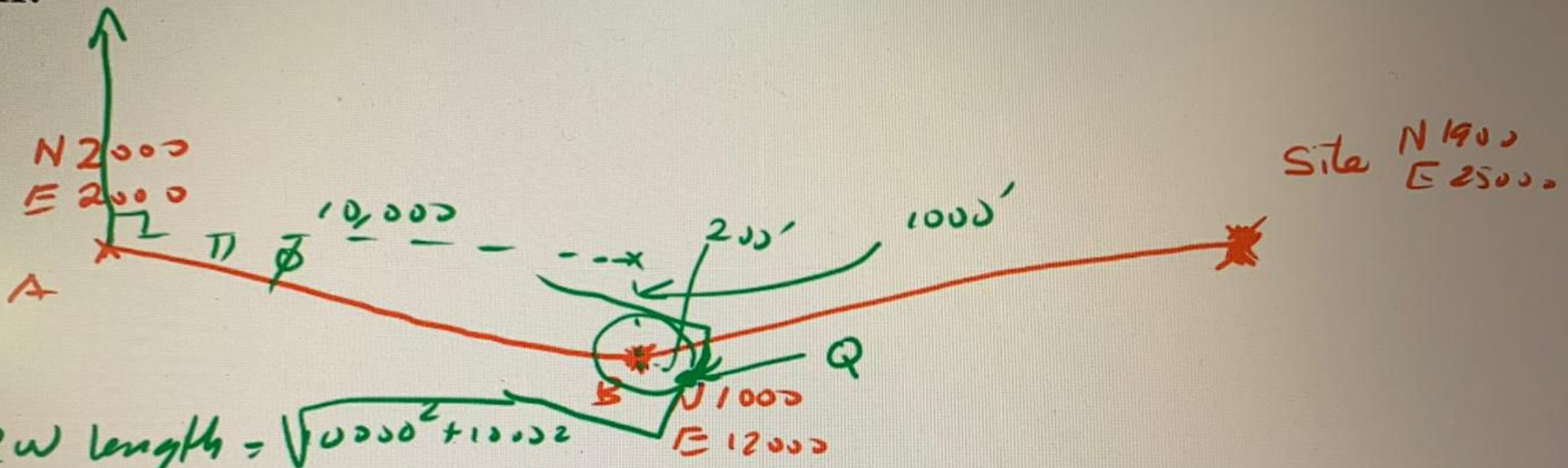
Civil Airport Imaginary Surfaces Example:

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:

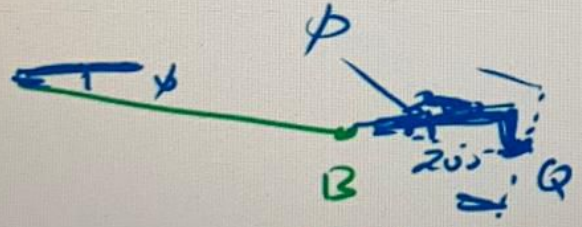


RW length = $\sqrt{10000^2 + 1000^2}$

= 10,050'

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

Azimuth AB = 90 + ϕ = 95°43'

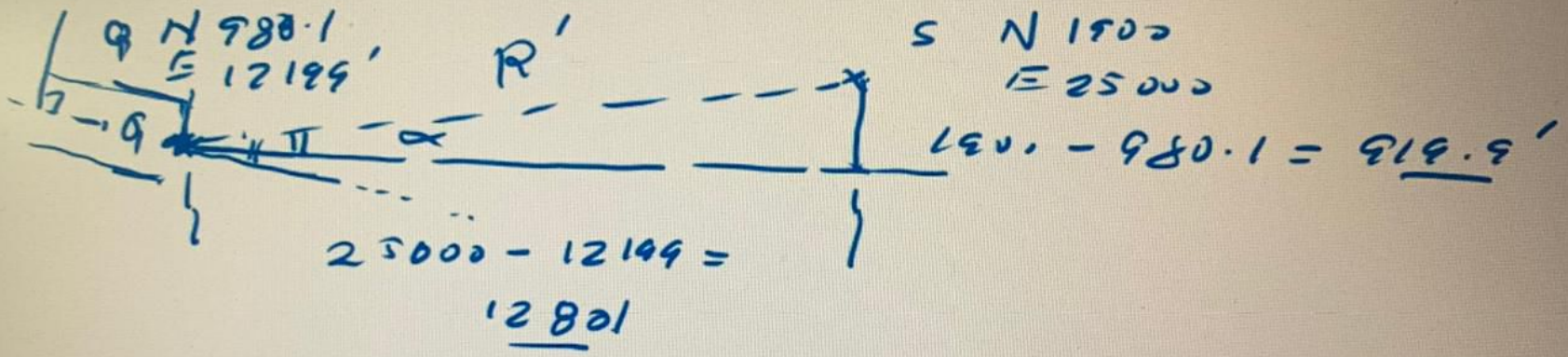


Q_N = 1000 − 200 sin ϕ = 9801'

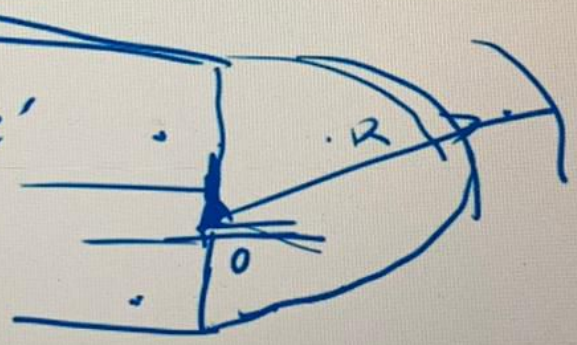
Q_E = 12000 + 200 cos ϕ = 12199'

Case I

primary, horizontal & conical



$$\alpha = \tan^{-1}\frac{519.9}{12801} = 4°7'$$



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

$$R' = 12834'$$

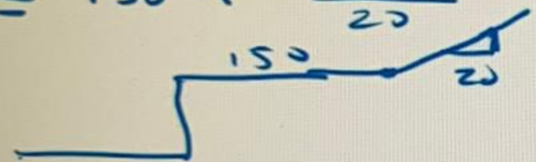
$10{,}000' \leq R' < 14000'$

$\therefore$ ~~Cartic~~ site within conical surface

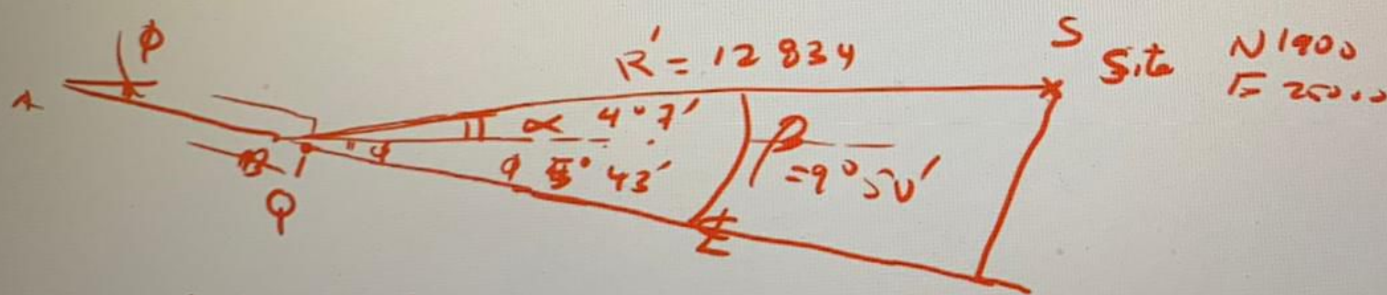
Group I

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

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



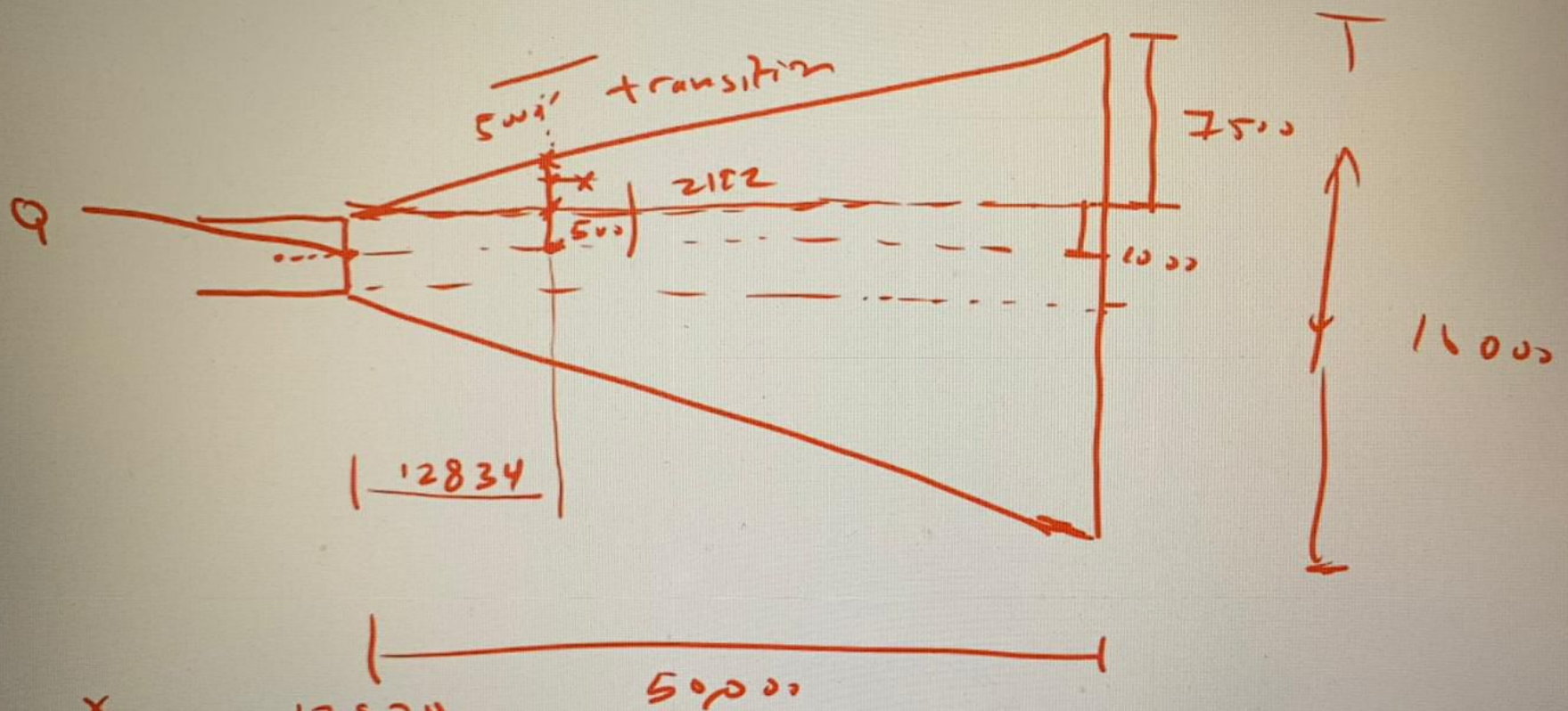
Group II primary, approach, transitional surface



SL = distance from to RW centerline extension $= 12834 \sin\beta = 2192'$

QL = ~~distance~~ distance along ℄ extension $= 12834 \cos\beta = 12643'$

00:36:26 / 01:41:25



$$\frac{X}{7500} = \frac{12834}{50{,}000}$$

$$X = 1897$$

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

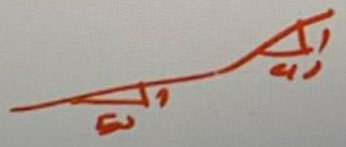
Since the site is located 2192' perpendicular to RW
centerline extension which is less than 2391' (edge of
approach surface), thus site is within approach.

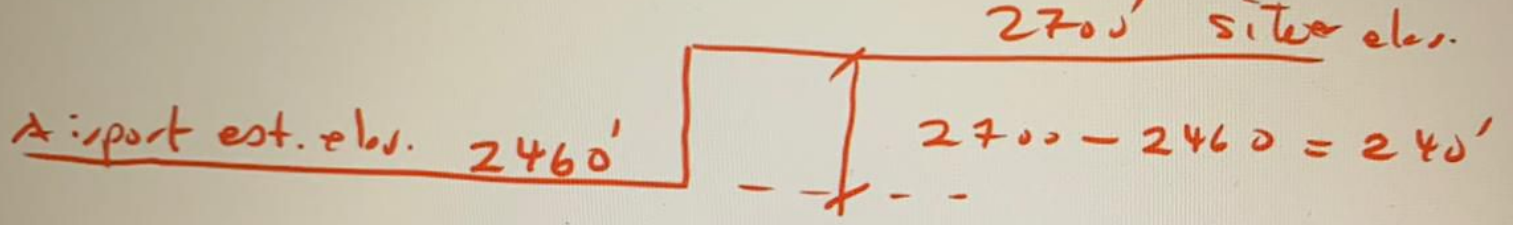
Hence

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'

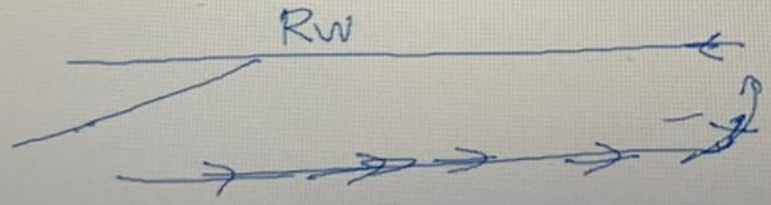
≅ 8.0 m

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 gø operations (sorties for practice)

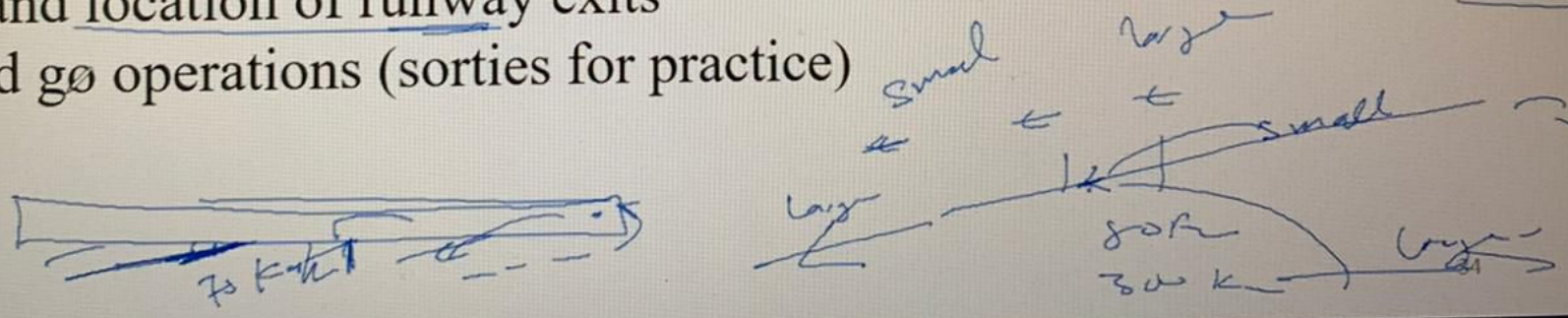


Table 16.3, p. 519 provide hourly capacity and annual service capacity in operations for planning purposes based on aircraft mix and runway configuration **only**

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

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

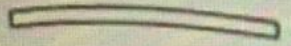
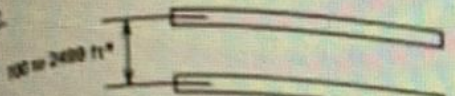
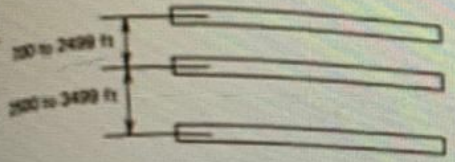
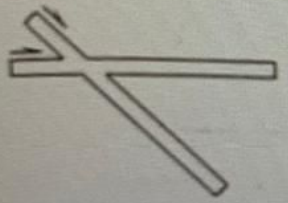
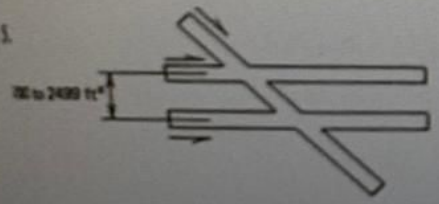
Runway Use Configuration	Mix Index (Percent) (C + 3D)	Hourly Capacity (Operations) VFR	Hourly Capacity (Operations) IFR	Annual Service Volume (Operations/yr)
1. 	0–20	98	59	230,000
	21–50	74	57	195,000
	51–80	63	56	205,000
	81–120	55	53	210,000
	121–180	51	50	240,000
2. 	0–20	197	59	355,000
	21–50	145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

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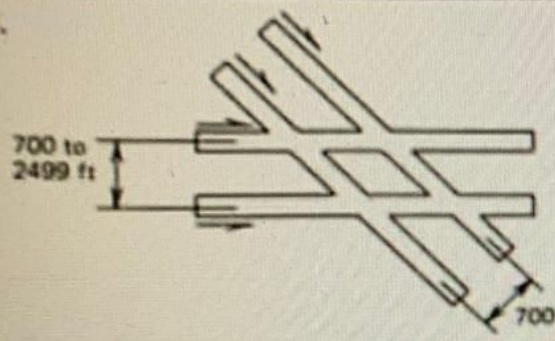
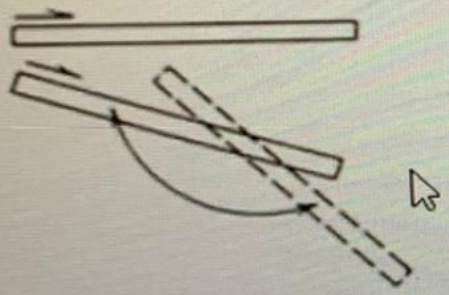
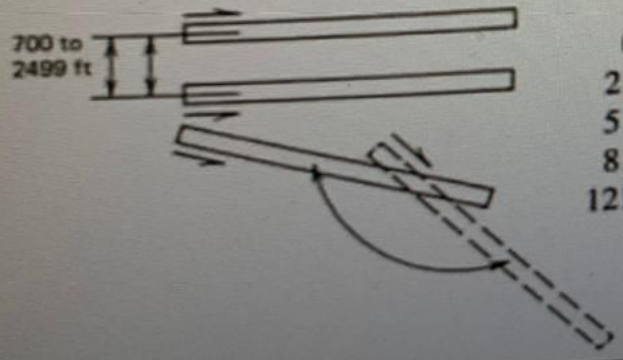
Table 16-3 *Continued*

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

[a]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): ??

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

		typical daily	%	
small	A	50	.05	5%
	B	100	0-1	10%
	C	550	.55	55%
large	D	300	.30	30%
		1000	1.0	100%

$MI = 55 + (3)(30) = 145$

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

Runway Use Configuration	Mix Index (Percent) (C + 3D)	Hourly Capacity (Operations) VFR	Hourly Capacity (Operations) IFR	Annual Service Volume (Operations/yr)
1	0–20	98	59	230,000
	21–50	74	57	195,000
	51–80	63	56	205,000
	81–120	55	53	210,000
	121–180	51	50	240,000
2	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
3	0–20	295	62	385,000
	21–50	219	63	310,000
	51–80	184	65	290,000
	81–120	161	70	315,000
	121–180	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

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

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

A 5°

B 5°

C 0°

D ½ ——— 10°