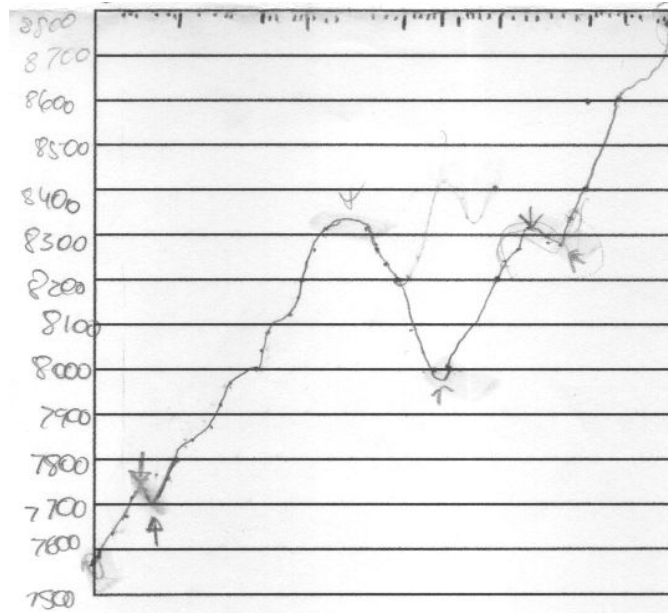


BARSO 2016 Road Scholar Answer Key

Part 1: USGS Topographic Map

1. Colorado
2. Eldorado Springs
3. Sector 6/Sector E/Sector East (all correct)
4. 7.5 minute
5. Boulder
6. Boulder and Jefferson
7. 11°
8. 1:24,000
9. 40 ft
10. Sea Level/Datum/National Geodetic Vertical Datum of 1929 (all correct, last is better)
11. Yes (because of above response, and it is explicitly written in the bottom.)
12. 2221 m (+/- 1m) [2220 to 2222]
13. 8335 ft
14. 2800 m (+/- 10 m)
15. 1.74 mi (+/- 0.01 mi) [1.73 to 1.75]
16. Not more of 10% of elevations tested shall be in error of more than half of the contour interval.
17. [T1] 340° (+/- 1°)
18. N 20° W (+/- 1°)
19. NE
20. [T2] 130'/1000' (+/- 4) [126'/1000' to 134'/1000']
21. [T3] 39° 54' 10" N 105° 21' 21" W (+/- 10")
22. [T4] In meters: 13N 469585 E 4417020 N (+/- 50) In kilometers: 469.585 E 4417.020 N (+/- 0.05)
23. Mine shaft
24. 7
25. Sixth principal meridian.
26. [T5] 57.15'/100' (+/- 0.75) [56.4'/100' to 57.9'/100']
27. Standard gauge railroad, multiple track
28. 72, 93, 170
29. 36
30. [See scanned image.]

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Scoring guidelines:

1 pt for initial point (Chapel in the Hills)

1 pt for final point (Scar Top Mountain)

1 pt for each one of the arrows above, make sure it goes above/below the right lines.

Part 2A: Road Map, Colorado

31. Denver
32. A-24
33. E-26/E-27 [either one is OK]
34. US-36 and I-25
35. Exit 212
36. 23 mi (+/- 1 mi) [22 to 24 mi]
37. [T6] 164 mi
38. 2:38 (+/- 0:12) [2:26 to 2:50]
39. Q-32
40. [T7] Montezuma
41. [T8] 281 sq mi
42. [T9] 44 mi
43. US-160
44. [T10] 39 mi (+/- 2 mi) [37 to 41 mi]
45. Yes
46. Mount Elbert
47. [T11] 14,433 ft
48. No
49. H-31

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51. HDN
52. Mountain Time
53. I-70
54. \$3.50
55. 0
56. Ute Mountain Indian Reservation and Southern Ute Indian Reservation
57. 1-303-239-4501 or *277

Part 2B: Road Map, Wyoming:

58. Cheyenne
59. H-6
60. C-3
61. O-5.
62. 222 mi
63. 4 h
64. Gannett Peak
65. [T12] 13,804 ft
66. [T13] Ten
67. Closed roads
68. 23
69. Big Horn and Washakie
70. Lambert Conformal Conic Projection

Part 3: Theoretical questions and Map Drawing:

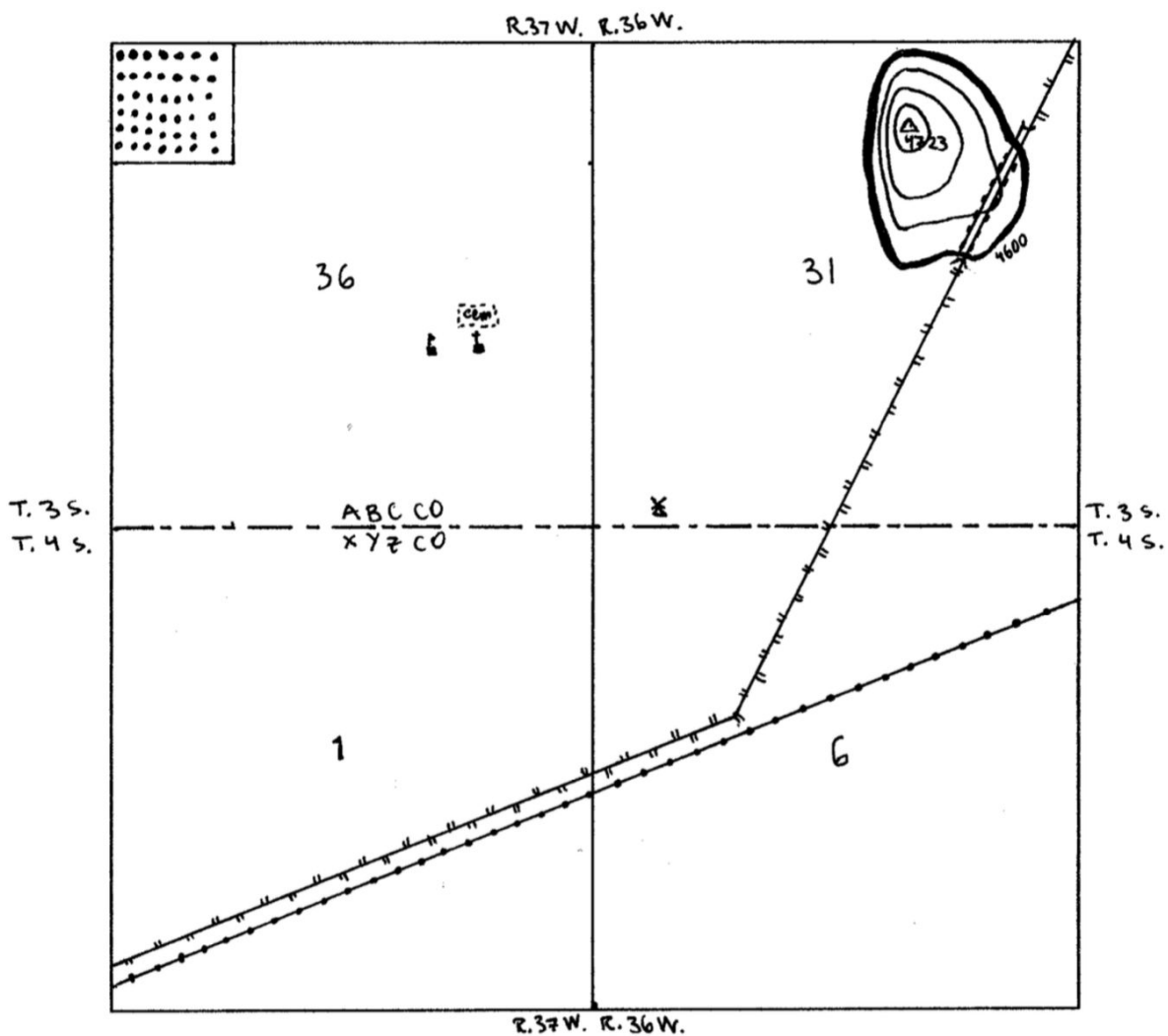
70. $d \Rightarrow 1:20,000$
71. 1 square mile
72. 640 acres
73. [T14] 23040 acres
74. [T15] $d \Rightarrow$ Hawaii
75. b, a, c \Rightarrow Vertical Control Station Mark, Spot Elevation, Contour Line
76. West to east, because it is an even number.
77. 10 to 19
78. 6
79. 10,000,000 m
80. National Geospatial Intelligence Agency/National Intelligence Mapping Agency/NIMA/US Army Corp of Engineers (any is OK)
81. Transverse Mercator
82. Meades Ranch, Kansas
83. 24
84. 8
85. 12

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86.

- A. Saddle
- B. Hill/Peak
- C. Saddle/Pass
- D. Valley
- E. Spur/Ridge
- F. Draw/Gulley

87. [See image.] [Tunnel symbol lines are not continuous.]

Scoring guidelines in *italics*:

(16) Hand-Drawn Map: 2 points per item a to h below

- a. In this map, there are four PLSS sections. They are part of four different townships, which are divided by two lines *½ pt labels, ½ pt dividing lines*
 - i. a township line dividing T 3 S and T 4 S *1 pt (section # 1, 3, 36, 31)*
 - ii. a range line dividing R 36 W and R 37 W
- b. The township line which divides T 3 and T 4 also separates two counties:
 - i. ABC in the north *1 pt for dashed line*
 - ii. XYZ in the south *1 pt for labels ABC and XYZ*
- c. A power transmission line enters this map 264 feet above the southwest corner.
 - i. This power transmission line passes through the center of NE ¼, Sec 6, T 4 S, R 36 W. *1 pt path, 1 pt line*
- d. A multiple track, narrow gauge railroad follows this power transmission line along its immediate north.
 - i. When starting from the west, after crossing 1.4 miles in the map, the railroad turns left and for the remainder of the map, travels at an azimuth of 27°. *1 pt trajectory (½ path, ½ line), 1 pt tunnel (½ pt location, ½ pt shape)*
 - ii. This railroad passes through a tunnel 0.3 miles long. The trains leave the tunnel 0.2 miles before the railroad exits the map.
- e. The entire region displayed on this map is at an elevation of 4580 feet above sea level. There is, however, one exception: a hill, which the tunnel cuts through.
 - i. The peak of this hill is 1320 feet to the west from the northern terminus of the tunnel. *peek location ½ pt*
 1. It contains a horizontal control station mark which indicates an elevation of 4723 feet. *½ pt*
 2. The hill is steeper on the west slope than on the east slope. *½ pt*
 3. When drawing the contour lines for the hill, keep in mind that the contour interval is 40 feet. *½ pt (3 regular contours, 1 index contour labelled 4600 crossing the tunnel)*
- f. At the northwest corner of the map there is a 40 acre orchard, shaped like a square. *1 pt dots, 1 pt area*
- g. At a point 0.7 miles along the railroad, past the western border of the map, there is a small school exactly 1 mile north.
 - i. 528 feet to the east of the school, there is a church. *1 pt location*
 - ii. Along the northern border of the church, there is a cemetery. *1 pt box*
- h. From the church, there is a windmill half a mile away in the S 47° E direction. *1 pt location, 1 pt correct symbol*