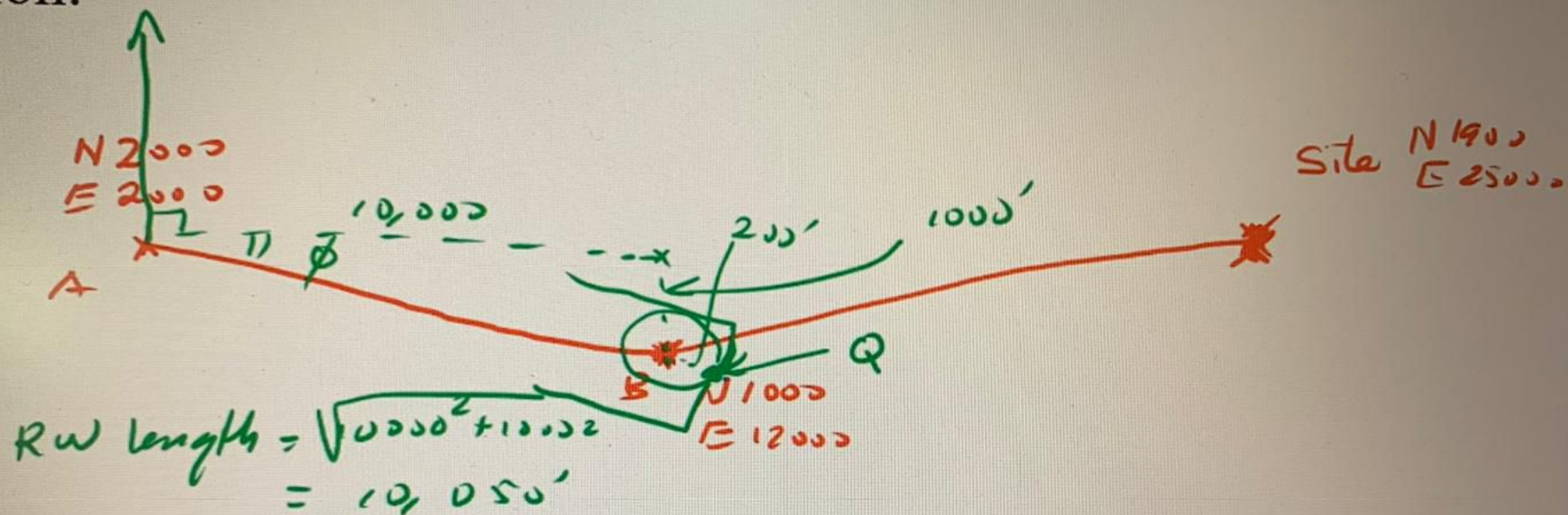


Civil Airport Imaginary Surfaces Example:

Given an airport with one precision instrument runway. The end of the runway has the following coordinates (N: 2000', E: 2000') and (N: 1000', E: 12000'). The airport established elevation is 2460' above msl.

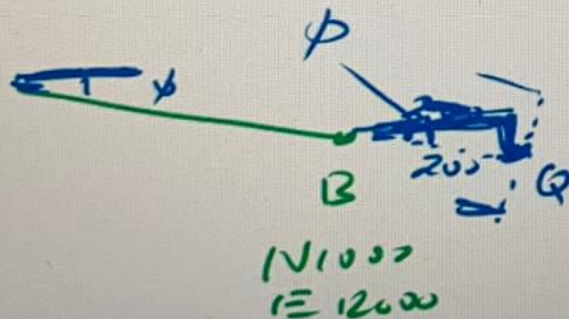
Determine the maximum height of a structure at a proposed construction site with the following coordinates (N: 1900', E: 25000', Z: 2700' above msl)

Solution:



$$\phi = \tan^{-1} \frac{1000}{10000} = 5^{\circ}43'$$

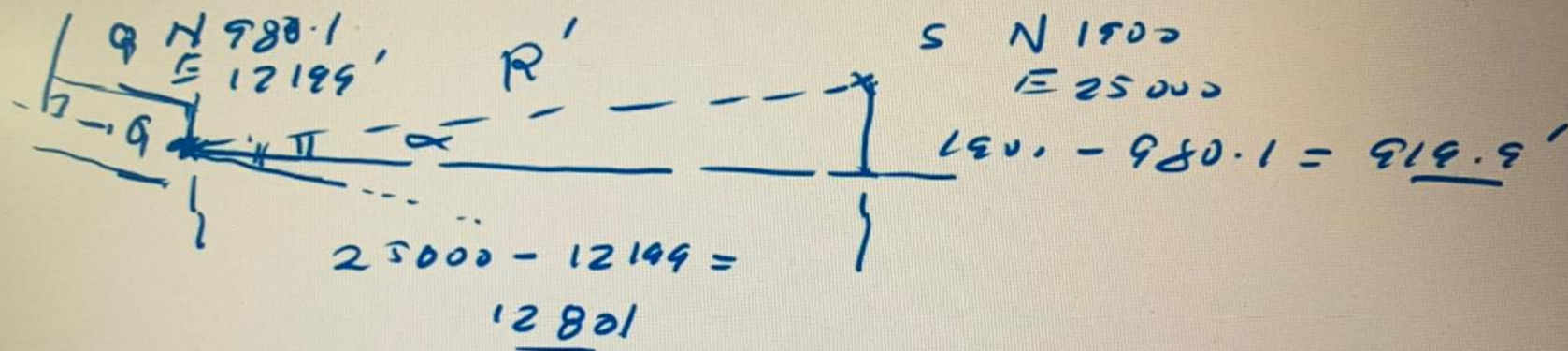
$$\text{Azimuth } AB = 90 + \phi = 95^{\circ}43'$$



$$Q_N = 1000 - 200 \sin \phi = 980.1'$$

$$Q_E = 12000 + 200 \cos \phi = 12199'$$

Case I
primary, horizontal & conical



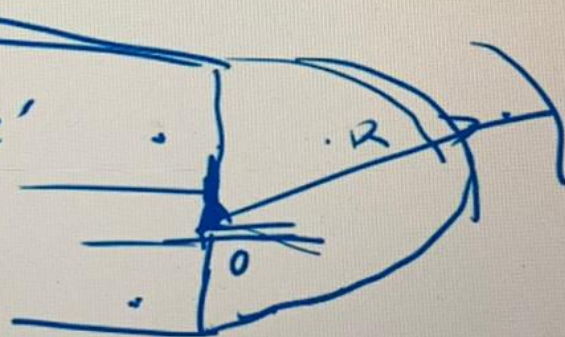
$$\alpha = \tan^{-1} \frac{919.9}{12801} = 4^\circ 7'$$

$$R' = \sqrt{12801^2 + 919.9^2}$$

$$R' = 12834'$$

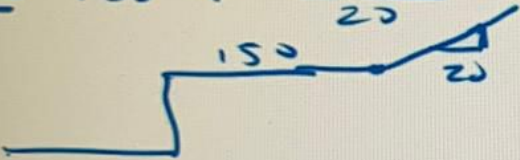
$$10,000' \leq R' < 14,000'$$

$\therefore$ critical site within conical surface

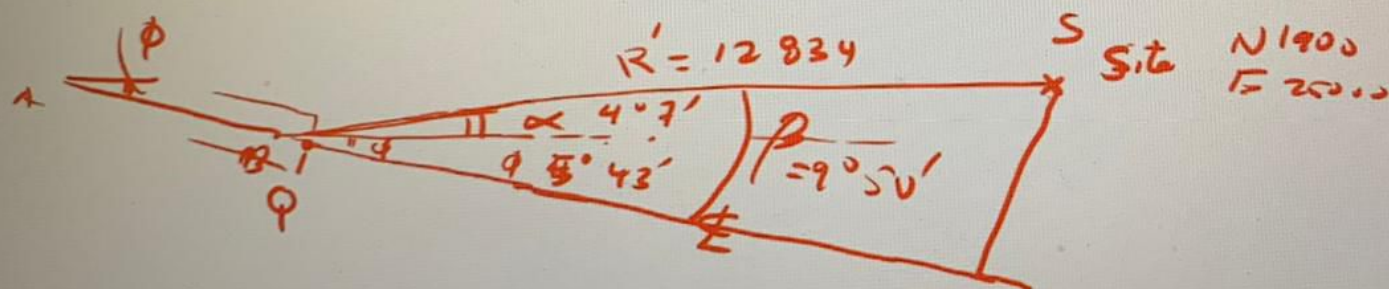


Group I

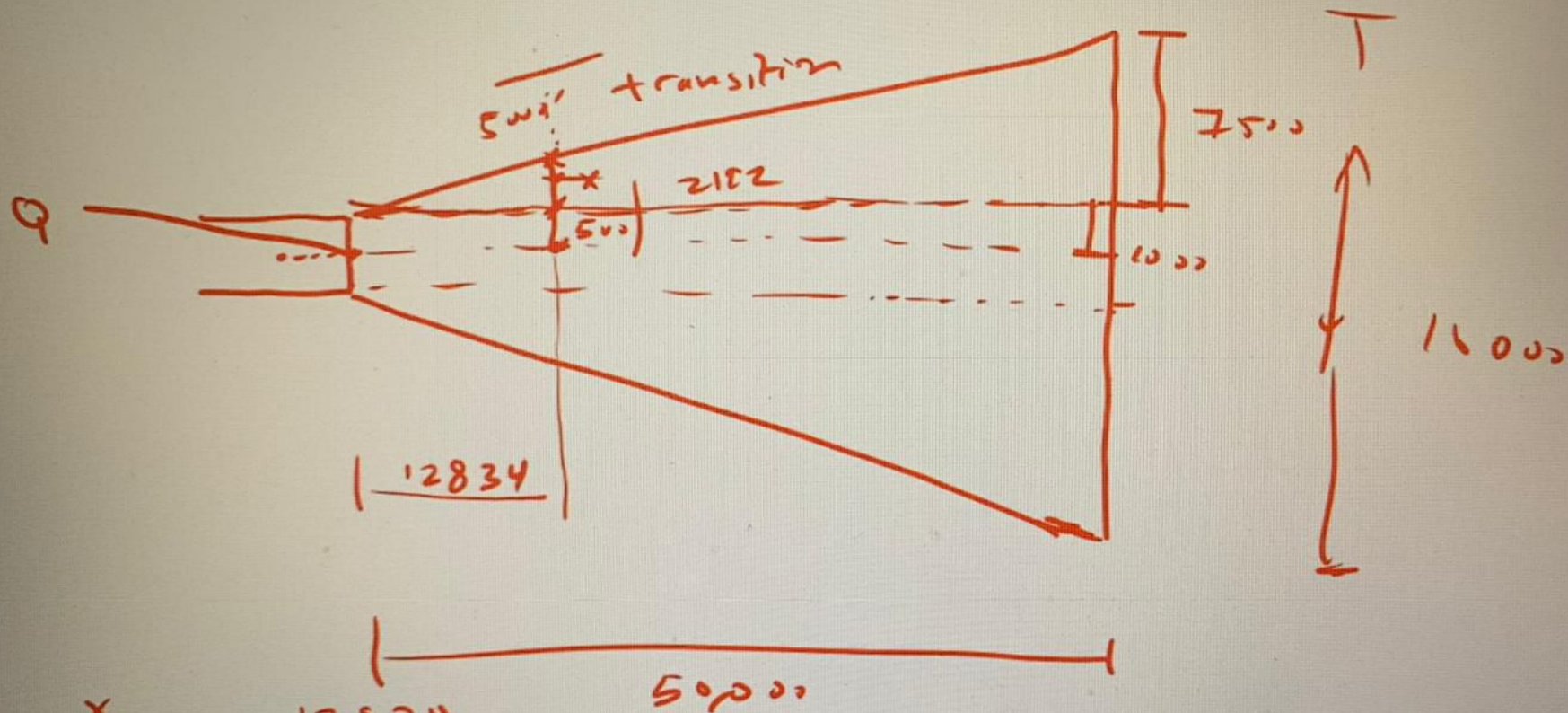
The max. elevation diff. on the site for
group I

$$= 150 + \frac{12834}{20} = \underline{\underline{291.7'}}$$


Group II bridge, approach, transitional surface



SL = distance $\perp$ to RW centerline $L_{\text{extension}} = 12834 \sin \beta = 2192'$
 QL = ~~distance~~ distance along Φ extension $= 12834 \cos \beta = 12643'$



$$\frac{X}{7500} = \frac{12834}{50000}$$

$$X = 1897$$

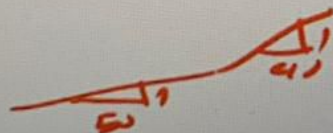
+ from RW extension to edge of horizontal surface = $500 + 1897 = \underline{2397}$

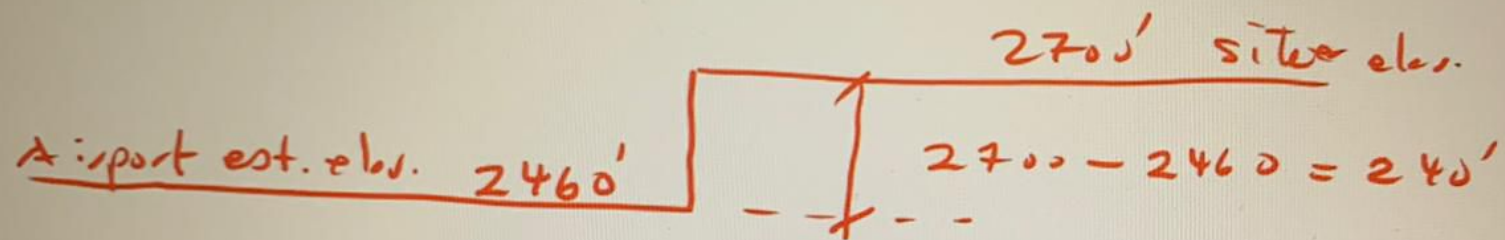
Since the site is located 2192' perpendicular $\perp$ RW
road & extension which is less than 2397' (edge of
approach surface), thus site is within approach.
Hence

The max elevation at site (for group II)

$$= \frac{10,000}{50} + \frac{12645 - 10,000}{40} = 200 + 66.1 = \underline{\underline{266.1'}}$$

Group II controls





The max. structure height allowed = $266.1' - 240 = 26.1'$

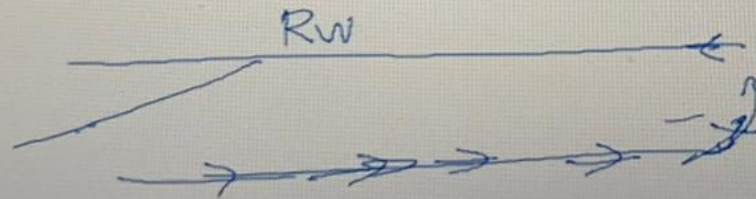
$\approx \underline{\underline{8.0m}}$

Only 2 floors

Runway Capacity

Type of capacity:

- Ultimate or Saturation (based on backlog of waiting aircrafts for landing and takeoffs, recommend by text and instructor)
- Practical capacity (based on tolerable delay)



Factors affecting runway capacity:

- Weather and traffic control conditions (instrument and visual flight rules: IFR and VFR)
- Number and configuration of runways (parallel, spacing, angle, etc.,)
- Fleet mix (same type of aircraft and smaller air craft give higher capacity)
- Arrival/ Departure Ratio (higher capacity for takeoffs than landing)
- Number and location of runway exits
- Touch and go operations (sorties for practice)

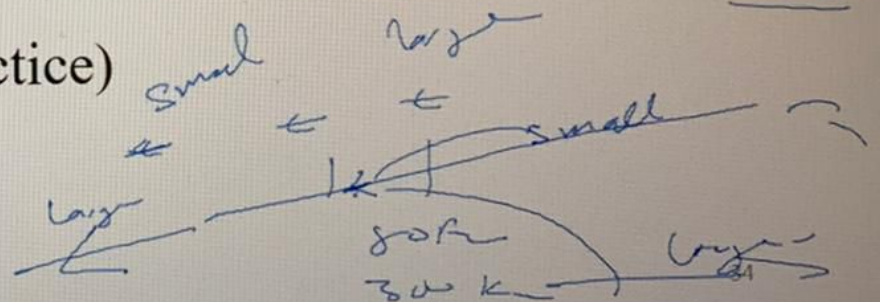
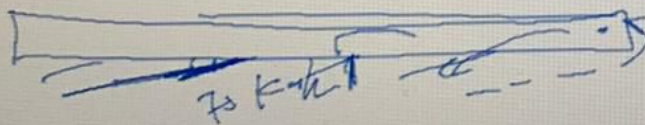
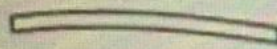
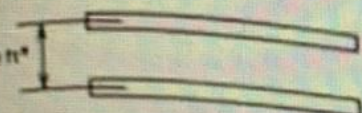
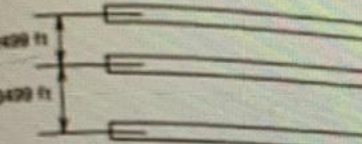
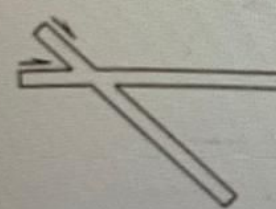
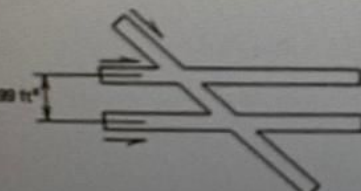


Table 16.3, p. 519 provide hourly capacity and annual service capacity in operations for planning purposes based on aircraft mix and runway configuration **only**

Mix index range (from eq. p. 518): ??

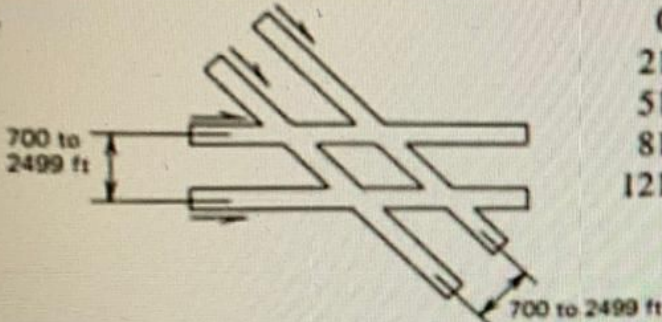
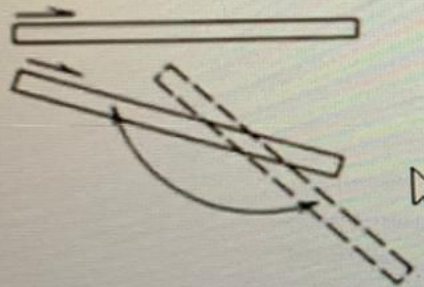
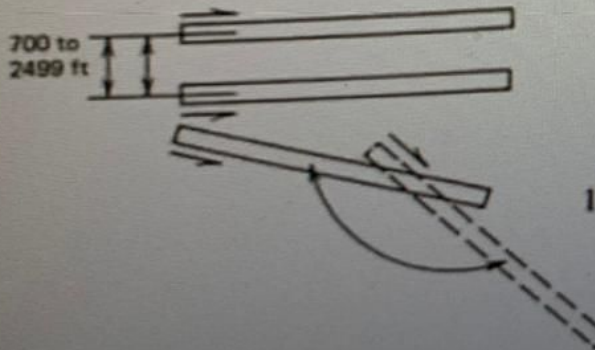
Table 16-3 Airport Capacities for Long-Range Planning Purpose

16-8. Runway Capacity 519

Runway Use Configuration	Mix Index (Percent) (C + 3D)	Hourly Capacity (Operations)		Annual Service Volume (Operations/yr)
		VRF	IFR	
1. 	0-20			
	21-50	98	59	230,000
	51-80	74	57	195,000
	81-120	63	56	205,000
	121-180	55	53	210,000
		51	50	240,000
2. 	0-20			
	21-50	197	59	355,000
	51-80	145	57	275,000
	81-120	121	56	260,000
	121-180	105	59	285,000
		94	60	340,000
3. 	0-20			
	21-50	295	62	385,000
	51-80	219	63	310,000
	81-120	184	65	290,000
	121-180	161	70	315,000
		146	75	385,000
4. 	0-20	98	59	230,000
	21-50	77	57	200,000
	51-80	77	56	215,000
	81-120	76	59	225,000
	121-180	72	60	265,000
5. 	0-20	197	59	355,000
	21-50	145	57	275,000
	51-80	121	56	260,000
	81-120	105	59	285,000
	121-180	94	60	340,000

Continued on following page

Table 16-3 Continued

6.		0-20	197	59	355,000
		21-50	147	57	275,000
		51-80	145	56	270,000
		81-120	138	59	295,000
		121-180	125	60	350,000
7.		0-20	150	59	270,000
		21-50	108	57	225,000
		51-80	85	56	220,000
		81-120	77	59	225,000
		121-180	73	60	265,000
8.		0-20	295	59	385,000
		21-50	210	57	305,000
		51-80	164	56	275,000
		81-120	146	59	300,000
		121-180	129	60	355,000

*Staggered threshold adjustments may apply.

Source: Airport Capacity and Delay, AC 150/5060.5, Federal Aviation Administration, Washington, DC, Sept. 23, 1983.

Table 16.3, p. 519 provide hourly capacity and annual service capacity in operations for planning purposes based on aircraft mix and runway configuration **only**

Mix index range (from eq. p. 518): ??

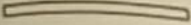
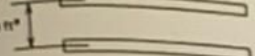
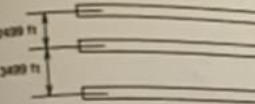
$$MI = \% \text{ of aircraft in C} + 3 (\% \text{ of aircraft in class D})$$

	<u>travels daily</u>	<u>%</u>	
small A	50	.05	5%
B	100	0.1	10%
C	550	.55	55%
large D	300	.30	30%
	<u>1000</u>	<u>1.0</u>	<u>100%</u>

$$MI = 55 + (3)(30) = \underline{145}$$

Table 16-3 Airport Capacities for Long-Range Planning Purpose

16-8. Runway Capacity 519

Runway Use Configuration	Mix Index (Percent) (C + 3D)	Hourly Capacity (Operations)		Annual Service Volume (Operations/yr)
		VRF	IFR	
1. 	0-20			
	21-50	98	59	230,000
	51-80	74	57	195,000
	81-120	63	56	205,000
	121-180	55	53	210,000
2. 	0-20			
	21-50	197	59	355,000
	51-80	145	57	275,000
	81-120	121	56	260,000
	121-180	105	59	285,000
3. 	0-20			
	21-50	295	62	385,000
	51-80	219	63	310,000
	81-120	184	65	290,000
	121-180	161	70	315,000
4. 	0-20	98	59	230,000
	21-50	77	57	200,000
	51-80	77	56	215,000
	81-120	76	59	225,000
	121-180	72	60	265,000
5. 	0-20	197	59	355,000
	21-50	145	57	275,000
	51-80	121	56	260,000
	81-120	105	59	285,000
	121-180	94	60	340,000

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$$MI = \% of C + 3(A) = 0$$

$$= 0 + (3)(10\%) = 30\%$$

A 50
B 50

C 0%

D 10% — 10%