 2 hours. The same flight would have taken 1 hr 36 min if she flew with a tailwind of the same speed. Find the speed of the plane in still air.
- (A) 180 mph      (B) 162 mph      (C) 198 mph      (D) 150 mph      (E) 172 mph
4. Ilia has a large irrigation water tank in the shape of an inverted cone with a base diameter of 6 ft and a height of 10 ft. If she started with the tank completely empty, and added 400 gallons of water, what was the depth of the water in the tank? (nearest inch)
- (A) 6 ft 8 in      (B) 7 ft 2 in      (C) 7 ft 11 in      (D) 8 ft 3 in      (E) 8 ft 9 in
5. Heather is solving the quadratic equation  $x^2 - 5x + 8 = 0$  by completing the square. Her second step is  $x^2 - 5x + c = -8 + c$ . The value of  $c$  is \_\_\_\_\_.
- (A) 25      (B) 16      (C)  $\frac{25}{4}$       (D)  $\frac{25}{2}$       (E)  $\frac{16}{25}$
6. The perimeter of triangle ABC show on the right is \_\_\_\_\_. (nearest tenth)
- (A) 27.2      (B) 27.5      (C) 27.9      (D) 28.3      (E) 28.8
7. The area of triangle ABC is \_\_\_\_\_. (nearest tenth)
- (A) 38.5      (B) 37.2      (C) 35.5      (D) 40      (E) 38
8. The coordinates of the midpoint of  $\overline{BC}$  are  $(a,b)$ .  $a + b =$  \_\_\_\_\_. (nearest tenth)
- (A) 2      (B) 2.1      (C) 2.5      (D) 2.8      (E) 3
9. Find the number that is  $\frac{1}{3}$  of the way from  $-4\frac{7}{9}$  and  $2\frac{1}{2}$ .
- (A)  $-\frac{127}{27}$       (B)  $-\frac{71}{54}$       (C)  $-\frac{127}{54}$       (D)  $-\frac{16}{27}$       (E)  $-\frac{16}{54}$



Problems 6, 7, 8

10. If  $f(x) = x + 1$  and  $g(x) = \frac{3}{x}$ , find  $g(f^{-1}(x))$ .

- (A)  $\frac{x-1}{x+3}$       (B)  $\frac{3}{x-1}$       (C)  $\frac{3}{x+3}$       (D)  $\frac{x+3}{x-1}$       (E)  $\frac{x+3}{x}$

11. A triangle has a perimeter of 237 m and an area of  $171 \text{ m}^2$ . A similar triangle has a perimeter of 79 m. The area of the similar triangle is \_\_\_\_\_  $\text{m}^2$ .

- (A) 38      (B) 19      (C) 110      (D) 114      (E) 57

Problems 12-13. The base of a pyramid is square with each side equal to 20 cm. The slant height is 18 cm.

12. The lateral surface area of the pyramid is \_\_\_\_\_  $\text{cm}^2$ . (nearest whole number)

- (A) 360      (B) 748      (C) 352      (D) 374      (E) 720

13. The volume of the pyramid is \_\_\_\_\_  $\text{cm}^3$ . (nearest whole number)

- (A) 1729      (B) 1200      (C) 1248      (D) 1996      (E) 1800

14. There are two possible triangles ABC such that  $m\angle A = 30^\circ$ ,  $AB = 12 \text{ cm}$  and  $BC = 8 \text{ cm}$ . The area of the smaller triangle is \_\_\_\_\_  $\text{cm}^2$ . (nearest tenth)

- (A) 15.3      (B) 55.4      (C) 13.9      (D) 41.6      (E) 47.1

15. A circle with a radius of 24 in has a center at the point Q. How far from Q is a chord of the circle that has a length of 10 in? (nearest tenth inch)

- (A) 10.9 in      (B) 26.5 in      (C) 23.5 in      (D) 13.3 in      (E) 21.8 in

16. Four workers can paint a wall in 20 minutes. How long will it take six workers at the same individual rate to paint a wall three times as long and three times as high?

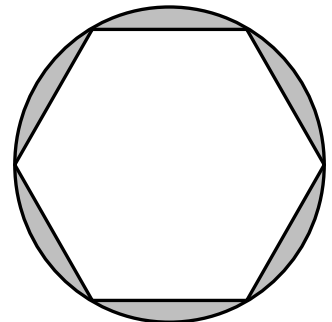
- (A) 40 min      (B) 60 min      (C) 120 min      (D) 90 min      (E) 180 min

17. Ashlee's SUV gets 18 miles per gallon in city driving and 24 miles per gallon in highway driving. She drove the SUV 465 miles on 23 gallons of gas. How many miles were driven on the highway?

- (A) 260      (B) 204      (C) 205      (D) 261      (E) 212

18. A dart lands randomly on the figure composed of a regular hexagon inscribed in a circle as shown. What are the odds that it lands in the shaded region? (nearest thousandth)

- (A) 0.173      (B) 0.346      (C) 0.209      (D) 0.413      (E) 0.827



19. The area of a  $30^\circ$ -  $60^\circ$ -  $90^\circ$  triangle is  $432 \text{ in}^2$ . The length of the shorter leg is \_\_\_\_\_in. (nearest tenth)

- (A) 22.3                      (B) 24.7                      (C) 23.1                      (D) 21.8                      (E) 22.0

20. The diameter of each tire on my car is 27 inches. If I drive at a constant speed of 100 kph for 10 minutes, how many revolutions will each tire make during this 10-minute period? (nearest whole number)

- (A) 76349                      (B) 8483                      (C) 25450                      (D) 7736                      (E) 8231

21. Find the eccentricity of the ellipse  $x^2 + 4y^2 - 6x - 16y - 11 = 0$ . (nearest hundredth)

- (A) 0.71                      (B) 0.87                      (C) 0.35                      (D) 0.43                      (E) 0.82

22. If  $f(x) = \sqrt{x}$ , then  $\frac{f(x+h) - f(x)}{h} = \underline{\hspace{2cm}}$ .

- (A)  $\frac{1}{\sqrt{x+h} - \sqrt{x}}$     (B)  $\frac{h}{2\sqrt{x}}$                       (C)  $\frac{1}{\sqrt{x+h} + \sqrt{x}}$     (D)  $\frac{1}{2\sqrt{x}}$                       (E)  $\frac{-h}{\sqrt{x+h} - \sqrt{x}}$

23. If  $\log 9 = P$  and  $\log 5 = Q$ , then  $\log 0.6 = \underline{\hspace{2cm}}$ .

- (A)  $\frac{PQ}{2}$                       (B)  $2PQ$                       (C)  $\frac{\sqrt{P}}{Q}$                       (D)  $\log \frac{\sqrt{P}}{Q}$                       (E)  $\frac{P-2Q}{2}$

24. Connie is one of the children in a large family. She has twice as many brothers as she has sisters. Another child, Paul, has the same number of brothers as he has sisters. How many children are in the family?

- (A) 4                      (B) 5                      (C) 6                      (D) 7                      (E) 8

25.  $\sum_{k=0}^{12} 2k(k+3) = \underline{\hspace{2cm}}$ .

- (A) 1768                      (B) 884                      (C) 2184                      (D) 1807                      (E) 1416

26.  $\frac{1 - \cos 2\theta}{\sin 2\theta} = \underline{\hspace{2cm}}$ .

- (A)  $\tan 2\theta$                       (B)  $\csc 2\theta$                       (C)  $\sec \theta$                       (D)  $\tan \theta$                       (E)  $\cos \theta$

27. If  $\sec \theta = -3$  and  $\sin \theta > 0$ , then  $\tan \theta = \underline{\hspace{2cm}}$ .

- (A) -2                      (B)  $2\sqrt{2}$                       (C)  $\frac{8}{3}$                       (D)  $-2\sqrt{2}$                       (E) 2

28. An investor has \$12000 to split between two bonds that pay 10.5% and 12% simple interest. The investor wants annual interest of \$1400. What is the most that can be invested in the 10.5% bond?

- (A) \$1444.00                      (B) \$9333.33                      (C) \$2666.66                      (D) \$867.00                      (E) \$8667.00

29. In how many ways can five couples be seated at a round table if the men and women want to sit alternately? Assume couples do not need to sit together.

- (A) 144 (B) 1440 (C) 288 (D) 576 (E) 2880

30. If  $x - y = 7$  and  $xy = 3$ , then  $x^3 - y^3 =$  \_\_\_\_\_.

- (A) 385 (B) 427 (C) 343 (D) 112 (E) 406

31. If  $(3 - 5i)^2 - (2 + 5i)^3 = a + bi$ , then  $a + b =$  \_\_\_\_\_.

- (A) -47 (B) 161 (C) -253 (D) -45 (E) 126

32. Multiply  $\left(5\text{cis}\frac{\pi}{6}\right)\left(\sqrt{2}\text{cis}\frac{\pi}{2}\right)$  and express the result in rectangular form.

- (A)  $\frac{5\sqrt{2}}{2} - \frac{5\sqrt{6}}{2}i$  (B)  $\frac{5\sqrt{2}}{2} - \frac{5\sqrt{3}}{2}i$  (C)  $-\frac{5\sqrt{2}}{2} + \frac{5\sqrt{6}}{2}i$  (D)  $\frac{5\sqrt{2}}{2} - \frac{5\sqrt{2}}{2}i$  (E)  $\frac{5\sqrt{2}}{2} + \frac{5\sqrt{2}}{2}i$

33. The point  $(-8, b)$  lies on the curve defined by the parametric equations  $\begin{matrix} x = 6 - t \\ y = t + 9 \end{matrix}$ .  $b =$  \_\_\_\_\_.

- (A) 23 (B) -5 (C) 14 (D) 5 (E) -9

34. Find the total number of diagonals that can be drawn from the vertices of a regular dodecagon.

- (A) 78 (B) 66 (C) 72 (D) 36 (E) 54

35. Find the distance from the point  $(4, -1, 2)$  to the line  $2x - 2y + z = 21$ .

- (A) 1 (B) 6 (C) 2 (D) 3 (E)  $\frac{\sqrt{3}}{3}$

36. Classify the graph of  $3x^2 + 8xy + 4y^2 - 7 = 0$ .

- (A) Hyperbola (B) Cartoid (C) Parabola (D) Ellipse (E) Circle

37. Due to improved conservation efforts, the elephant population in South Africa's Kruger National Park has increased from 1300 in 1995 to 8870 in 2022. Assume that the population is growing exponentially and that the habitat can accommodate the continued growth. Calculate the expected elephant population in 2030.

- (A) 14728 (B) 15209 (C) 15669 (D) 15831 (E) 16207

38. Two of the zeros of  $f(x) = x^4 + bx^3 + cx^2 + dx - 5$  are  $1 + \sqrt{2}$  and  $2 + i$ .  $f(-1) =$  \_\_\_\_\_.

- (A) 15 (B) 20 (C) 22 (D) 25 (E) 30

39. Assume that the earth rotates about its axis every 23 hours, 56 minutes and 4 seconds. Find the linear speed of a person sitting in a chair at  $10^\circ$  north latitude. The radius of the earth is 3960 miles. (nearest whole number)

(A) 1036 mph    (B) 968 mph    (C) 1016 mph    (D) 1040 mph    (E) 1024 mph

40. Find the acute angle between the line  $3y = x - 7$  and  $2y = 3 - 4x$ . (nearest tenth)

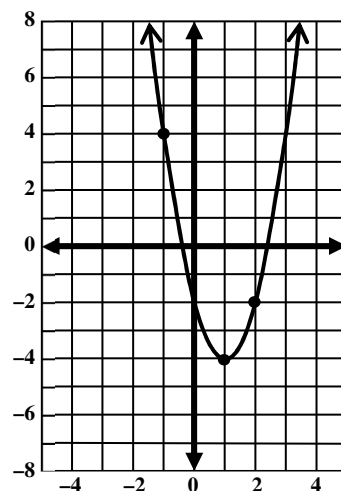
(A)  $81.9^\circ$     (B)  $79.8^\circ$     (C)  $80.7^\circ$     (D)  $81.2^\circ$     (E)  $82.1^\circ$

41. Find the length of the latus rectum of the parabola shown on the right.

(A)  $\frac{1}{16}$     (B)  $\frac{1}{8}$     (C)  $\frac{1}{4}$     (D)  $\frac{1}{2}$     (E) 1

42. The graph shown on the right is the graph of  $y = f'(x)$ . If  $f(3) = 0$ , then  $f(-3) = \underline{\hspace{1cm}}$ .

(A) 0    (B) -18    (C) -22    (D) -24    (E) -30



Problems 41,42

43. Find the angle between the vectors  $v_1 = \langle -3, 2 \rangle$  and  $v_2 = \langle 5, -11 \rangle$ . (nearest degree)

(A)  $32^\circ$     (B)  $122^\circ$     (C)  $77^\circ$     (D)  $148^\circ$     (E)  $103^\circ$

44. Evaluate  $\lim_{\theta \rightarrow 0} \frac{\sin(2\theta)}{5\theta}$

(A)  $\frac{1}{5}$     (B)  $\frac{2}{5}$     (C) 1    (D)  $\frac{5}{2}$     (E) does not exist

45. Given:  $x^2 + y^2 = 64$ , find the value of  $\frac{d^2x}{dy^2}$  at the point  $(2, -2\sqrt{15})$ . (nearest hundredth)

(A) 0.11    (B) -0.14    (C) 0.14    (D) -0.12    (E) -0.18

46.  $\frac{d}{d\theta} \sin(3\theta^2) = \underline{\hspace{1cm}}$ .

(A)  $-3\cos(6\theta)$     (B)  $6\theta\cos(3\theta^2)$     (C)  $\cos(6\theta)$     (D)  $3\theta\cos(3\theta^2)$     (E)  $-3\theta\cos(3\theta^2)$

47-48. Consider the region bounded by the graphs of  $y_1 = 0.5x^2 - 3$  and  $y_2 = x + 1$ .

47. Find the area of the bounded region. (nearest tenth)

- (A) 18.0                      (B) 16.3                      (C) 16.7                      (D) 17.2                      (E) 17.7

48. Find the volume of the solid generated by revolving the specified region about the line  $y = -3$ . (nearest whole number)

- (A) 115                      (B) 82                      (C) 259                      (D) 362                      (E) 278

49. A Ferris wheel is built so that the bottom is at ground level. It has a radius of 10 m is rotating at a rate of one revolution every 2 minutes. When a rider is 18 m above the ground on his way up, he is rising at a rate of \_\_\_\_\_ m/min.

- (A)  $20.5\pi$                       (B)  $16\pi$                       (C)  $15\pi$                       (D)  $6\pi$                       (E)  $8\pi$

50. If  $P_4(x)$  is the fourth degree Maclaurin polynomial for  $f(x) = \cos x$ , then  $f\left(\frac{\pi}{3}\right) - P_4\left(\frac{\pi}{3}\right) =$  \_\_\_\_\_. (nearest ten-thousandth)

- (A) -0.0016                      (B) -0.0018                      (C) -0.0019                      (D) -0.0022                      (E) -0.0025

51. When evaluating  $\int \frac{x}{\sqrt{1-4x^2}} dx$  using  $u$ -substitution, the best choice for  $u$  is \_\_\_\_\_.

- (A)  $\sqrt{1-4x^2}$                       (B)  $4x^2$                       (C)  $1-4x^2$                       (D)  $x$                       (E)  $x^2$

Game	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Points	49	55	73	52	68	64	35	47	37	45	27	42	17	52

Use the table above for problems 52, 53 and 54.

The table shows the season scores for 2022 5A Football State Champion Team from Aledo.

52. What is the difference in the mean score and the median score, a positive number. (nearest tenth)

- (A) 1.7                      (B) 0.2                      (C) 1.3                      (D) 1.1                      (E) 0.6

53. Find the interquartile range of the scores.

- (A) 20                      (B) 18                      (C) 11                      (D) 7                      (E) 56

54. Calculate the standard deviation of the scores for Aledo's 2022 season. (nearest tenth)

- (A) 14.8                      (B) 15.4                      (C) 15.0                      (D) 14.9                      (E) 15.2

55. Over time, Cyd establishes that her commute times are normally distributed with a mean of 32 minutes and a standard deviation of 6 minutes. What is the probability that on a single day her commute will take longer than 40 minutes?

- (A) 0.081                      (B) 0.171                      (C) 0.041                      (D) 0.091                      (E) 0.909

56. Three cards are dealt from a standard 52-card deck. What is the probability that the first is an ace, the second is a spade, and the third is black?

- (A)  $\frac{25}{2652}$                       (B)  $\frac{1}{104}$                       (C)  $\frac{613}{66300}$                       (D)  $\frac{469}{66300}$                       (E)  $\frac{13}{1275}$

57. A fair coin is tossed six times. What is the probability of tossing at least four consecutive heads?

- (A)  $\frac{11}{32}$                       (B)  $\frac{3}{32}$                       (C)  $\frac{11}{21}$                       (D)  $\frac{15}{64}$                       (E)  $\frac{1}{8}$

58. Five professional drivers drove a course with speeds of 90 mph, 102 mph, 98 mph, 110 mph and 103 mph. The average speed for all of the trips was \_\_\_\_\_ mph. (nearest tenth)

- (A) 100.6                      (B) 100.4                      (C) 100.2                      (D) 100.0                      (E) 100.8

59. In 2022, there were 44 states that had some form of casino gambling, 45 states that sold lottery tickets of some kind, and 43 states that had both casinos and lottery. How many states did not have either?

- (A) 1                      (B) 2                      (C) 3                      (D) 4                      (E) 5

60. A survey asked a random sample of 800 holiday grocery shoppers whether they would cut their grocery budgets in January. Of the sample, 675 said “yes.” Construct a 95% confidence interval for the portion of the city’s grocery shoppers who would say “yes.” if asked this question. (nearest ten-thousandth)

- (A) (.8048,.8813) (B) (.8186,.8689) (C) (.8116,.8758) (D) (.8142,.8693) (E) (.8205,.8536)



**2022-2023**  
**Virtual Challenge Meet #4**  
**Mathematics – Student Answer Sheet**

Contestant Name \_\_\_\_\_ Grade \_\_\_\_\_

Score 1: _____	Score 2: _____
Score 3: _____	<b>Final Score:</b> _____

1. \_\_\_\_\_
2. \_\_\_\_\_
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**2022-2023**  
**VIRTUAL CHALLENGE MEET #4**  
**MATHEMATICS - KEY**

<b>1. D</b>	<b>21. B</b>	<b>41. D</b>
<b>2. B</b>	<b>22. C</b>	<b>42. D</b>
<b>3. A</b>	<b>23. E</b>	<b>43. D</b>
<b>4. D</b>	<b>24. D</b>	<b>44. B</b>
<b>5. C</b>	<b>25. A</b>	<b>45. C</b>
<b>6. E</b>	<b>26. D</b>	<b>46. B</b>
<b>7. A</b>	<b>27. D</b>	<b>47. A</b>
<b>8. C</b>	<b>28. C</b>	<b>48. D</b>
<b>9. C</b>	<b>29. E</b>	<b>49. D</b>
<b>10. B</b>	<b>30. E</b>	<b>50. B</b>
<b>11. B</b>	<b>31. B</b>	<b>51. C</b>
<b>12. E</b>	<b>32. C</b>	<b>52. E</b>
<b>13. D</b>	<b>33. A</b>	<b>53. B</b>
<b>14. A</b>	<b>34. E</b>	<b>54. D</b>
<b>15. C</b>	<b>35. D</b>	<b>55. D</b>
<b>16. C</b>	<b>36. A</b>	<b>56. A</b>
<b>17. B</b>	<b>37. C</b>	<b>57. B</b>
<b>18. C</b>	<b>38. B</b>	<b>58. C</b>
<b>19. A</b>	<b>39. E</b>	<b>59. D</b>
<b>20. D</b>	<b>40. A</b>	<b>60. B</b>

Name \_\_\_\_\_ Grade Level \_\_\_\_\_

Tie Breaker: Points scored on Stated and Geometry Problems

+ \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

5x (Last Problem Attempted) + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

7x (Number Incorrect) - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

2x (Number Incorrect SDs) - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

TOTAL SCORE \_\_\_\_\_

# Calculator Applications

2022-2023

HS Virtual Challenge Meet #4

## DO NOT OPEN THE TEST UNTIL INSTRUCTED TO BEGIN

I. Calculator Applications rules and scoring—See UIL Constitution

II. How to write the answers

A. For all problems except stated problems as noted below—write three significant digits.

1. Examples (\* means correct but not recommended)

Correct: 12.3, 123, 123.\*, 1.23x10\*, 1.23x10<sup>0\*</sup> 1.23x10<sup>1</sup>,  
1.23x10<sup>01</sup>, .0190, 0.0190, 1.90x10<sup>-2</sup>

Incorrect: 12.30, 123.0, 1.23(10)<sup>2</sup>, 1.23·10<sup>2</sup>, 1.230x10<sup>2</sup>,  
1.23x10<sup>2</sup>, 0.19, 1.9x10<sup>-2</sup>, 19.0x10<sup>-3</sup>, 1.90E-02

2. Plus or minus one digit error in the third significant digit is permitted.

B. For stated problems

1. Except for integer, dollar sign, and significant digit problems, as detailed below, answers to stated problems should be written with three significant digits.

2. Integer problems are indicated by (integer) in the answer blank. Integer problems answers must be exact, no plus or minus one digit, no decimal point or scientific notation.

3. Dollar sign (\$) problems should be answered to the exact cent, but plus or minus one cent error is permitted. The decimal point and cents are required for exact-dollar answers.

4. Significant digit problems are indicated by underlined numbers and by (SD) in the answer blank. See the UIL Constitution and Contest Manual for details.

III. Some symbols used on the test

A. Angle measure: rad means radians; deg means degrees.

B. Inverse trigonometric functions: arcsin for inverse sine, etc.

C. Special numbers:  $\pi$  for 3.14159 ...; e for 2.71828 ...

D. Logarithms: Log means common (base 10); Ln means natural (base e); exp(u) means e<sup>u</sup>.

NEVADA

SPILLWAY

Tunnel plug

PLAN

23X-1.  $-7.66 + 1.28 - 9.17$  ----- 1=\_\_\_\_\_

23X-2.  $(0.85 \times 5.34) - (1.88 - 4.51)$  ----- 2=\_\_\_\_\_

23X-3.  $(-0.127 - 0.0937 - 0.127 + 0.0135) \times (-0.603)$  ----- 3=\_\_\_\_\_

23X-4.  $\{(31.3 - 27.1 + 236)(0.00909)(-0.0991)\} - 0.0733$  ----- 4=\_\_\_\_\_

23X-5.  $1.64 + 0.897 - \pi + \frac{(-59000 + 16900)}{(-307)(210)}$  ----- 5=\_\_\_\_\_

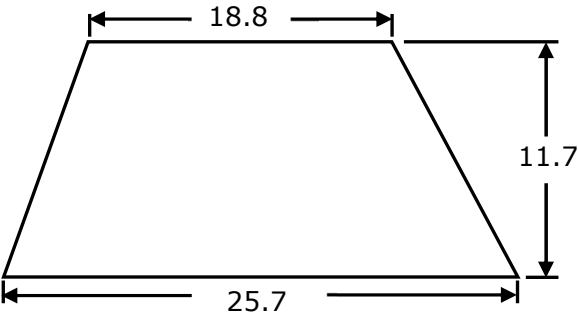
23X-6. Cindy purchased \$5.17 worth of smoked turkey at \$8.50 per pound.  
How much did she buy?----- 6=\_\_\_\_\_oz

23X-7. What is the reciprocal of the product of 17.5 and 43.6? ----- 7=\_\_\_\_\_

23X-8. How many centimeters are in 2 miles?----- 8=\_\_\_\_\_

23X-9.

TRAPEZOID

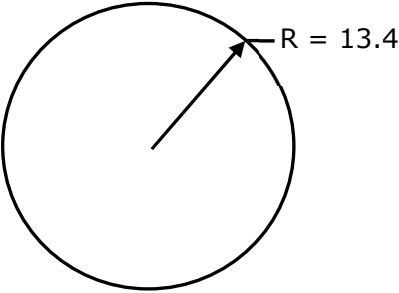


Area = ?

23X-9 = \_\_\_\_\_

23X-10.

CIRCLE



Circumference = ?

23X-10 = \_\_\_\_\_

23X-11.  $\frac{(7.62 + 2.53)(1.34 - 1.18 + 2.77)}{(\pi)(-1.69) - 69.8}$  ----- 11=

23X-12.  $\frac{(0.937 + 0.68 - 1.77)(0.625)(-0.592)}{(3.91 - 1.68)(0.365 - 0.576)}$  ----- 12=

23X-13.  $\frac{(-0.0823)(812 - 668)\{0.00141 - (-0.0903)(-0.0147)\}}{(0.0302 + 0.0217)(-0.0665 - 0.284)}$  ----- 13=

23X-14.  $\frac{(50.4 + 46.2)(\pi + 22.5)(21.1 - 29.8)}{(-63.3 + 27)(29.4)\{(-90.6)/(-13.8)\}}$  ----- 14=

23X-15.  $\frac{(42500 + 20800 - 33100)(0.164 - 0.0336 - 0.0347)}{(-0.04)(0.0332)(-0.0901)(6.72 + 2.12 + 4.69)}$  ----- 15=

23X-16. If a pine tree needs 140 ft<sup>2</sup>, how many trees can be planted in a 480-acre forest? ----- 16=

23X-17. Erica invests \$15,000 in an account that earns 6.25% annual interest compounded monthly. How much is her account worth after 6 years?----- 17=\$

23X-18. What number when added to the numerator and denominator of  $\frac{5}{8}$  yields 0.803? ----- 18=

<div data-bbox="77 1255 191 1285" data-label="Text"><p>23X-19.</p></div> <div data-bbox="318 1289 571 1318" data-label="Text"><p>RIGHT TRIANGLE</p></div> <div data-bbox="142 1352 685 1621" data-label="Figure"> <p>A right triangle with a vertical leg of length 12.6. The angle between the vertical leg and the hypotenuse is labeled 0.48 rad. A right angle symbol is at the vertex where the vertical leg meets the horizontal leg.</p> </div> <div data-bbox="380 1713 506 1743" data-label="Text"><p>Area = ?</p></div> <div data-bbox="77 1892 477 1921" data-label="Text"><p>23X-19 =</p></div>	<div data-bbox="841 1255 954 1285" data-label="Text"><p>23X-20.</p></div> <div data-bbox="1068 1289 1321 1318" data-label="Text"><p>RIGHT TRIANGLE</p></div> <div data-bbox="899 1381 1477 1684" data-label="Figure"> <p>A right triangle with a vertical leg of length 0.613. The angle between the horizontal leg and the hypotenuse is labeled 37°. The hypotenuse is labeled with a question mark. A right angle symbol is at the vertex where the vertical leg meets the horizontal leg.</p> </div> <div data-bbox="841 1892 1240 1921" data-label="Text"><p>23X-20 =</p></div>
---	--

23X-21.  $\left[\frac{(0.279)(0.788)}{4.16} + 0.0127\right]^2 + \sqrt{1.65 \times 10^{-5}}$  ----- 21=\_\_\_\_\_

23X-22.  $\left[\frac{\sqrt{0.954 - 0.874}}{-4.19} + \frac{(-0.00719)}{0.23}\right]^2$  ----- 22=\_\_\_\_\_

23X-23.  $\left[\frac{1.34 + 0.815 + \sqrt{0.547/0.448}}{-25.9 + 11.8}\right]^2$  ----- 23=\_\_\_\_\_

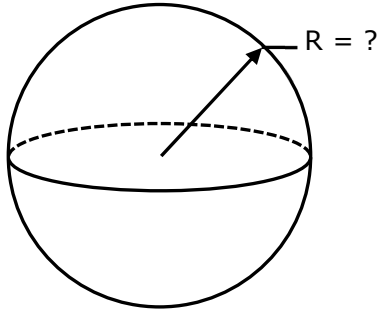
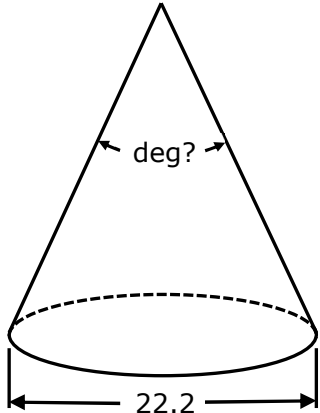
23X-24.  $\frac{\sqrt{6.51 + 1.87 + (74.9)/(9.37)}}{0.684 + 0.31}$  ----- 24=\_\_\_\_\_

23X-25.  $[-72.9 + \sqrt{1270}]^2 \times [246 + 719]^2 \times \sqrt{32.5/69.1}$  ----- 25=\_\_\_\_\_

23X-26. On his 20-min time trial in September, Galen ran 4.275 miles. On his 20-min time trial in October, Galen ran 4.525 miles. Find the percent increase in his distance covered?----- 26=\_\_\_\_\_%(SD)

23X-27. Highway center stripes are 8 in wide, 10 ft long and 30 ft apart. A gallon of paint covers 275 ft². How many gallons are needed to paint the center stripes of a 60-mile stretch of highway?----- 27=\_\_\_\_\_gal

23X-28. A population of ants doubles every 24 days. If the initial count was 2000 ants, how long will it take the population to reach 2,000,000?----- 28=\_\_\_\_\_days

<p>23X-29.</p> <p style="text-align: center;">SPHERE</p> <p style="text-align: center;">Volume = 733</p>  <p>23X-29 = _____</p>	<p>23X-30.</p> <p style="text-align: center;">CONE</p> <p style="text-align: center;">Volume = 3900</p>  <p>23X-30 = _____</p>
--	---

23X-31.  $\left[\frac{-18.3}{-48 + 41.6} + \pi\right] \times \left\{249 + (-18)^2 - \sqrt{1.11 \times 10^5}\right\}$  ----- 31=\_\_\_\_\_

23X-32.  $\sqrt{\frac{9.54}{\sqrt{99.7 + 94.4}}} \times \left[\frac{1}{(4.16 - 2.68)^2} + \frac{1}{(4.43 + \pi)^2}\right]$  ----- 32=\_\_\_\_\_

23X-33.  $\frac{(9.00 \times 10^5)^2 (8.38 \times 10^{-13} + 2.80 \times 10^{-13})}{19.5 + (-0.224)(-115)} + \frac{1}{\frac{1}{0.00269} + \frac{1}{(-0.0167)}}$  33=\_\_\_\_\_

23X-34.  $\frac{[(248 - 240)(0.673/0.686)]^{1/2}}{(0.86)^2 + (0.401 + 0.703)^2 + 0.688}$  ----- 34=\_\_\_\_\_

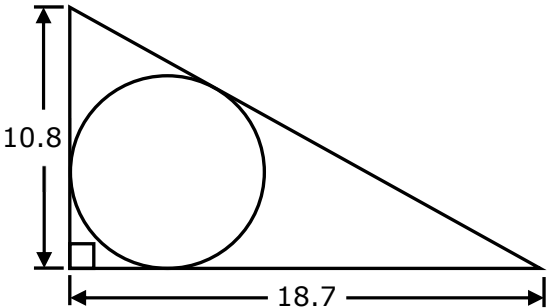
23X-35.  $\frac{\left[\frac{-5.08 \times 10^{-5}}{765}\right]^2 + \sqrt{\frac{(0.194)(0.717)}{(2.18 \times 10^{28})}} + (1.31 \times 10^{-14})}{0.281 + \sqrt{(-0.812)(-0.966)}}$  ----- 35=\_\_\_\_\_

23X-36. A painter needs 14 hours to paint an apartment. His assistant needs 18 hours to paint an apartment. If they work together, how long would it take them to paint 12 apartments? ----- 36=\_\_\_\_\_ hr

23X-37. If a person is on the top of a 120-ft-tall tower next to the ocean, what is the distance to the horizon?----- 37=\_\_\_\_\_ mi

23X-38. The graphs of  $y_1 = -2x^2 - 4x + 8$  and  $y_2 = 0.75x^2 + x - 4$  intersect at points A and B. Find the length of the segment  $\overline{AB}$ . ----- 38=\_\_\_\_\_

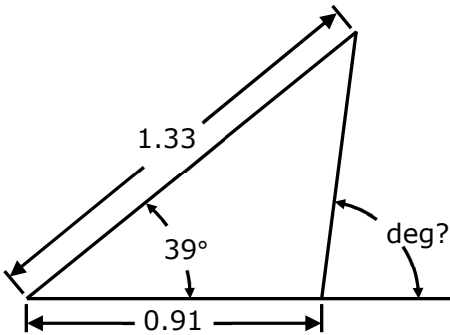
23X-39. RIGHT TRIANGLE AND CIRCLE



Area of Circle = ?

23X-39 = \_\_\_\_\_

23X-40. SCALENE TRIANGLE



23X-40 = \_\_\_\_\_

23X-41.
$$\frac{10^{-(2.3 - 2.92)}}{-9.33 \times 10^7 + 9.21 \times 10^7}$$
-----
41=

23X-42.
$$\frac{(-5.95 \times 10^{-4})}{(-2.06 \times 10^{-4})} \left[ 1 - e^{-(0.628)(0.964)} \right]$$
-----
42=

23X-43.
$$-0.389 + (0.955) \ln(0.874 - 0.701)$$
-----
43=

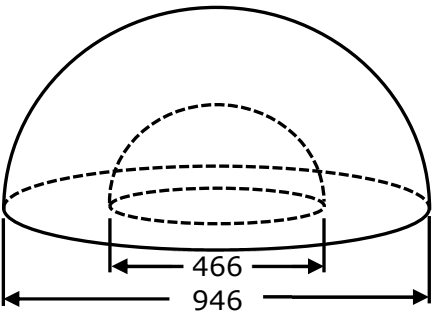
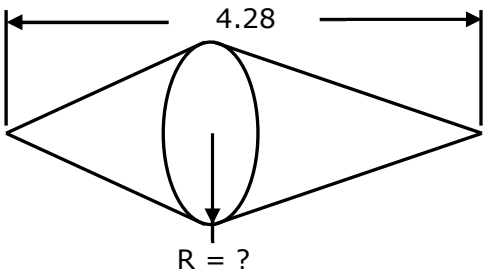
23X-44.
$$(800 + 1400)^{-(0.961 + 0.416)}$$
-----
44=

23X-45.
(deg)
$$\frac{\cos\{(79.5^\circ)/(7.2)\}}{\sin\{109^\circ - 155^\circ\}}$$
-----
45=

23X-46.
A 6-in-tall model of a pyramid weighs 1.46 lb. How much would a 200-ft-tall pyramid weigh if it is made of the same material? -----
46=
lb

23X-47.
Joe’s weight varies with the amount of time he exercises each week. Here is some data in the form (min, lb): (120, 170), (152, 165), (180, 158), (214, 154) and (238, 149). How many minutes should Joe exercise to reduce his weight to 136 lb? -----
47=
min

23X-48.
Solve for  $w$ ,  $w > 1$ , if  $4w^{-2} = 3w^{-3} + \ln w$ . -----
48=

<div> 23X-49. <div> HEMISPHERE WITH HEMISPHERE CAVITY </div>  <div> Total Surface Area = ? </div> </div> <div> 23X-49 = </div>	<div> 23X-50. <div> Cones </div> <div> Total Volume = 6.67 </div>  </div> <div> 23X-50 = </div>
---	---



23X-51.
$$\frac{(8.71 \times 10^5) 10^{-(1.41 - 0.901)}}{9.22 \times 10^5 + 2.92 \times 10^5}$$
-----
51=

23X-52.
$$\frac{(-56.7 - 29.5) e^{(0.257)(0.599)}}{e^{-(7.64 - 6.55)}}$$
-----
52=

23X-53.
$$\frac{(8.99 \times 10^{-4} + 0.00332) \operatorname{Log}\{1/48.1\}}{\operatorname{Log}\{(40.7)/(13.2 + 14.5)\}}$$
-----
53=

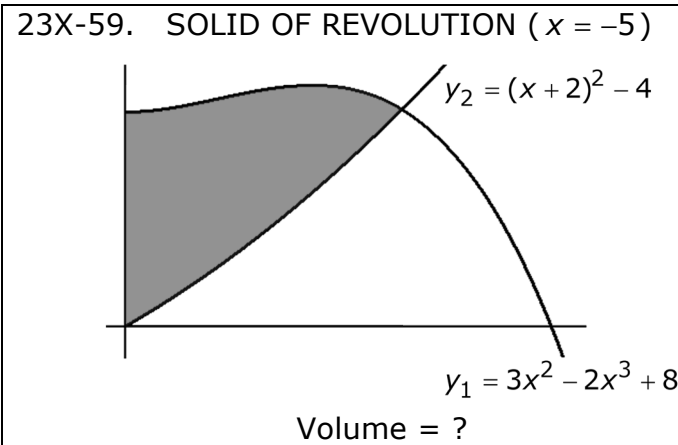
23X-54.
$$\frac{(-33.2 + 55.1)^{-0.88}}{(738)^{-(0.966 + 0.241)}}$$
-----
54=

23X-55.(rad)
$$\frac{\arcsin\{(608)(-828)/(-1.96 \times 10^6)\}}{23400 + (-850)(-220)}$$
-----
55=

23X-56. Consider the graph of  $3xy^3 - 6 = 0$ . Find the slope of the line tangent to the graph at  $x = 4$ . -----
56=

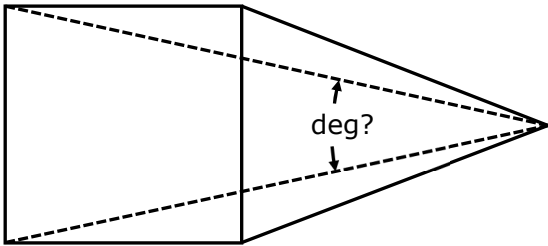
23X-57. A cube with an original volume of  $2744\text{ cm}^3$  began to expand at  $12\text{ cm}^3/\text{s}$ . At what rate is the surface area changing when each edge is  $18\text{ cm}$ ? -----
57=
cm<sup>2</sup>/s

23X-58. If  $A = \begin{bmatrix} 2 & 4 & 6 \\ 1 & 3 & 5 \\ -2 & 2 & -2 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 1 & 1 \\ 2 & 3 & 7 \\ -1 & -1 & 5 \end{bmatrix}$  then  $\det[A \cdot B] = ?$  -----
58=



23X-60. SQUARE AND ISOSCELES TRIANGLE

Perimeter of Square = Perimeter of Triangle



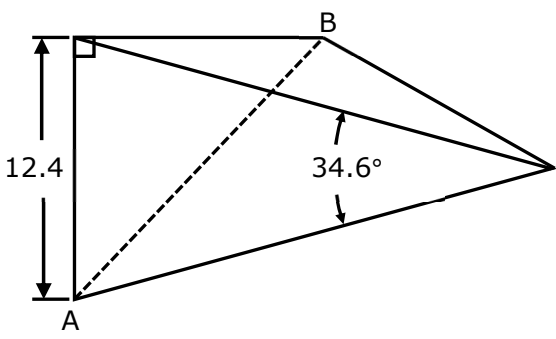
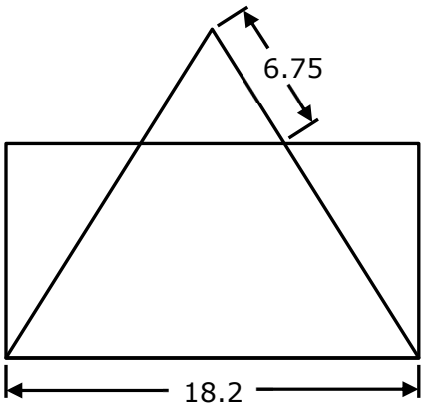
23X-59 =

23X-60 =

23X-61. Find the product of the slopes of the lines passing through the origin that are tangent to the circle  $(x + 6)^2 + (y - 8)^2 = 16$ . ----- 61=\_\_\_\_\_

23X-62. Evaluate  $1776^{-1918}$ . ----- 62=\_\_\_\_\_

23X-63. A runner accelerates from rest at  $3.6 \text{ ft/s}^2$  over a distance of 45 ft. Then he continues at the velocity attained for one mile. How long did it take the runner to run the mile? ----- 63=\_\_\_\_\_min

<p>23X-64.</p> <p style="text-align: center;">ISOSCELES TRIANGLES</p>  <p style="text-align: center;">AB = ?</p> <p>23X-64 = _____</p>	<p>23X-65.</p> <p style="text-align: center;">RECTANGLE AND EQUILATERAL TRIANGLE</p>  <p style="text-align: center;">Area of Rectangle = ?</p> <p>23X-65 = _____</p>
---	--

23X-66.  $\frac{\{e^{0.237} + e^{-0.237}\}^2}{\sqrt{e^{(79.9)(0.683)} \times (1/e^{(33.2)})}}$  ----- 66=\_\_\_\_\_

23X-67.  $(\text{rad}) \sin(5.8)\cos(5.25) - \cos(5.8)\sin(5.25)$  ----- 67=\_\_\_\_\_

23X-68.  $(\text{rad}) \frac{1}{(992)(0.111)} \ln\{(0.639) + (-0.362)\sin(3.95)\}$  ----- 68=\_\_\_\_\_

23X-69.  $(0.289) - \frac{(0.289)^2}{2} + \frac{(0.289)^3}{3} - \frac{(0.289)^4}{4}$  ----- 69=\_\_\_\_\_

23X-70.  $\frac{-6.25}{\sqrt{5.17}} \ln \left[ \frac{\sqrt{(\pi)^2 + (8.29)} + \sqrt{13}}{\sqrt{1.83 + (83.8)(0.00196)}} \right]$  ----- 70=\_\_\_\_\_

# 2022-2023

## HS Virtual Challenge Meet #4 – Key

23X-1	= -15.5 = $-1.55 \times 10^1$	23X-11	= -0.396 = $-3.96 \times 10^{-1}$	23X-21	= 0.00836 = $8.36 \times 10^{-3}$
23X-2	= 7.17 = $7.17 \times 10^0$	23X-12	= -0.120 = $-1.20 \times 10^{-1}$	23X-22	= 0.00975 = $9.75 \times 10^{-3}$
23X-3	= 0.202 = $2.02 \times 10^{-1}$	23X-13	= 0.0538 = $5.38 \times 10^{-2}$	23X-23	= 0.0535 = $5.35 \times 10^{-2}$
23X-4	= -0.290 = $-2.90 \times 10^{-1}$	23X-14	= 3.08 = $3.08 \times 10^0$	23X-24	= 4.07 = $4.07 \times 10^0$
23X-5	= 0.0484 = $4.84 \times 10^{-2}$	23X-15	= $1.79 \times 10^6$	23X-25	= $8.87 \times 10^8$
23X-6	= 9.73 = $9.73 \times 10^0$	23X-16	= 149,000 = $1.49 \times 10^5$	23X-26	= 5.8 (2SD) = $5.8 \times 10^0$
23X-7	= 0.00131 = $1.31 \times 10^{-3}$	23X-17	= \$21,803.64	23X-27	= 192 = $1.92 \times 10^2$
23X-8	= 322,000 = $3.22 \times 10^5$	23X-18	= 7.23 = $7.23 \times 10^0$	23X-28	= 239 = $2.39 \times 10^2$
23X-9	= 260 = $2.60 \times 10^2$	23X-19	= 152 = $1.52 \times 10^2$	23X-29	= 5.59 = $5.59 \times 10^0$
23X-10	= 84.2 = $8.42 \times 10^1$	23X-20	= 1.02 = $1.02 \times 10^0$	23X-30	= 40.3 = $4.03 \times 10^1$

# 2022-2023

## HS Virtual Challenge Meet #4 – Key

23X-31 = 1440 = $1.44 \times 10^3$	23X-41 = $-3.47 \times 10^{-6}$	23X-51 = 0.222 = $2.22 \times 10^{-1}$	23X-61 = 2.40 = $2.40 \times 10^0$
23X-32 = 0.392 = $3.92 \times 10^{-1}$	23X-42 = 1.31 = $1.31 \times 10^0$	23X-52 = -299 = $-2.99 \times 10^2$	23X-62 = $3.70 \times 10^{-6233}$
23X-33 = 0.0232 = $2.32 \times 10^{-2}$	23X-43 = -2.06 = $-2.06 \times 10^0$	23X-53 = -0.0425 = $-4.25 \times 10^{-2}$	23X-63 = 4.89 = $4.89 \times 10^0$
23X-34 = 1.06 = $1.06 \times 10^0$	23X-44 = $2.50 \times 10^{-5}$	23X-54 = 191 = $1.91 \times 10^2$	23X-64 = 16.5 = $1.65 \times 10^1$
23X-35 = $1.72 \times 10^{-14}$	23X-45 = -1.36 = $-1.36 \times 10^0$	23X-55 = $1.23 \times 10^{-6}$	23X-65 = 180 = $1.80 \times 10^2$
23X-36 = 94.5 = $9.45 \times 10^1$	23X-46 = $9.34 \times 10^7$	23X-56 = -0.0661 = $-6.61 \times 10^{-2}$	23X-66 = $9.67 \times 10^{-5}$
23X-37 = 13.4 = $1.34 \times 10^1$	23X-47 = 312 = $3.12 \times 10^2$	23X-57 = 2.67 = $2.67 \times 10^0$	23X-67 = 0.523 = $5.23 \times 10^{-1}$
23X-38 = 4.85 = $4.85 \times 10^0$	23X-48 = 1.93 = $1.93 \times 10^0$	23X-58 = -800 = $-8.00 \times 10^2$	23X-68 = -0.000949 = $-9.49 \times 10^{-4}$
23X-39 = 49.1 = $4.91 \times 10^1$	23X-49 = 2,280,000 = $2.28 \times 10^6$	23X-59 = 252 = $2.52 \times 10^2$	23X-69 = 0.254 = $2.54 \times 10^{-1}$
23X-40 = 81.6 = $8.16 \times 10^1$	23X-50 = 1.22 = $1.22 \times 10^0$	23X-60 = 23.4 = $2.34 \times 10^1$	23X-70 = -4.52 = $-4.52 \times 10^0$

# The Virtual Challenge Meets

## HS Number Sense Test • VCM #4 • 2022–2023

Contestant's Name \_\_\_\_\_

School \_\_\_\_\_

Contestant's Grade      9          10          11          12

Final \_\_\_\_\_

2<sup>nd</sup> \_\_\_\_\_

1<sup>st</sup> \_\_\_\_\_

Score    Initials

**Read directions carefully  
before beginning test**

**DO NOT UNFOLD THIS SHEET  
UNTIL TOLD TO BEGIN**

**Directions:** Do not turn this page until the proctor gives the signal to begin. This is a ten-minute test. There are 80 problems. Solve accurately and quickly as many as you can in the order in which they appear. ALL PROBLEMS ARE TO BE SOLVED MENTALLY. Make no calculations with paper and pencil. Write only the answer in the space provided at the end of each problem. Problems marked with an (\*) require approximate integral answers; any answer to a problem with an asterisk that is within five percent of the exact answer will be scored correct; all other problems require exact answers.

The person conducting this contest should explain these directions to the contestants.

**STOP – WAIT FOR SIGNAL!**

(1)  $2023 \times 8 =$  \_\_\_\_\_

(2)  $347 - 743 =$  \_\_\_\_\_

(3)  $0.875 =$  \_\_\_\_\_ (common fraction)

(4)  $16 \div 3\frac{2}{3} =$  \_\_\_\_\_ (improper fraction)

(5)  $20.23 + 202.3 + 2023 =$  \_\_\_\_\_ (decimal)

(6)  $12^1 + 9^2 - 11.5^0 =$  \_\_\_\_\_

(7)  $32^2 =$  \_\_\_\_\_

(8)  $17 \times 25 + 27 \times 25 =$  \_\_\_\_\_

(9)  $824 \div 4 \div 2 =$  \_\_\_\_\_

\*(10)  $13142 + (278 \times 283) =$  \_\_\_\_\_

(11)  $85 \times 85 =$  \_\_\_\_\_

(12) The LCM of 25 and 60 is \_\_\_\_\_

(13)  $37 \times 45 =$  \_\_\_\_\_

(14)  $1 + 2 + 3 + \dots + 59 =$  \_\_\_\_\_

(15) 5 square yards = \_\_\_\_\_ square feet

(16) 18% of 42 is 14% of \_\_\_\_\_

(17)  $(3^2 + 5 \times 7 - 11) \div 9$  has a remainder of \_\_\_\_\_

(18)  $39^2 - 26^2 = 5 \times$  \_\_\_\_\_

(19)  $(1 + 3 + 5 + 7 + 9 + \dots + 19) \div (1 + 3 + 5) =$   
\_\_\_\_\_ (mixed number)

\*(20)  $437124 \div 146 =$  \_\_\_\_\_

(21)  $3157 \div 11$  has a remainder of \_\_\_\_\_

(22) The LCM of 18, 30, and 36 is \_\_\_\_\_

(23)  $5^{-1} + 5^{-2} + 5^{-3} =$  \_\_\_\_\_ (fraction)

(24) The simple interest on \$450 at 6%  
for 18 months is \$ \_\_\_\_\_

(25) If  $x = 7$ , then  $x^4 - 18x^2 + 81 =$  \_\_\_\_\_

(26)  $24 \times 95 =$  \_\_\_\_\_

(27)  $43_{10} =$  \_\_\_\_\_<sub>5</sub>

(28)  $58 \times 58 =$  \_\_\_\_\_

(29)  $44137 \div 101 =$  \_\_\_\_\_

\*(30)  $\sqrt{74125} =$  \_\_\_\_\_

(31)  $2023 \times 17 =$  \_\_\_\_\_

(32) Let  $A = 4$ ,  $B = -6$ ,  $C = 5$ ,  $(AB) \div C^2 =$  \_\_\_\_\_

(33) 56 has \_\_\_\_\_ positive integral divisors

(34)  $(24^3 - 1) \div (24 - 1) =$  \_\_\_\_\_

(35) If  $x + y = 8$  and  $x^2 - y^2 = 12.8$ , then  $x - y =$  \_\_\_\_\_

(36)  $4\frac{7}{9} \times 4\frac{2}{9} =$  \_\_\_\_\_ (mixed number)

(37) If  $(4x - 3)^3 = ax^3 + bx^2 + cx + d$ ,  
then  $a - b + c - d =$  \_\_\_\_\_

- (38)  $[25 + 21 \times 22 - 11^2] \div 4$  has a remainder of \_\_\_\_\_
- (39) If 18 people have orange juice, 23 have grape juice and 12 people have both, then how many people are there? \_\_\_\_\_
- \*(40)  $148 \times 152 \times 72 =$  \_\_\_\_\_
- (41)  $14^{-2} \div 7^{-2} \times 3.5^{-2} =$  \_\_\_\_\_
- (42) If  $\frac{a}{11}$  has a remainder of 6 and  $\frac{b}{11}$  has a remainder of 3, then  $\frac{5ab}{11}$  has a remainder of \_\_\_\_\_
- (43) Find the smaller root of  $6x^2 - 13x - 5 = 0$ . \_\_\_\_\_
- (44) The coefficient of the  $x^3y^3$  term of  $(2x + 5y)^6$  is \_\_\_\_\_
- (45)  $107 \times 108 =$  \_\_\_\_\_
- (46) If y varies inversely with x and y = 30 when x = 12, then y = \_\_\_\_\_ when x = 8
- (47) A dodecagon has \_\_\_\_\_ distinct diagonals
- (48) The product of the roots of  $6x^3 + 9x^2 - 11x + 20 = 0$  is \_\_\_\_\_
- (49) If  $x < 0$ , and  $|4x + 3| = 27$ , then x = \_\_\_\_\_
- \*(50)  $833.33 \times 359 =$  \_\_\_\_\_
- (51)  $0.3838... + 0.2222... =$  \_\_\_\_\_ (fraction)
- (52)  $3\frac{9}{m} \times n\frac{4}{7} = 6$ , where m and n are natural numbers. Find m + n. \_\_\_\_\_
- (53)  $(6 - 2i)(1 + 3i) = a + bi$ . Find a + b. \_\_\_\_\_
- (54)  $9 + 6 + 4 + ... =$  \_\_\_\_\_
- (55)  $37 \times 1111 =$  \_\_\_\_\_
- (56)  $\log_4 \sqrt{2} =$  \_\_\_\_\_
- (57) The vertex of  $f(x) = 4x^2 - 8x + 3$  is (h, k). k = \_\_\_\_\_
- (58)  $\sum_{k=1}^{44} (-1)^k (k)^2 =$  \_\_\_\_\_
- (59)  $12^{33} \div 17$  has a remainder of \_\_\_\_\_
- \*(60)  $\sqrt{2400} \times 286 =$  \_\_\_\_\_

- (61)  $\frac{9!+10!}{7!} =$  \_\_\_\_\_
- (62)  $(5x^3 - 6x^2 + kx + 14) \div (x - 2)$  has a remainder of 0. k = \_\_\_\_\_
- (63) The harmonic mean of the roots of  $5x^2 - 11x - 13 = 0$  is \_\_\_\_\_
- (64)  $|10 + 5i\sqrt{5}| =$  \_\_\_\_\_
- (65) The measure of the exterior angle of a regular nonagon is how much less than its interior angle? \_\_\_\_\_
- (66)  $19 \times \frac{16}{15} =$  \_\_\_\_\_ (mixed number)
- (67) Let  $f(x) = x^2 + 16x + 64$  and  $g(x) = \sqrt{4x - 3}$ .  $f(g(13)) =$  \_\_\_\_\_
- (68)  $433_5 \times 111_5 =$  \_\_\_\_\_<sub>5</sub>
- (69) If  $\sqrt{10} + \sqrt{90} = \sqrt{x}$ , then x = \_\_\_\_\_
- \*(70) The radius of a sphere is 6. The volume is \_\_\_\_\_
- (71) The area of the ellipse  $4x^2 + 9y^2 = 144$  is  $k\pi$ , find k. \_\_\_\_\_
- (72)  $\lim_{x \rightarrow 3} \frac{5x-15}{x^2-9} =$  \_\_\_\_\_
- (73)  $(14, \frac{4\pi}{3})$  are the polar coordinates for the point (x, y) in rectangular coordinates.  $y = a\sqrt{b}$ , find a + b. \_\_\_\_\_
- (74) The graph of  $y = \frac{3x-2}{9x^2-4}$  has \_\_\_\_\_ asymptotes
- (75) If  $xy = 5$  and  $x + y = 6$ , then  $x^3 + y^3 =$  \_\_\_\_\_
- (76)  $\int_2^4 (2x^3) dx =$  \_\_\_\_\_
- (77)  $0.42222..._7 =$  \_\_\_\_\_ (base 7 fraction)
- (78) How many distinguishable permutations can be made using the letters, T, O, P, P, S? \_\_\_\_\_
- (79) The seventh decagonal number is \_\_\_\_\_
- \*(80)  $8.8888... \times 27 \times 260 =$  \_\_\_\_\_

# 2022-2023 Virtual Challenge Meet #4 • HS Number Sense - Key

(1) 16184	*(20) 2845 – 3143	(37) 343	(61) 792
(2) – 396	(21) 0	(38) 2	
(3) $\frac{7}{8}$	(22) 180	(39) 29	(62) – 15
(4) $\frac{48}{11}$	(23) $\frac{31}{125}$	*(40) 1538727 – 1700697	(63) $-\frac{26}{11}$
(5) 2245.53	(24) 40.50	(41) $\frac{1}{49}$	(64) 15
(6) 92	(25) 1600		
(7) 1024	(26) 2280	(42) 2	
(8) 1100	(27) 133		(65) 100
(9) 103	(28) 3364	(43) $-\frac{1}{3}$	(66) $20\frac{4}{15}$
*(10) 87226 – 96406	(29) 437	(44) 20000	
(11) 7225	*(30) 259 – 285	(45) 11556	(67) 225
(12) 300	(31) 34391		
(13) 1665	(32) $-\frac{24}{25}$ or $-.96$	(46) 45	(68) 104113
(14) 1770	(33) 8	(47) 54	(69) 160
(15) 45	(34) 601	(48) $-\frac{10}{3}, -3\frac{1}{3}$	*(70) 860 – 950
(16) 54	(35) $1.6, \frac{8}{5}$ or $1\frac{3}{5}$	(49) $-\frac{15}{2}, -7\frac{1}{2}$	(71) 24
(17) 6	(36) $20\frac{14}{81}$	*(50) 284208 – 314123	(72) $\frac{5}{6}$
(18) 169		(51) $\frac{20}{33}$	
		(52) 12	(73) – 4
(19) $11\frac{1}{9}$		(53) 28	(74) 2
		(54) 27	(75) 126
		(55) 41107	(76) 120
		(56) $\frac{1}{4}$ or .25	(77) $\frac{16}{30}$
		(57) – 1	
		(58) 990	(78) 60
		(59) 12	(79) 175
		*(60) 13311-14711	*(80) 59280 – 65520