

2026 UIL CALCULATOR APPLICATIONS DISTRICT CHAMPIONSHIP EXAM

HIGH SCHOOL CHAMPIONSHIP DIVISION • 70 PROBLEMS • 30-MINUTE SPEED SPRINT

// OFFICIAL CONTESTANT IDENTIFICATION

CONTESTANT NAME: _____

SCHOOL / CAMPUS: _____

GRADE LEVEL: [] 9 [] 10 [] 11 [] 12

CONTESTANT ID #: _____

OFFICIAL SCORING GRID (GRADER VERIFIED)

PAGE	P1	P2	P3	P4	P5	P6	P7	FINAL
Correct (+5):								
Errors (-4):								
Subtotal:								

CONTEST RULES: 30 MINUTES • ALL ANSWERS TO 3 SIGNIFICANT DIGITS UNLESS INTEGER (INT) OR DOLLARS [\$].

SCORING: +5 points per correct response; -4 points per wrong/skipped question up to last attempted. Zero after last attempted.

- 26C-1.** $64.8 + 182.5 - 54.3$ **1 =** _____
- 26C-2.** $(21.5 \times 4.65) + 112.4 - 42.8$ **2 =** _____
- 26C-3.** $(108.4 + 285) / 21.6$ **3 =** _____
- 26C-4.** $(385 - 94.8) / (18.4 + 29.5)$ **4 =** _____
- 26C-5.** $1 / 38.5 + 1 / 54.2$ **5 =** _____
- 26C-6.** $\sqrt{(48.5^2 + 68.4^2)}$ **6 =** _____
- 26C-7.** $16800 / (22.5 \times 11.2 \times 4.85)$ **7 =** _____
- 26C-8.** $(29.5 + 74.2)^{1.42}$ **8 =** _____
- 26C-9.** A StackCalc32 hardware developer kit priced at \$145.00 is discounted by 25%. With 8.25% sales tax applied to the net discounted price, calculate the total final purchase cost.
9 = \$ _____
- 26C-10.** Heavy-duty carbon-fiber reinforced PETG 3D printing filament weighs 4.85 grams per meter. How many meters of filament are wound onto a 7.50 kilogram industrial spool?
10 = _____ m

26C-11. $(\sqrt{645 + 104.5}) / (22.5 \times 4.85)$ **11 =** _____

26C-12. $\sqrt{(225 + \sqrt{84.5 + 138})}$ **12 =** _____

26C-13. $\sqrt{(1/22.5 + 1/44.8)}$ **13 =** _____

26C-14. $(112.5^2 - 52.8^2) / (28.5 + 44.2)$ **14 =** _____

26C-15. $(22.5^{2.5} + 315) / (39.5^2 - 524)$ **15 =** _____

26C-16. $\sqrt{[(225 \times 44.2) / (52.5 + 118)]}$ **16 =** _____

26C-17. $\sqrt[3]{(820 + 56.4 \times 28.5)}$ **17 =** _____

26C-18. $(1/11.2 - 1/29.5)^2$ **18 =** _____

26C-19. A dual-channel resin dispenser on an SLA 3D printer fills a photopolymer vat using primary line A in 5.20 hours and auxiliary line B in 8.40 hours. How many hours will it take to fill the vat if both lines operate concurrently?

19 = _____ hrs

26C-20. A 3D printed circular slip-ring commutator bezel has an inside radius of 28.5 meters and an exterior guard ring extending out to a radius of 34.0 meters. Calculate the surface area of the circular border in square meters.

20 = _____ m²

26C-21. $118^{0.76} + 29.5^{-0.34}$ **21 =** _____

26C-22. $22.4 + 41.5 / [11.5 + (22.5 / 7.2)]$ **22 =** _____

26C-23. $1 / 18.5^{1.5} + 1 / 11.2^{2.1}$ **23 =** _____

26C-24. $\sqrt[3]{78.5^3 - 49.2^3}$ **24 =** _____

26C-25. $[215 - (68.4 / 9.2)] / [42.5 + (138 / 19.5)]$... **25 =** _____

26C-26. $(48.5^{2.2} \times 11.2^{-1.3}) / \sqrt{720}$ **26 =** _____

26C-27. $\sqrt{\sqrt{740} + \sqrt{215}}$ **27 =** _____

26C-28. $[(108.5 + 56.4) / (98.2 - 41.5)]^{3.12}$ **28 =** _____

26C-29. Two autonomous mobile robotics platforms separated by 78.0 miles travel toward each other on parallel tracks at constant speeds of 18.4 mph and 22.6 mph. In how many minutes will they pass each other?

29 = _____ min

26C-30. An articulated PCB inspection microscope boom measuring 44.0 feet long leans against a vertical equipment frame with its base 10.5 feet from the frame. What acute angle in degrees does the boom make with the horizontal floor?

30 = _____ deg

26C-31. $\sin(2.65 \text{ rad}) + \cos(1.35 \text{ rad})$ **31 =** _____

26C-32. $\tan(58.4^\circ) \times \sin(38.5^\circ)$ **32 =** _____

26C-33. $\ln(225) + \ln(58.4) - \ln(21.5)$ **33 =** _____

26C-34. $\log(1240) / [\log(54.2) + 2.15]$ **34 =** _____

26C-35. $e^{2.15} - e^{-1.12}$ **35 =** _____

26C-36. $\sin(2.78 \text{ rad}) / [\ln(74.2) + \sqrt{31.5}]$ **36 =** _____

26C-37. $\cos^2(48.2^\circ) + \sin(71.5^\circ)$ **37 =** _____

26C-38. $(10^{1.84} - 10^{-1.84}) / (10^{1.84} + 10^{-1.84})$ **38 =** _____

26C-39. An electronic scintillation sensor uses a radioactive calibration isotope with a half-life of 18.5 days. If a test capsule initially holds 160.0 grams of the isotope, what mass in grams remains active after 52.0 days?

39 = _____ g

26C-40. From calibration point M on a level test facility, the angle of elevation to an automated 3D printer gantry apex is 41.8° . Moving 62.0 meters closer to point N, the angle of elevation is 56.2° . Find the vertical height of the gantry in meters.

40 = _____ m

26C-41. $\arcsin(0.645) + \arccos(0.485)$ [rad] **41 =** _____

26C-42. $\arctan(94.8 / 58.2)$ [deg] **42 =** _____

26C-43. $\sinh(1.68) \times \cosh(1.08)$ **43 =** _____

26C-44. $\tanh(0.98 + 1.48)$ **44 =** _____

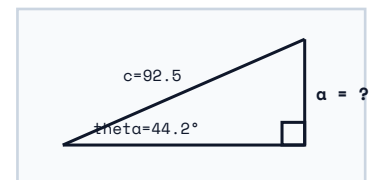
26C-45. $[\cos(1.04 \text{ rad})]^{\sin(1.36 \text{ rad})}$ **45 =** _____

26C-46. $\sqrt{ \ln^2(42.5) + \ln^2(145) }$ **46 =** _____

26C-47. $\arctan(3.85) / \arcsin(0.82)$ [rad] **47 =** _____

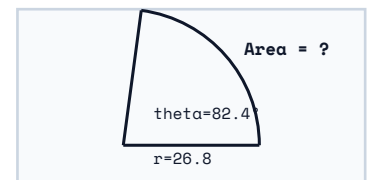
26C-48. $22.5^{\log(58.4)}$ **48 =** _____

26C-49. RIGHT TRIANGLE: In the right triangle shown below, hypotenuse $c = 92.5$ cm and acute angle $\theta = 44.2^\circ$. Calculate the length of opposite side a .



49 = _____ cm

26C-50. CIRCULAR SECTOR: For the circular sector diagrammed below, radius $r = 26.8$ m and central angle $\theta = 82.4^\circ$. Determine the total area of the shaded sector in square meters.



50 = _____ m^2

26C-51. 23 C 9 **51 =** _____ INT

26C-52. 16 P 7 **52 =** _____ INT

26C-53. $\sqrt[4]{(51.2^3 + 26.8^2 \times 14.5)}$ **53 =** _____

26C-54. $(20 \text{ C } 8) / (14 \text{ C } 6)$ **54 =** _____

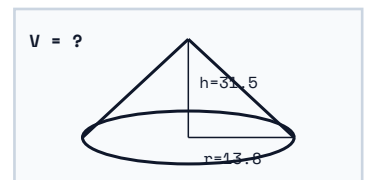
26C-55. $[e^{1.72} - \ln(31.5)]^{2.48}$ **55 =** _____

26C-56. $\sqrt{\cosh(2.95) - \sinh(2.35)}$ **56 =** _____

26C-57. $\sqrt{72 + \sqrt{72 + \sqrt{72}}}$ **57 =** _____

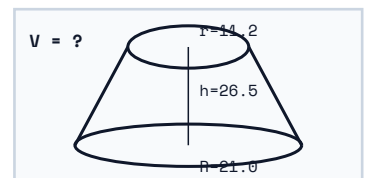
26C-58. $\log_{9.6}(1680)$ **58 =** _____

26C-59. RIGHT CIRCULAR CONE: The solid cone shown has base radius $r = 13.8$ cm and vertical height $h = 31.5$ cm. Calculate the volume of the cone in cubic centimeters.



59 = _____ cm³

26C-60. CONICAL FRUSTUM: A truncated cone has lower base radius $R = 21.0$ cm, upper base radius $r = 11.2$ cm, and vertical height $h = 26.5$ cm. Calculate the frustum volume in cubic centimeters.



60 = _____ cm³

26C-61. $\sqrt{(92.4^2 + 58.5^2)} / [\ln(310) + \sin(1.82 \text{ rad})]$... **61** = _____

26C-62. $[(e^{2.10} - 1) / (4.85 \times \log(720))]^{2.15}$... **62** = _____

26C-63. $[\tan(72.5^\circ) - \tan(39.4^\circ)] / [1 + \tan(72.5^\circ)\tan(39.4^\circ)] =$ _____

26C-64. $\sinh(2.45) / [\cosh(1.72) + \tanh(0.92)]$... **64** = _____

26C-65. $\sqrt{215 + \sqrt{145}} / \sqrt[3]{82 + \sqrt{48}}$... **65** = _____

26C-66. $[\ln(94.5) + \cos(0.96 \text{ rad})]^{\sin(1.48 \text{ rad})}$... **66** = _____

26C-67. $(1/\sqrt{31.5} + 1/\sqrt{62.4})^{-1.95}$... **67** = _____

26C-68. $(18.4^{3.1} - 11.5^{2.3}) / [(18.4 \times 11.5) + (3.1 \times 2.3)]$ **68** = _____

26C-69. A 3D printed electronics project housing with an open top and square base is fabricated using 600 square inches of polymer material. Using calculus optimization, determine the maximum theoretical volume of the housing in cubic inches.

69 = _____ in³

26C-70. In an accelerated life-cycle test rig for mechanical keyboard switches, a spring-driven actuator pin is propelled from ground level with launch velocity $v_0 = 105.0 \text{ m/s}$ at an elevation angle of 44.5° above horizontal. With gravitational acceleration $g = 9.81 \text{ m/s}^2$, determine the horizontal range in meters.

70 = _____ m