

2026 TAPPS HIGH SCHOOL CALCULATOR APPLICATIONS STATE CHAMPIONSHIP EXAM

VARSITY CHAMPIONSHIP DIVISION • 70 PROBLEMS • 30-MINUTE SPEED SPRINT • GRADES 9–12

// 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.

- TAPPS-1.

$-54.8 + 148.2 - 62.5$

1 = _____
- TAPPS-2.

$(18.4 \times 6.25) + 84.5 - 31.2$

2 = _____
- TAPPS-3.

$(124.6 + 312.0) / 18.5$

3 = _____
- TAPPS-4.

$(420.0 - 115.4) / (22.4 + 36.8)$

4 = _____
- TAPPS-5.

$1 / 42.5 + 1 / 68.0$

5 = _____
- TAPPS-6.

$\sqrt{(52.4^2 + 74.8^2)}$

6 = _____
- TAPPS-7.

$18400 / (28.4 \times 14.5 \times 6.20)$

7 = _____
- TAPPS-8.

$(34.5 + 82.4)^{1.38}$

8 = _____
- TAPPS-9.

A digital electronics laboratory purchases a 4-channel mixed-signal oscilloscope originally priced at \$1,250.00 with an 18% educational discount. If state sales tax is 8.25%, what is the final purchase cost?

9 = \$ _____
- TAPPS-10.

Conductive copper-infused 3D printing filament weighs 6.45 grams per meter. How many meters of filament are wound onto a 9.20 kilogram commercial spool?

10 = _____ m

TAPPS-11. $(\sqrt{785 + 142.5}) / (26.4 \times 5.80)$ **11 =** _____

TAPPS-12. $\sqrt{(340 + \sqrt{92.5 + 168})}$ **12 =** _____

TAPPS-13. $\sqrt{(1/28.5 + 1/54.2)}$ **13 =** _____

TAPPS-14. $(148.5^2 - 64.2^2) / (32.5 + 56.4)$ **14 =** _____

TAPPS-15. $(26.5^{2.4} + 420) / (44.5^2 - 680)$ **15 =** _____

TAPPS-16. $\sqrt{[(285 \times 52.4) / (64.5 + 142)]}$ **16 =** _____

TAPPS-17. $\sqrt[3]{950 + 64.5 \times 32.4}$ **17 =** _____

TAPPS-18. $(1/14.5 - 1/36.0)^2$ **18 =** _____

TAPPS-19. In an automated vacuum chamber for degassing 3D printing silicone molds, primary vacuum line A evacuates the tank in 6.40 hours and auxiliary pump line B requires 9.80 hours. In how many hours will the tank evacuate if both lines operate simultaneously?

19 = _____ hrs

TAPPS-20. A 3D printed circular speaker grille bezel has an inner circular opening radius of 31.5 meters and an outer perimeter radius of 42.0 meters. Calculate the surface area of the circular border ring in square meters.

20 = _____ m²

TAPPS-21. $145^{0.72} + 38.5^{-0.42}$ **21** = _____

TAPPS-22. $28.5 + 56.4 / [14.5 + (28.4 / 8.6)]$ **22** = _____

TAPPS-23. $1 / 22.4^{1.6} + 1 / 14.8^{2.2}$ **23** = _____

TAPPS-24. $\sqrt[3]{92.5^3 - 58.4^3}$ **24** = _____

TAPPS-25. $[265 - (84.5 / 11.2)] / [52.4 + (168 / 22.5)]$... **25** = _____

TAPPS-26. $(58.2^{2.1} \times 14.5^{-1.2}) / \sqrt{860}$ **26** = _____

TAPPS-27. $\sqrt{\sqrt{920} + \sqrt{315}}$ **27** = _____

TAPPS-28. $[(124.5 + 68.2) / (112.0 - 48.5)]^{2.85}$ **28** = _____

TAPPS-29. Two autonomous robotic parts shuttles in an electronics cleanroom separated by 94.0 miles travel toward each other at steady velocities of 22.5 mph and 28.5 mph. In how many minutes will they pass each other?

29 = _____ min

TAPPS-30. An articulated camera inspection boom on an automated PCB assembly line is 52.0 feet long with its footing positioned 12.5 feet from the vertical mounting rail. What acute angle in degrees does the boom form with the horizontal floor?

30 = _____ deg

TAPPS-31. $\sin(2.45 \text{ rad}) + \cos(1.15 \text{ rad})$ **31 =** _____

TAPPS-32. $\tan(62.5^\circ) \times \sin(41.2^\circ)$ **32 =** _____

TAPPS-33. $\ln(315) + \ln(72.5) - \ln(28.0)$ **33 =** _____

TAPPS-34. $\log(1850) / [\log(68.4) + 2.45]$ **34 =** _____

TAPPS-35. $e^{2.45} - e^{-1.28}$ **35 =** _____

TAPPS-36. $\sin(2.95 \text{ rad}) / [\ln(88.5) + \sqrt{42.0}]$ **36 =** _____

TAPPS-37. $\cos^2(54.5^\circ) + \sin(68.2^\circ)$ **37 =** _____

TAPPS-38. $(10^{2.15} - 10^{-2.15}) / (10^{2.15} + 10^{-2.15})$ **38 =** _____

TAPPS-39. An electronic timing sensor's radioactive calibration source decays with a clearance half-life of 22.5 hours. If an initial activity of 220.0 mg is administered, what mass in milligrams remains active after 64.0 hours?

39 = _____ mg

TAPPS-40. An optical laser triangulation sensor measures the vertical height of a 3D printer gantry tower. From calibration station P on level ground, the angle of elevation to the tower apex is 38.5° . Moving 75.0 meters closer to station Q, the elevation angle increases to 52.4° . Find the vertical height of the tower in meters.

40 = _____ m

TAPPS-41. $\arcsin(0.725) + \arccos(0.385)$ [rad] **41 =** _____

TAPPS-42. $\arctan(112.5 / 64.5)$ [deg] **42 =** _____

TAPPS-43. $\sinh(1.85) \times \cosh(1.22)$ **43 =** _____

TAPPS-44. $\tanh(1.15 + 1.65)$ **44 =** _____

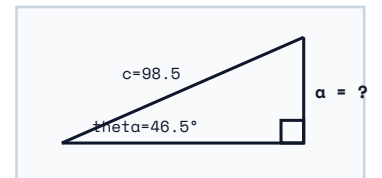
TAPPS-45. $[\cos(1.18 \text{ rad})]^{[\sin(1.42 \text{ rad})]}$ **45 =** _____

TAPPS-46. $1 / (1/9.50 + 1/16.4 + 1/26.0)$ **46 =** _____

TAPPS-47. $\cos^2(42.0^\circ) + \sin(48.0^\circ)$ **47 =** _____

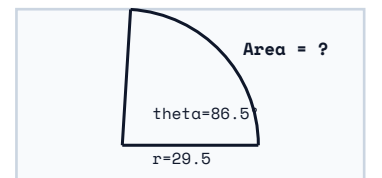
TAPPS-48. $\sqrt{ (58.4 \times 22.5 \times 11.2) / (4.2 \times 5.6) }$ **48 =** _____

TAPPS-49. RIGHT TRIANGLE: In the right triangle diagrammed below, hypotenuse $c = 98.5$ cm and acute angle $\theta = 46.5^\circ$. Find the length of leg a in centimeters.



49 = _____ cm

TAPPS-50. CIRCULAR SECTOR: For the circular sector below, radius $r = 29.5$ m and central angle $\theta = 86.5^\circ$. Calculate the area of the sector in square meters.



50 = _____ m^2

TAPPS-51.

25 C 10

51 = _____

INT

TAPPS-52.

18 P 6

52 = _____

INT

TAPPS-53.

$\sqrt[4]{(62.4^3 + 31.5^2 \times 18.2)}$

53 = _____

TAPPS-54.

$(22 \text{ C } 9) / (15 \text{ C } 5)$

54 = _____

TAPPS-55.

$[e^{1.88} - \ln(38.2)]^{2.35}$

55 = _____

TAPPS-56.

$\sqrt{\cosh(3.15) - \sinh(2.45)}$

56 = _____

TAPPS-57.

$\sqrt{85 + \sqrt{(85 + \sqrt{85})}}$

57 = _____

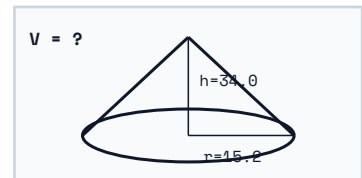
TAPPS-58.

$\log_{8.5}(2450)$

58 = _____

TAPPS-59.

RIGHT CIRCULAR CONE: The cone shown has base radius $r = 15.2$ cm and height $h = 34.0$ cm. Calculate its volume in cubic centimeters.

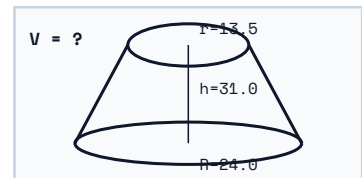


59 = _____

cm³

TAPPS-60.

CONICAL FRUSTUM: A truncated cone has bottom radius $R = 24.0$ cm, top radius $r = 13.5$ cm, and height $h = 31.0$ cm. Find the volume in cubic centimeters.



60 = _____

cm³

TAPPS-61. $\sqrt{(108.5^2 + 64.2^2)} / [\ln(380) + \sin(1.95 \text{ rad})]$... **61** = _____

TAPPS-62. $[(e^{2.25} - 1) / (5.20 \times \log(850))]^{2.40}$... **62** = _____

TAPPS-63. $[\tan(76.2^\circ) - \tan(42.8^\circ)] / [1 + \tan(76.2^\circ)\tan(42.8^\circ)] =$ _____

TAPPS-64. $\sinh(2.68) / [\cosh(1.88) + \tanh(1.05)]$... **64** = _____

TAPPS-65. $\sqrt{265 + \sqrt{175}} / \sqrt[3]{98 + \sqrt{64}}$... **65** = _____

TAPPS-66. $[\ln(115.0) + \cos(1.05 \text{ rad})]^{[\sin(1.55 \text{ rad})]}$... **66** = _____

TAPPS-67. $(1/\sqrt{38.5} + 1/\sqrt{74.2})^{-2.10}$... **67** = _____

TAPPS-68. $(21.5^{3.2} - 13.8^{2.5}) / [(21.5 \times 13.8) + (3.2 \times 2.5)]$ **68** = _____

TAPPS-69. A 3D printed modular electronics enclosure with an open top and square base is constructed from 720 square inches of polymer sheet. Using calculus optimization, determine the maximum theoretical internal volume in cubic inches.

69 = _____ in³

TAPPS-70. In an automated drop-and-ejection test rig for mechanical keyboard switches, a spring-driven switch stem is propelled from level ground with initial velocity $v_0 = 118.0 \text{ m/s}$ at an elevation angle of 42.0° above horizontal. With gravitational acceleration $g = 9.81 \text{ m/s}^2$, determine the horizontal trajectory range in meters.

70 = _____ m