2. [Solve either by hand or using Excel and submit accordingly] Ryan Potter HW2

Various techniques have been proposed to curb cross-border drug smuggling into a country. The costs of implementing each strategy along a particular rugged section of the border are indicated below. The table also includes a score that is compiled based on deterrence, interdiction, and apprehension, with a higher score indicated better performance. For a budget of $60 million, determine which techniques should be employed on the basis of a cost-effectiveness analysis. Note: Activities are independent

Activity	Cost, $ Millions	Score
1. Tethered aerostats	3.8	8
2. Boots on-the-ground	31.4	52
3. Fence	18.7	12
4. Motion sensors	9.8	7
5. Seismic sensors	8.3	5
6. Drones	12.1	28

Cost-effectiveness ratio (CER): $CER = \dfrac{\text{Equivalent total cost}}{\text{Total Effectiveness Measure}} = \dfrac{C}{E}$

Total Budget = $60 Million,

CER Ranking

CER Calculation

Rank	CER	Activity	Cost, $ Millions	Cum. Costs, $ Millions
1.	0.4165	Drones	12.1	12.1
2.	0.475	Tethered aerostats	3.8	12.1+3.8=15.9
3.	0.604	Boots-on-the-ground	31.4	15.9+31.4=47.3
4.	1.4	Motion sensors	9.8	47.3+9.8=57.1
5.	1.558	Fence	18.7	57.1+18.7=75.8
6.	1.66	Seismic sensors	8.3	N/A

1. Tethered aerostats
$$CER_1 = \frac{3.8}{8} = 0.4375$$

2. Boots-on-the-ground
$$CER_2 = \frac{31.4}{52} = 0.604$$

3. Fence
$$CER_3 = \frac{18.7}{12} = 1.5583$$

2. Continued

CER calculation (Continued)

4. Motion Sensors

$$CER_4 = \frac{9.8}{7} = 1.4$$

5. Seismic Sensors

$$CER_5 = \frac{8.3}{5} = 1.66$$

6. Drones

$$CER_6 = \frac{12.1}{26} = 0.4653$$

★ ANSWER ★

For CER performance ~~project~~ for independent projects, select each project so the total project budget isn't exceeded.

∴ Find activities 1, 6, 2, and 4 which are tethered aerostats, drones, boots-on-the ground, and sensors.