

ANSWER KEY - ANSWER KEY - ANSWER KEY

2024 Los Angeles Regional Science Olympiad Tournament

Astronomy C



Answer Key

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Section A (36 points)

1. B 2. B 3. A 4. DE
5. A 6. C 7. D 8. A
9. White dwarf 10. D 11. NGC 1333 12. D
13. B 14. C 15. A 16. C
17. C 18. A 19. B 20. Herbig-Haro
21. C 22. B 23. D 24. A
25. A 26. B 27. C 28. C
29. C 30. T 31. B 32. A
33. D 34. A
35. 6.99×10^{-4} arcseconds [6.64, 7.34] [1.5 pts] which would be picked up by Gaia [0.5 pts].

Section B (36 points)

1. BD 2. B 3. C 4. C
5. D 6. A 7. C 8. Radial vel.
9. B 10. B 11. Transit 12. C
13. B 14. D
15. Accept: astrometry, timing, microlensing. Do not accept: direct imaging, radial velocity, transit.
16. G 17. H 18. C 19. F
20. D 21. E 22. D 23. A
24. 60 m s^{-1} (exactly)
25. B
26. $2.33 \times 10^{-5} \text{ au}$ [2.21, 2.45]
27. $0.516 M_J$ [0.490, 0.542]
28. (1) light curve of the transits **[1 pt]**, (2) radius of the planet **[1]**, (3) use the mass-velocity ratio to determine the velocity of the planet, then use distance over time to determine the radius of the planet, finally use the radius to compute the volume of the planet and thereby its density **[0.5 each; to 2 pts]**.