





Falakiyah Pesantren 1.5 (Data Ephemeris Matahari Dan Bulan)

Oleh: Ahmad Ghozali Muhammad Fathulloh

Diprogram Oleh: Lajnah Falakiyah Al-Mubarak Lanbulan (LAFAL)

PP. Al-Mubarak Lanbulan Baturasang Tambelangan Sampang

Data Ephemeris Matahari Pada Tanggal 01 Juni 2016

Jam	Longitude	Latitude	R. Ascension	Declination	Parallax
09:41:46,00	: 071° 19' 19,59"	-00° 00' 00,33"	069° 46' 26,71"	22° 07' 57,96"	00° 00' 08,67
09:42:46,00	: 071° 19' 21,99"	-00° 00' 00,33"	069° 46' 29,28"	22° 07' 58,29"	00° 00' 08,67
09:43:46,00	: 071° 19' 24,39"	-00° 00' 00,33"	069° 46' 31,84"	22° 07' 58,62"	00° 00' 08,67
09:44:46,00	: 071° 19' 26,78"	-00° 00' 00,33"	069° 46' 34,40"	22° 07' 58,95"	00° 00' 08,67
09:45:46,00	: 071° 19' 29,18"	-00° 00' 00,33"	069° 46' 36,96"	22° 07' 59,28"	00° 00' 08,67
09:46:46,00	: 071° 19' 31,58"	-00° 00' 00,33"	069° 46' 39,53"	22° 07' 59,61"	00° 00' 08,67
09:47:46,00	: 071° 19' 33,97"	-00° 00' 00,33"	069° 46' 42,09"	22° 07' 59,94"	00° 00' 08,67
09:48:46,00	: 071° 19' 36,37"	-00° 00' 00,33"	069° 46' 44,65"	22° 08' 00,27"	00° 00' 08,67
09:49:46,00	: 071° 19' 38,76"	-00° 00' 00,33"	069° 46' 47,21"	22° 08' 00,60"	00° 00' 08,67
09:50:46,00	: 071° 19' 41,16"	-00° 00' 00,33"	069° 46' 49,78"	22° 08' 00,93"	00° 00' 08,67
09:51:46,00	: 071° 19' 43,56"	-00° 00' 00,33"	069° 46' 52,34"	22° 08' 01,26"	00° 00' 08,67
09:52:46,00	: 071° 19' 45,95"	-00° 00' 00,33"	069° 46' 54,90"	22° 08' 01,59"	00° 00' 08,67
09:53:46,00	: 071° 19' 48,35"	-00° 00' 00,33"	069° 46' 57,46"	22° 08' 01,92"	00° 00' 08,67
09:54:46,00	: 071° 19' 50,74"	-00° 00' 00,33"	069° 47' 00,02"	22° 08' 02,24"	00° 00' 08,67
09:55:46,00	: 071° 19' 53,14"	-00° 00' 00,33"	069° 47' 02,59"	22° 08' 02,57"	00° 00' 08,67
09:56:46,00	: 071° 19' 55,54"	-00° 00' 00,34"	069° 47' 05,15"	22° 08' 02,90"	00° 00' 08,67
09:57:46,00	: 071° 19' 57,93"	-00° 00' 00,34"	069° 47' 07,71"	22° 08' 03,23"	00° 00' 08,67
09:58:46,00	: 071° 20' 00,33"	-00° 00' 00,34"	069° 47' 10,27"	22° 08' 03,56"	00° 00' 08,67
09:59:46,00	: 071° 20' 02,73"	-00° 00' 00,34"	069° 47' 12,84"	22° 08' 03,89"	00° 00' 08,67
10:00:46,00	: 071° 20' 05,12"	-00° 00' 00,34"	069° 47' 15,40"	22° 08' 04,22"	00° 00' 08,67
10:01:46,00	: 071° 20' 07,52"	-00° 00' 00,34"	069° 47' 17,96"	22° 08' 04,55"	00° 00' 08,67
10:02:46,00	: 071° 20' 09,91"	-00° 00' 00,34"	069° 47' 20,52"	22° 08' 04,88"	00° 00' 08,67
10:03:46,00	: 071° 20' 12,31"	-00° 00' 00,34"	069° 47' 23,09"	22° 08' 05,21"	00° 00' 08,67
10:04:46,00	: 071° 20' 14,71"	-00° 00' 00,34"	069° 47' 25,65"	22° 08' 05,54"	00° 00' 08,67
10:05:46,00	: 071° 20' 17,10"	-00° 00' 00,34"	069° 47' 28,21"	22° 08' 05,87"	00° 00' 08,67
10:06:46,00	: 071° 20' 19,50"	-00° 00' 00,34"	069° 47' 30,77"	22° 08' 06,19"	00° 00' 08,67
10:07:46,00	: 071° 20' 21,90"	-00° 00' 00,34"	069° 47' 33,33"	22° 08' 06,52"	00° 00' 08,67
10:08:46,00	: 071° 20' 24,29"	-00° 00' 00,34"	069° 47' 35,90"	22° 08' 06,85"	00° 00' 08,67
10:09:46,00	: 071° 20' 26,69"	-00° 00' 00,34"	069° 47' 38,46"	22° 08' 07,18"	00° 00' 08,67
10:10:46,00	: 071° 20' 29,08"	-00° 00' 00,34"	069° 47' 41,02"	22° 08' 07,51"	00° 00' 08,67
10:11:46,00	: 071° 20' 31,48"	-00° 00' 00,34"	069° 47' 43,58"	22° 08' 07,84"	00° 00' 08,67
10:12:46,00	: 071° 20' 33,88"	-00° 00' 00,34"	069° 47' 46,15"	22° 08' 08,17"	00° 00' 08,67
10:13:46,00	: 071° 20' 36,27"	-00° 00' 00,34"	069° 47' 48,71"	22° 08' 08,50"	00° 00' 08,67
10:14:46,00	: 071° 20' 38,67"	-00° 00' 00,34"	069° 47' 51,27"	22° 08' 08,83"	00° 00' 08,67

10:15:46,00 : 071° 20' 41,06" -00° 00' 00,34" 069° 47' 53,83" 22° 08' 09,16" 00° 00' 08,67  
10:16:46,00 : 071° 20' 43,46" -00° 00' 00,34" 069° 47' 56,40" 22° 08' 09,48" 00° 00' 08,67  
10:17:46,00 : 071° 20' 45,86" -00° 00' 00,34" 069° 47' 58,96" 22° 08' 09,81" 00° 00' 08,67  
10:18:46,00 : 071° 20' 48,25" -00° 00' 00,34" 069° 48' 01,52" 22° 08' 10,14" 00° 00' 08,67  
10:19:46,00 : 071° 20' 50,65" -00° 00' 00,34" 069° 48' 04,08" 22° 08' 10,47" 00° 00' 08,67  
10:20:46,00 : 071° 20' 53,05" -00° 00' 00,34" 069° 48' 06,64" 22° 08' 10,80" 00° 00' 08,67  
10:21:46,00 : 071° 20' 55,44" -00° 00' 00,34" 069° 48' 09,21" 22° 08' 11,13" 00° 00' 08,67  
10:22:46,00 : 071° 20' 57,84" -00° 00' 00,34" 069° 48' 11,77" 22° 08' 11,46" 00° 00' 08,67  
10:23:46,00 : 071° 21' 00,23" -00° 00' 00,34" 069° 48' 14,33" 22° 08' 11,79" 00° 00' 08,67  
10:24:46,00 : 071° 21' 02,63" -00° 00' 00,34" 069° 48' 16,89" 22° 08' 12,12" 00° 00' 08,67  
10:25:46,00 : 071° 21' 05,03" -00° 00' 00,34" 069° 48' 19,46" 22° 08' 12,44" 00° 00' 08,67  
10:26:46,00 : 071° 21' 07,42" -00° 00' 00,34" 069° 48' 22,02" 22° 08' 12,77" 00° 00' 08,67  
10:27:46,00 : 071° 21' 09,82" -00° 00' 00,34" 069° 48' 24,58" 22° 08' 13,10" 00° 00' 08,67  
10:28:46,00 : 071° 21' 12,21" -00° 00' 00,34" 069° 48' 27,14" 22° 08' 13,43" 00° 00' 08,67  
10:29:46,00 : 071° 21' 14,61" -00° 00' 00,34" 069° 48' 29,71" 22° 08' 13,76" 00° 00' 08,67  
10:30:46,00 : 071° 21' 17,01" -00° 00' 00,34" 069° 48' 32,27" 22° 08' 14,09" 00° 00' 08,67  
10:31:46,00 : 071° 21' 19,40" -00° 00' 00,34" 069° 48' 34,83" 22° 08' 14,42" 00° 00' 08,67  
10:32:46,00 : 071° 21' 21,80" -00° 00' 00,34" 069° 48' 37,39" 22° 08' 14,75" 00° 00' 08,67  
10:33:46,00 : 071° 21' 24,20" -00° 00' 00,34" 069° 48' 39,96" 22° 08' 15,08" 00° 00' 08,67  
10:34:46,00 : 071° 21' 26,59" -00° 00' 00,34" 069° 48' 42,52" 22° 08' 15,40" 00° 00' 08,67  
10:35:46,00 : 071° 21' 28,99" -00° 00' 00,34" 069° 48' 45,08" 22° 08' 15,73" 00° 00' 08,67  
10:36:46,00 : 071° 21' 31,38" -00° 00' 00,34" 069° 48' 47,64" 22° 08' 16,06" 00° 00' 08,67  
10:37:46,00 : 071° 21' 33,78" -00° 00' 00,34" 069° 48' 50,21" 22° 08' 16,39" 00° 00' 08,67  
10:38:46,00 : 071° 21' 36,18" -00° 00' 00,34" 069° 48' 52,77" 22° 08' 16,72" 00° 00' 08,67  
10:39:46,00 : 071° 21' 38,57" -00° 00' 00,34" 069° 48' 55,33" 22° 08' 17,05" 00° 00' 08,67  
10:40:46,00 : 071° 21' 40,97" -00° 00' 00,34" 069° 48' 57,89" 22° 08' 17,38" 00° 00' 08,67

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Semi Diameter      Distance      Obliquity      Sid. Time      Eq Of Time  
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''' 00° 15' 46,24''	1,014150748	23° 26' 04,31''	035° 44' 53,14''	02 m 08 s
''' 00° 15' 46,24''	1,014150857	23° 26' 04,31''	035° 59' 55,60''	02 m 08 s
''' 00° 15' 46,24''	1,014150966	23° 26' 04,31''	036° 14' 58,07''	02 m 08 s
''' 00° 15' 46,24''	1,014151075	23° 26' 04,31''	036° 30' 00,53''	02 m 08 s
''' 00° 15' 46,24''	1,014151184	23° 26' 04,31''	036° 45' 03,00''	02 m 08 s
''' 00° 15' 46,24''	1,014151293	23° 26' 04,31''	037° 00' 05,46''	02 m 08 s
''' 00° 15' 46,24''	1,014151402	23° 26' 04,31''	037° 15' 07,92''	02 m 08 s
''' 00° 15' 46,24''	1,014151511	23° 26' 04,31''	037° 30' 10,39''	02 m 08 s
''' 00° 15' 46,24''	1,014151620	23° 26' 04,31''	037° 45' 12,85''	02 m 08 s
''' 00° 15' 46,24''	1,014151729	23° 26' 04,31''	038° 00' 15,32''	02 m 08 s
''' 00° 15' 46,24''	1,014151838	23° 26' 04,31''	038° 15' 17,78''	02 m 08 s
''' 00° 15' 46,24''	1,014151947	23° 26' 04,31''	038° 30' 20,25''	02 m 08 s
''' 00° 15' 46,24''	1,014152056	23° 26' 04,31''	038° 45' 22,71''	02 m 08 s
''' 00° 15' 46,24''	1,014152165	23° 26' 04,31''	039° 00' 25,17''	02 m 08 s
''' 00° 15' 46,24''	1,014152274	23° 26' 04,31''	039° 15' 27,64''	02 m 08 s
''' 00° 15' 46,24''	1,014152383	23° 26' 04,31''	039° 30' 30,10''	02 m 08 s
''' 00° 15' 46,24''	1,014152492	23° 26' 04,31''	039° 45' 32,57''	02 m 08 s
''' 00° 15' 46,24''	1,014152600	23° 26' 04,31''	040° 00' 35,03''	02 m 08 s
''' 00° 15' 46,24''	1,014152709	23° 26' 04,31''	040° 15' 37,49''	02 m 08 s
''' 00° 15' 46,24''	1,014152818	23° 26' 04,31''	040° 30' 39,96''	02 m 08 s
''' 00° 15' 46,24''	1,014152927	23° 26' 04,31''	040° 45' 42,42''	02 m 08 s
''' 00° 15' 46,24''	1,014153036	23° 26' 04,31''	041° 00' 44,89''	02 m 08 s
''' 00° 15' 46,24''	1,014153145	23° 26' 04,31''	041° 15' 47,35''	02 m 08 s
''' 00° 15' 46,24''	1,014153254	23° 26' 04,31''	041° 30' 49,81''	02 m 08 s
''' 00° 15' 46,24''	1,014153363	23° 26' 04,31''	041° 45' 52,28''	02 m 08 s
''' 00° 15' 46,24''	1,014153472	23° 26' 04,31''	042° 00' 54,74''	02 m 08 s
''' 00° 15' 46,24''	1,014153581	23° 26' 04,31''	042° 15' 57,21''	02 m 08 s
''' 00° 15' 46,24''	1,014153690	23° 26' 04,31''	042° 30' 59,67''	02 m 08 s
''' 00° 15' 46,24''	1,014153799	23° 26' 04,31''	042° 46' 02,13''	02 m 08 s
''' 00° 15' 46,24''	1,014153908	23° 26' 04,31''	043° 01' 04,60''	02 m 08 s
''' 00° 15' 46,24''	1,014154017	23° 26' 04,31''	043° 16' 07,06''	02 m 08 s
''' 00° 15' 46,24''	1,014154126	23° 26' 04,31''	043° 31' 09,53''	02 m 08 s
''' 00° 15' 46,24''	1,014154235	23° 26' 04,31''	043° 46' 11,99''	02 m 08 s
''' 00° 15' 46,24''	1,014154344	23° 26' 04,31''	044° 01' 14,46''	02 m 08 s

''' 00° 15' 46,24'' 1,014154453 23° 26' 04,31'' 044° 16' 16,92'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014154561 23° 26' 04,31'' 044° 31' 19,38'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014154670 23° 26' 04,31'' 044° 46' 21,85'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014154779 23° 26' 04,31'' 045° 01' 24,31'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014154888 23° 26' 04,31'' 045° 16' 26,78'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014154997 23° 26' 04,31'' 045° 31' 29,24'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014155106 23° 26' 04,31'' 045° 46' 31,70'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014155215 23° 26' 04,31'' 046° 01' 34,17'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014155324 23° 26' 04,31'' 046° 16' 36,63'' 02 m 08 s  
''' 00° 15' 46,24'' 1,014155433 23° 26' 04,31'' 046° 31' 39,10'' 02 m 06 s  
''' 00° 15' 46,24'' 1,014155542 23° 26' 04,31'' 046° 46' 41,56'' 02 m 06 s  
''' 00° 15' 46,24'' 1,014155651 23° 26' 04,31'' 047° 01' 44,02'' 02 m 06 s  
''' 00° 15' 46,24'' 1,014155759 23° 26' 04,31'' 047° 16' 46,49'' 02 m 06 s  
''' 00° 15' 46,24'' 1,014155868 23° 26' 04,31'' 047° 31' 48,95'' 02 m 06 s  
''' 00° 15' 46,24'' 1,014155977 23° 26' 04,31'' 047° 46' 51,42'' 02 m 06 s  
''' 00° 15' 46,24'' 1,014156086 23° 26' 04,31'' 048° 01' 53,88'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014156195 23° 26' 04,31'' 048° 16' 56,34'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014156304 23° 26' 04,31'' 048° 31' 58,81'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014156413 23° 26' 04,31'' 048° 47' 01,27'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014156522 23° 26' 04,31'' 049° 02' 03,74'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014156631 23° 26' 04,31'' 049° 17' 06,20'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014156739 23° 26' 04,31'' 049° 32' 08,67'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014156848 23° 26' 04,31'' 049° 47' 11,13'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014156957 23° 26' 04,31'' 050° 02' 13,59'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014157066 23° 26' 04,31'' 050° 17' 16,06'' 02 m 06 s  
''' 00° 15' 46,23'' 1,014157175 23° 26' 04,31'' 050° 32' 18,52'' 02 m 06 s

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Falakiyah Pesantren 1.5 (Data Ephemeris Matahari Dan Bulan)  
 Oleh: Ahmad Ghozali Muhammad Fathulloh  
 Diprogram Oleh: Lajnah Falakiyah Al-Mubarak Lanbulan (LAFAL)  
 PP. Al-Mubarak Lanbulan Baturasang Tambelangan Sampang

Data Ephemeris Matahari Pada Tanggal 01 Juni 2016

Jam	Longitude	Latitude	R. Ascension	Declination	Parallax
11:43:35,00	071° 24' 11,49"	-00° 00' 00,34"	069° 51' 38,86"	22° 08' 38,00"	00° 00' 08,67
11:44:35,00	071° 24' 13,88"	-00° 00' 00,34"	069° 51' 41,42"	22° 08' 38,33"	00° 00' 08,67
11:45:35,00	071° 24' 16,28"	-00° 00' 00,34"	069° 51' 43,99"	22° 08' 38,66"	00° 00' 08,67
11:46:35,00	071° 24' 18,68"	-00° 00' 00,34"	069° 51' 46,55"	22° 08' 38,99"	00° 00' 08,67
11:47:35,00	071° 24' 21,07"	-00° 00' 00,34"	069° 51' 49,11"	22° 08' 39,32"	00° 00' 08,67
11:48:35,00	071° 24' 23,47"	-00° 00' 00,34"	069° 51' 51,67"	22° 08' 39,64"	00° 00' 08,67
11:49:35,00	071° 24' 25,86"	-00° 00' 00,34"	069° 51' 54,24"	22° 08' 39,97"	00° 00' 08,67
11:50:35,00	071° 24' 28,26"	-00° 00' 00,34"	069° 51' 56,80"	22° 08' 40,30"	00° 00' 08,67
11:51:35,00	071° 24' 30,66"	-00° 00' 00,34"	069° 51' 59,36"	22° 08' 40,63"	00° 00' 08,67
11:52:35,00	071° 24' 33,05"	-00° 00' 00,34"	069° 52' 01,93"	22° 08' 40,95"	00° 00' 08,67
11:53:35,00	071° 24' 35,45"	-00° 00' 00,34"	069° 52' 04,49"	22° 08' 41,28"	00° 00' 08,67
11:54:35,00	071° 24' 37,85"	-00° 00' 00,34"	069° 52' 07,05"	22° 08' 41,61"	00° 00' 08,67
11:55:35,00	071° 24' 40,24"	-00° 00' 00,34"	069° 52' 09,61"	22° 08' 41,94"	00° 00' 08,67
11:56:35,00	071° 24' 42,64"	-00° 00' 00,34"	069° 52' 12,18"	22° 08' 42,27"	00° 00' 08,67
11:57:35,00	071° 24' 45,03"	-00° 00' 00,34"	069° 52' 14,74"	22° 08' 42,59"	00° 00' 08,67
11:58:35,00	071° 24' 47,43"	-00° 00' 00,34"	069° 52' 17,30"	22° 08' 42,92"	00° 00' 08,67
11:59:35,00	071° 24' 49,83"	-00° 00' 00,34"	069° 52' 19,86"	22° 08' 43,25"	00° 00' 08,67
12:00:35,00	071° 24' 52,22"	-00° 00' 00,34"	069° 52' 22,43"	22° 08' 43,58"	00° 00' 08,67
12:01:35,00	071° 24' 54,62"	-00° 00' 00,34"	069° 52' 24,99"	22° 08' 43,91"	00° 00' 08,67
12:02:35,00	071° 24' 57,01"	-00° 00' 00,34"	069° 52' 27,55"	22° 08' 44,23"	00° 00' 08,67
12:03:35,00	071° 24' 59,41"	-00° 00' 00,34"	069° 52' 30,11"	22° 08' 44,56"	00° 00' 08,67
12:04:35,00	071° 25' 01,81"	-00° 00' 00,34"	069° 52' 32,68"	22° 08' 44,89"	00° 00' 08,67
12:05:35,00	071° 25' 04,20"	-00° 00' 00,34"	069° 52' 35,24"	22° 08' 45,22"	00° 00' 08,67
12:06:35,00	071° 25' 06,60"	-00° 00' 00,34"	069° 52' 37,80"	22° 08' 45,54"	00° 00' 08,67
12:07:35,00	071° 25' 09,00"	-00° 00' 00,34"	069° 52' 40,37"	22° 08' 45,87"	00° 00' 08,67
12:08:35,00	071° 25' 11,39"	-00° 00' 00,34"	069° 52' 42,93"	22° 08' 46,20"	00° 00' 08,67
12:09:35,00	071° 25' 13,79"	-00° 00' 00,34"	069° 52' 45,49"	22° 08' 46,53"	00° 00' 08,67
12:10:35,00	071° 25' 16,18"	-00° 00' 00,34"	069° 52' 48,05"	22° 08' 46,86"	00° 00' 08,67
12:11:35,00	071° 25' 18,58"	-00° 00' 00,34"	069° 52' 50,62"	22° 08' 47,18"	00° 00' 08,67
12:12:35,00	071° 25' 20,98"	-00° 00' 00,34"	069° 52' 53,18"	22° 08' 47,51"	00° 00' 08,67
12:13:35,00	071° 25' 23,37"	-00° 00' 00,34"	069° 52' 55,74"	22° 08' 47,84"	00° 00' 08,67
12:14:35,00	071° 25' 25,77"	-00° 00' 00,35"	069° 52' 58,30"	22° 08' 48,17"	00° 00' 08,67
12:15:35,00	071° 25' 28,16"	-00° 00' 00,35"	069° 53' 00,87"	22° 08' 48,49"	00° 00' 08,67

12:16:35,00 : 071° 25' 30,56" -00° 00' 00,35" 069° 53' 03,43" 22° 08' 48,82" 00° 00' 08,67  
12:17:35,00 : 071° 25' 32,96" -00° 00' 00,35" 069° 53' 05,99" 22° 08' 49,15" 00° 00' 08,67  
12:18:35,00 : 071° 25' 35,35" -00° 00' 00,35" 069° 53' 08,55" 22° 08' 49,48" 00° 00' 08,67  
12:19:35,00 : 071° 25' 37,75" -00° 00' 00,35" 069° 53' 11,12" 22° 08' 49,80" 00° 00' 08,67  
12:20:35,00 : 071° 25' 40,15" -00° 00' 00,35" 069° 53' 13,68" 22° 08' 50,13" 00° 00' 08,67  
12:21:35,00 : 071° 25' 42,54" -00° 00' 00,35" 069° 53' 16,24" 22° 08' 50,46" 00° 00' 08,67  
12:22:35,00 : 071° 25' 44,94" -00° 00' 00,35" 069° 53' 18,81" 22° 08' 50,79" 00° 00' 08,67  
12:23:35,00 : 071° 25' 47,33" -00° 00' 00,35" 069° 53' 21,37" 22° 08' 51,11" 00° 00' 08,67  
12:24:35,00 : 071° 25' 49,73" -00° 00' 00,35" 069° 53' 23,93" 22° 08' 51,44" 00° 00' 08,67  
12:25:35,00 : 071° 25' 52,13" -00° 00' 00,35" 069° 53' 26,49" 22° 08' 51,77" 00° 00' 08,67  
12:26:35,00 : 071° 25' 54,52" -00° 00' 00,35" 069° 53' 29,06" 22° 08' 52,10" 00° 00' 08,67  
12:27:35,00 : 071° 25' 56,92" -00° 00' 00,35" 069° 53' 31,62" 22° 08' 52,42" 00° 00' 08,67  
12:28:35,00 : 071° 25' 59,31" -00° 00' 00,35" 069° 53' 34,18" 22° 08' 52,75" 00° 00' 08,67  
12:29:35,00 : 071° 26' 01,71" -00° 00' 00,35" 069° 53' 36,74" 22° 08' 53,08" 00° 00' 08,67  
12:30:35,00 : 071° 26' 04,11" -00° 00' 00,35" 069° 53' 39,31" 22° 08' 53,41" 00° 00' 08,67  
12:31:35,00 : 071° 26' 06,50" -00° 00' 00,35" 069° 53' 41,87" 22° 08' 53,73" 00° 00' 08,67  
12:32:35,00 : 071° 26' 08,90" -00° 00' 00,35" 069° 53' 44,43" 22° 08' 54,06" 00° 00' 08,67  
12:33:35,00 : 071° 26' 11,29" -00° 00' 00,35" 069° 53' 47,00" 22° 08' 54,39" 00° 00' 08,67  
12:34:35,00 : 071° 26' 13,69" -00° 00' 00,35" 069° 53' 49,56" 22° 08' 54,72" 00° 00' 08,67  
12:35:35,00 : 071° 26' 16,09" -00° 00' 00,35" 069° 53' 52,12" 22° 08' 55,04" 00° 00' 08,67  
12:36:35,00 : 071° 26' 18,48" -00° 00' 00,35" 069° 53' 54,68" 22° 08' 55,37" 00° 00' 08,67  
12:37:35,00 : 071° 26' 20,88" -00° 00' 00,35" 069° 53' 57,25" 22° 08' 55,70" 00° 00' 08,67  
12:38:35,00 : 071° 26' 23,28" -00° 00' 00,35" 069° 53' 59,81" 22° 08' 56,03" 00° 00' 08,67  
12:39:35,00 : 071° 26' 25,67" -00° 00' 00,35" 069° 54' 02,37" 22° 08' 56,35" 00° 00' 08,67  
12:40:35,00 : 071° 26' 28,07" -00° 00' 00,35" 069° 54' 04,94" 22° 08' 56,68" 00° 00' 08,67  
12:41:35,00 : 071° 26' 30,46" -00° 00' 00,35" 069° 54' 07,50" 22° 08' 57,01" 00° 00' 08,67  
12:42:35,00 : 071° 26' 32,86" -00° 00' 00,35" 069° 54' 10,06" 22° 08' 57,34" 00° 00' 08,67

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Semi Diameter      Distance      Obliquity      Sid. Time      Eq Of Time

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" 00° 15' 46,23"	1,014164008	23° 26' 04,31"	066° 17' 08,31"	02 m 07 s
" 00° 15' 46,23"	1,014164117	23° 26' 04,31"	066° 32' 10,77"	02 m 07 s
" 00° 15' 46,23"	1,014164226	23° 26' 04,31"	066° 47' 13,24"	02 m 07 s
" 00° 15' 46,23"	1,014164334	23° 26' 04,31"	067° 02' 15,70"	02 m 07 s
" 00° 15' 46,23"	1,014164443	23° 26' 04,31"	067° 17' 18,16"	02 m 07 s
" 00° 15' 46,23"	1,014164552	23° 26' 04,31"	067° 32' 20,63"	02 m 07 s
" 00° 15' 46,23"	1,014164661	23° 26' 04,31"	067° 47' 23,09"	02 m 07 s
" 00° 15' 46,23"	1,014164769	23° 26' 04,31"	068° 02' 25,56"	02 m 07 s
" 00° 15' 46,23"	1,014164878	23° 26' 04,31"	068° 17' 28,02"	02 m 07 s
" 00° 15' 46,23"	1,014164987	23° 26' 04,31"	068° 32' 30,48"	02 m 07 s
" 00° 15' 46,23"	1,014165095	23° 26' 04,31"	068° 47' 32,95"	02 m 07 s
" 00° 15' 46,23"	1,014165204	23° 26' 04,31"	069° 02' 35,41"	02 m 07 s
" 00° 15' 46,23"	1,014165313	23° 26' 04,31"	069° 17' 37,88"	02 m 07 s
" 00° 15' 46,23"	1,014165421	23° 26' 04,31"	069° 32' 40,34"	02 m 07 s
" 00° 15' 46,23"	1,014165530	23° 26' 04,31"	069° 47' 42,80"	02 m 07 s
" 00° 15' 46,23"	1,014165639	23° 26' 04,31"	070° 02' 45,27"	02 m 07 s
" 00° 15' 46,23"	1,014165747	23° 26' 04,31"	070° 17' 47,73"	02 m 07 s
" 00° 15' 46,23"	1,014165856	23° 26' 04,31"	070° 32' 50,20"	02 m 07 s
" 00° 15' 46,23"	1,014165965	23° 26' 04,31"	070° 47' 52,66"	02 m 07 s
" 00° 15' 46,23"	1,014166073	23° 26' 04,31"	071° 02' 55,13"	02 m 07 s
" 00° 15' 46,23"	1,014166182	23° 26' 04,31"	071° 17' 57,59"	02 m 07 s
" 00° 15' 46,23"	1,014166291	23° 26' 04,31"	071° 33' 00,05"	02 m 07 s
" 00° 15' 46,23"	1,014166399	23° 26' 04,31"	071° 48' 02,52"	02 m 07 s
" 00° 15' 46,23"	1,014166508	23° 26' 04,31"	072° 03' 04,98"	02 m 07 s
" 00° 15' 46,23"	1,014166617	23° 26' 04,31"	072° 18' 07,45"	02 m 07 s
" 00° 15' 46,23"	1,014166725	23° 26' 04,31"	072° 33' 09,91"	02 m 07 s
" 00° 15' 46,22"	1,014166834	23° 26' 04,31"	072° 48' 12,37"	02 m 07 s
" 00° 15' 46,22"	1,014166943	23° 26' 04,30"	073° 03' 14,84"	02 m 07 s
" 00° 15' 46,22"	1,014167051	23° 26' 04,30"	073° 18' 17,30"	02 m 07 s
" 00° 15' 46,22"	1,014167160	23° 26' 04,30"	073° 33' 19,77"	02 m 07 s
" 00° 15' 46,22"	1,014167268	23° 26' 04,30"	073° 48' 22,23"	02 m 07 s
" 00° 15' 46,22"	1,014167377	23° 26' 04,30"	074° 03' 24,69"	02 m 07 s
" 00° 15' 46,22"	1,014167486	23° 26' 04,30"	074° 18' 27,16"	02 m 07 s

" 00° 15' 46,22" 1,014167594 23° 26' 04,30" 074° 33' 29,62" 02 m 07 s  
" 00° 15' 46,22" 1,014167703 23° 26' 04,30" 074° 48' 32,09" 02 m 07 s  
" 00° 15' 46,22" 1,014167812 23° 26' 04,30" 075° 03' 34,55" 02 m 07 s  
" 00° 15' 46,22" 1,014167920 23° 26' 04,30" 075° 18' 37,01" 02 m 07 s  
" 00° 15' 46,22" 1,014168029 23° 26' 04,30" 075° 33' 39,48" 02 m 07 s  
" 00° 15' 46,22" 1,014168137 23° 26' 04,30" 075° 48' 41,94" 02 m 07 s  
" 00° 15' 46,22" 1,014168246 23° 26' 04,30" 076° 03' 44,41" 02 m 07 s  
" 00° 15' 46,22" 1,014168355 23° 26' 04,30" 076° 18' 46,87" 02 m 07 s  
" 00° 15' 46,22" 1,014168463 23° 26' 04,30" 076° 33' 49,34" 02 m 07 s  
" 00° 15' 46,22" 1,014168572 23° 26' 04,30" 076° 48' 51,80" 02 m 07 s  
" 00° 15' 46,22" 1,014168680 23° 26' 04,30" 077° 03' 54,26" 02 m 07 s  
" 00° 15' 46,22" 1,014168789 23° 26' 04,30" 077° 18' 56,73" 02 m 07 s  
" 00° 15' 46,22" 1,014168898 23° 26' 04,30" 077° 33' 59,19" 02 m 07 s  
" 00° 15' 46,22" 1,014169006 23° 26' 04,30" 077° 49' 01,66" 02 m 07 s  
" 00° 15' 46,22" 1,014169115 23° 26' 04,30" 078° 04' 04,12" 02 m 07 s  
" 00° 15' 46,22" 1,014169223 23° 26' 04,30" 078° 19' 06,58" 02 m 07 s  
" 00° 15' 46,22" 1,014169332 23° 26' 04,30" 078° 34' 09,05" 02 m 07 s  
" 00° 15' 46,22" 1,014169441 23° 26' 04,30" 078° 49' 11,51" 02 m 07 s  
" 00° 15' 46,22" 1,014169549 23° 26' 04,30" 079° 04' 13,98" 02 m 07 s  
" 00° 15' 46,22" 1,014169658 23° 26' 04,30" 079° 19' 16,44" 02 m 07 s  
" 00° 15' 46,22" 1,014169766 23° 26' 04,30" 079° 34' 18,90" 02 m 07 s  
" 00° 15' 46,22" 1,014169875 23° 26' 04,30" 079° 49' 21,37" 02 m 07 s  
" 00° 15' 46,22" 1,014169984 23° 26' 04,30" 080° 04' 23,83" 02 m 07 s  
" 00° 15' 46,22" 1,014170092 23° 26' 04,30" 080° 19' 26,30" 02 m 07 s  
" 00° 15' 46,22" 1,014170201 23° 26' 04,30" 080° 34' 28,76" 02 m 07 s  
" 00° 15' 46,22" 1,014170309 23° 26' 04,30" 080° 49' 31,22" 02 m 07 s  
" 00° 15' 46,22" 1,014170418 23° 26' 04,30" 081° 04' 33,69" 02 m 07 s

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Falakiyah Pesantren 1.5 (Data Ephemeris Matahari Dan Bulan)  
 Oleh: Ahmad Ghozali Muhammad Fathulloh  
 Diprogram Oleh: Lajnah Falakiyah Al-Mubarak Lanbulan (LAFAL)  
 PP. Al-Mubarak Lanbulan Baturasang Tambelangan Sampang

Data Ephemeris Matahari Pada Tanggal 01 Juni 2016

Jam	Longitude	Latitude	R. Ascension	Declination	Parallax
00:00:00,00	: 070° 56' 05,51"	-00° 00' 00,29"	069° 21' 36,58"	22° 04' 44,46"	00° 00' 08,67
01:00:00,00	: 070° 58' 29,29"	-00° 00' 00,29"	069° 24' 10,22"	22° 05' 04,59"	00° 00' 08,67
02:00:00,00	: 071° 00' 53,07"	-00° 00' 00,30"	069° 26' 43,87"	22° 05' 24,68"	00° 00' 08,67
03:00:00,00	: 071° 03' 16,85"	-00° 00' 00,30"	069° 29' 17,53"	22° 05' 44,74"	00° 00' 08,67
04:00:00,00	: 071° 05' 40,63"	-00° 00' 00,31"	069° 31' 51,19"	22° 06' 04,75"	00° 00' 08,67
05:00:00,00	: 071° 08' 04,41"	-00° 00' 00,31"	069° 34' 24,87"	22° 06' 24,72"	00° 00' 08,67
06:00:00,00	: 071° 10' 28,19"	-00° 00' 00,32"	069° 36' 58,57"	22° 06' 44,65"	00° 00' 08,67
07:00:00,00	: 071° 12' 51,97"	-00° 00' 00,32"	069° 39' 32,27"	22° 07' 04,54"	00° 00' 08,67
08:00:00,00	: 071° 15' 15,74"	-00° 00' 00,33"	069° 42' 05,98"	22° 07' 24,39"	00° 00' 08,67
09:00:00,00	: 071° 17' 39,51"	-00° 00' 00,33"	069° 44' 39,70"	22° 07' 44,20"	00° 00' 08,67
10:00:00,00	: 071° 20' 03,28"	-00° 00' 00,34"	069° 47' 13,43"	22° 08' 03,97"	00° 00' 08,67
11:00:00,00	: 071° 22' 27,06"	-00° 00' 00,34"	069° 49' 47,18"	22° 08' 23,70"	00° 00' 08,67
12:00:00,00	: 071° 24' 50,82"	-00° 00' 00,34"	069° 52' 20,93"	22° 08' 43,39"	00° 00' 08,67
13:00:00,00	: 071° 27' 14,59"	-00° 00' 00,35"	069° 54' 54,70"	22° 09' 03,04"	00° 00' 08,67
14:00:00,00	: 071° 29' 38,36"	-00° 00' 00,35"	069° 57' 28,47"	22° 09' 22,64"	00° 00' 08,67
15:00:00,00	: 071° 32' 02,12"	-00° 00' 00,36"	070° 00' 02,26"	22° 09' 42,21"	00° 00' 08,67
16:00:00,00	: 071° 34' 25,89"	-00° 00' 00,36"	070° 02' 36,05"	22° 10' 01,74"	00° 00' 08,67
17:00:00,00	: 071° 36' 49,65"	-00° 00' 00,37"	070° 05' 09,86"	22° 10' 21,23"	00° 00' 08,67
18:00:00,00	: 071° 39' 13,41"	-00° 00' 00,37"	070° 07' 43,68"	22° 10' 40,68"	00° 00' 08,67
19:00:00,00	: 071° 41' 37,17"	-00° 00' 00,37"	070° 10' 17,50"	22° 11' 00,09"	00° 00' 08,67
20:00:00,00	: 071° 44' 00,93"	-00° 00' 00,38"	070° 12' 51,34"	22° 11' 19,45"	00° 00' 08,67
21:00:00,00	: 071° 46' 24,69"	-00° 00' 00,38"	070° 15' 25,19"	22° 11' 38,78"	00° 00' 08,67
22:00:00,00	: 071° 48' 48,44"	-00° 00' 00,39"	070° 17' 59,05"	22° 11' 58,07"	00° 00' 08,67
23:00:00,00	: 071° 51' 12,20"	-00° 00' 00,39"	070° 20' 32,92"	22° 12' 17,32"	00° 00' 08,67
24:00:00,00	: 071° 53' 35,95"	-00° 00' 00,39"	070° 23' 06,80"	22° 12' 36,52"	00° 00' 08,67

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Semi Diameter	Distance	Obliquity	Sid. Time	Eq Of Time
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" 00° 15' 46,30"	1,014086917	23° 26' 04,32"	249° 54' 29,62"	02 m 12 s
" 00° 15' 46,29"	1,014093538	23° 26' 04,32"	264° 56' 57,46"	02 m 10 s
" 00° 15' 46,29"	1,014100150	23° 26' 04,32"	279° 59' 25,31"	02 m 11 s
" 00° 15' 46,28"	1,014106754	23° 26' 04,32"	295° 01' 53,15"	02 m 09 s
" 00° 15' 46,27"	1,014113349	23° 26' 04,32"	310° 04' 21,00"	02 m 09 s
" 00° 15' 46,27"	1,014119935	23° 26' 04,32"	325° 06' 48,84"	02 m 10 s
" 00° 15' 46,26"	1,014126513	23° 26' 04,31"	340° 09' 16,69"	02 m 09 s
" 00° 15' 46,26"	1,014133082	23° 26' 04,31"	355° 11' 44,53"	02 m 09 s
" 00° 15' 46,25"	1,014139642	23° 26' 04,31"	010° 14' 12,38"	02 m 07 s
" 00° 15' 46,24"	1,014146193	23° 26' 04,31"	025° 16' 40,22"	02 m 07 s
" 00° 15' 46,24"	1,014152735	23° 26' 04,31"	040° 19' 08,07"	02 m 08 s
" 00° 15' 46,23"	1,014159268	23° 26' 04,31"	055° 21' 35,91"	02 m 06 s
" 00° 15' 46,23"	1,014165793	23° 26' 04,31"	070° 24' 03,76"	02 m 07 s
" 00° 15' 46,22"	1,014172308	23° 26' 04,30"	085° 26' 31,60"	02 m 06 s
" 00° 15' 46,21"	1,014178815	23° 26' 04,30"	100° 28' 59,45"	02 m 06 s
" 00° 15' 46,21"	1,014185312	23° 26' 04,30"	115° 31' 27,30"	02 m 06 s
" 00° 15' 46,20"	1,014191801	23° 26' 04,30"	130° 33' 55,14"	02 m 05 s
" 00° 15' 46,20"	1,014198280	23° 26' 04,30"	145° 36' 22,99"	02 m 05 s
" 00° 15' 46,19"	1,014204751	23° 26' 04,30"	160° 38' 50,83"	02 m 03 s
" 00° 15' 46,18"	1,014211212	23° 26' 04,29"	175° 41' 18,68"	02 m 03 s
" 00° 15' 46,18"	1,014217665	23° 26' 04,29"	190° 43' 46,52"	02 m 04 s
" 00° 15' 46,17"	1,014224108	23° 26' 04,29"	205° 46' 14,37"	02 m 02 s
" 00° 15' 46,17"	1,014230542	23° 26' 04,29"	220° 48' 42,21"	02 m 03 s
" 00° 15' 46,16"	1,014236967	23° 26' 04,29"	235° 51' 10,06"	02 m 02 s
" 00° 15' 46,15"	1,014243383	23° 26' 04,28"	250° 53' 37,91"	02 m 02 s

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KEMENTERIAN AGAMA  
UNIVERSITAS ISLAM NEGERI WALISONGO  
FAKULTAS SYARI'AH DAN HUKUM

Jl. Prof. Dr. Hamka Kampus III Ngaliyan Telp./ Fax. 7601291 Semarang

Nomor : Un.10.1/D1/TL.00/348/2016  
Lampiran : 1 (satu) Bendel Proposal  
Hal : Mohon Izin Riset  
A.n. Adi Misbahul Huda

Semarang, 25 Februari 2016

Kepada Yth.  
**KH. Ahmad Ghozali Muhammad Fathullah**  
di Tempat

*Assalamu'alaikum Wr. Wb.*

Diberitahukan dengan hormat, bahwa dalam rangka pelaksanaan Tri Dharma Perguruan Tinggi, mahasiswa kami :

N a m a : Adi Misbahul Huda  
N I M : 122111025  
Jurusan : Ilmu Falak

Sangat membutuhkan data guna penulisan skripsi yang berjudul:

**"RASHDUL KIBLAT DUA KALI DALAM SEHARI DI INDONESIA (STUDI ANALISIS PEMIKIRAN KH. AHMAD GHOZALI MUHAMMAD FATHULLAH DALAM DITAB JAMI' AL-ADILLAH FI MA'RIFATI SIMT AL-QIBLAT) "**

Dosen Pembimbing I : H. Maksun, M.Ag  
Dosen Pembimbing II : Drs. Slamet Hambali, MSI

Untuk itu kami mohon agar mahasiswa tersebut diberi izin untuk melaksanakan penelitian di wilayah/lembaga dimaksud selama 3 (tiga) bulan sejak diizinkan.

Sebagai bahan pertimbangan bersama ini kami lampirkan :

1. Proposal Skripsi
2. Fotocopy Identitas Diri (Kartu Mahasiswa).

Atas izin yang diberikan kami ucapkan terima kasih.

*Wassalamu'alaikum Wr. Wb*

A.n Dekan  
Wakil Dekan  
Bidang Akademik Dan Kelembagaan

**Drs. Sahidin, M.Si**  
NIP. 19670321 199303 1 005

SURAT PERNYATAAN

Yang bertanda tangan di bawah ini

Nama : KH. AHMAD GHOZALI MUHAMMAD FATHULLAH  
Alamat : Desa Batugarong, Kec. Tambelangan, Sampang, Madura  
Tempat/Tanggal Lahir : Madura, 7 Januari 1959  
Jabatan :  
No. Telepon/ Hp : 0813 3180 0088  
Email :

Menyatakan bahwa

Nama : Adi Misbahul Huda  
NIM : 122111025  
Tempat/Tanggal Lahir : Sidomukti, 14 Juni 1994  
Fakultas / Jurusan : Syariah dan Hukum / Ilmu Falak  
Judul Skripsi :

***Rashdul Kiblat Dua Kali Dalam Sehari Di Indonesia (Studi Analisis Pemikiran  
KH. Ahmad Ghozali Muhammad Fathullah dalam Kitab Jami' al-Adillah Fi  
Ma'rifati Simt al-Qiblat)***

Benar-benar telah melakukan wawancara dengan kami pada .....*Jum'at*.....*Minggu*.....  
*18-20* .....*Maret*.....*2016* .....*di* .....*PP. AL Mubarak* .....*Lanbulan*.....

Demikian Surat Pernyataan ini kami buat dengan sebenar-benarnya untuk dapat digunakan sebagaimana mestinya.

21 *Maret* 2016 .....

Yang Menyatakan



**SURAT PERNYATAAN**

Yang bertanda tangan di bawah ini

Nama : ACH. SU'UDI F  
Alamat : TAMBELANGAN  
Tempat/Tanggal Lahir : Sampang, 02-03-1984  
Jabatan : Dewan Lafal (Lajnah Falakryah Al-Mubarak Lambulan)  
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Menyatakan bahwa

Nama : Adi Misbahul Huda  
NIM : 122111025  
Tempat/Tanggal Lahir : Sidomukti, 14 Juni 1994  
Fakultas / Jurusan : Syariah dan Hukum / Ilmu Falak  
Judul Skripsi :

***Rashdul Kiblat Dua Kali Dalam Sehari Di Indonesia (Studi Analisis Pemikiran  
KH. Ahmad Ghozali Muhammad Fathullah dalam Kitab Jami' al-Adillah Fi  
Ma'rifati Simt al-Qiblat )***

Benar-benar telah melakukan wawancara dengan kami pada .....

Demikian Surat Pernyataan ini kami buat dengan sebenar-benarnya untuk dapat digunakan sebagaimana mestinya.

.....  
Yang Menyatakan



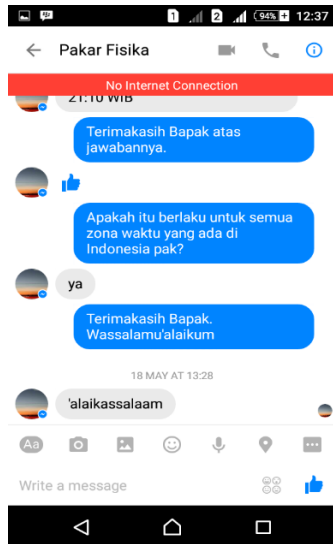
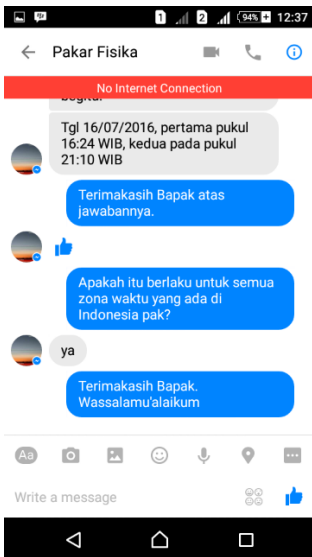
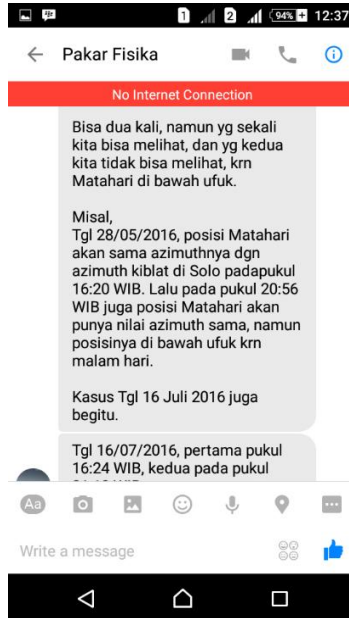
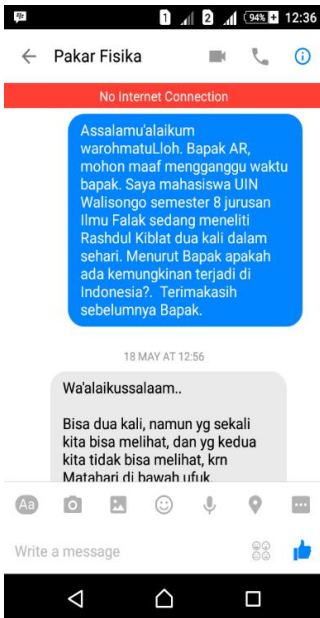


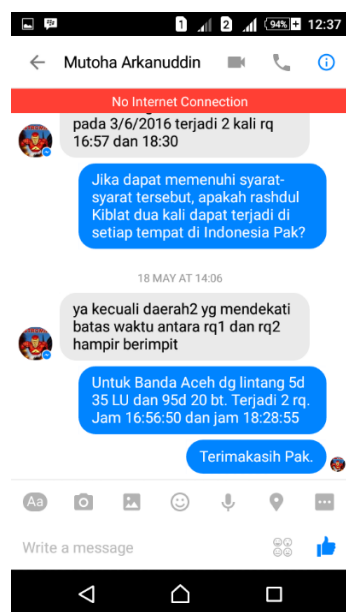
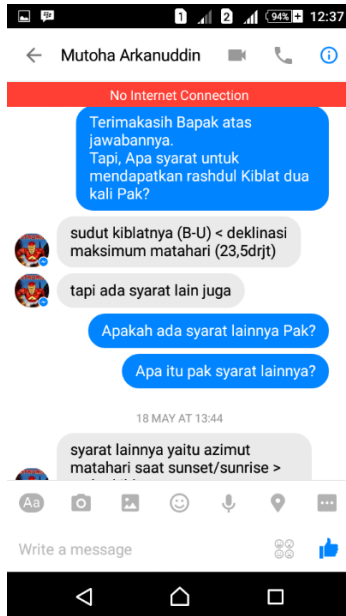
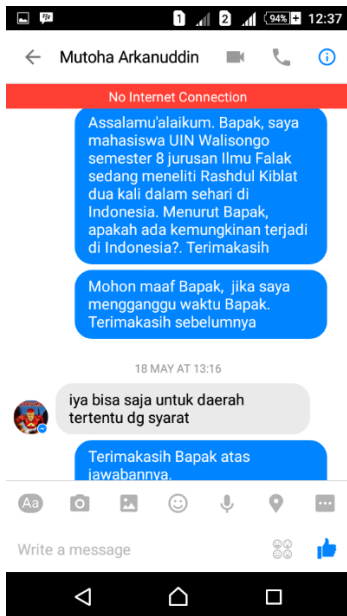
**(FOTO BERSAMA KH. AHMAD GHOZALI MUHAMMAD FATHULLAH)**

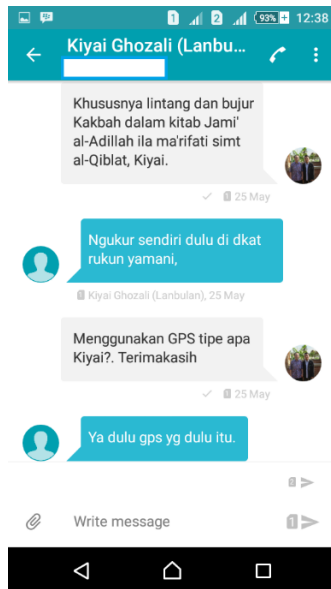
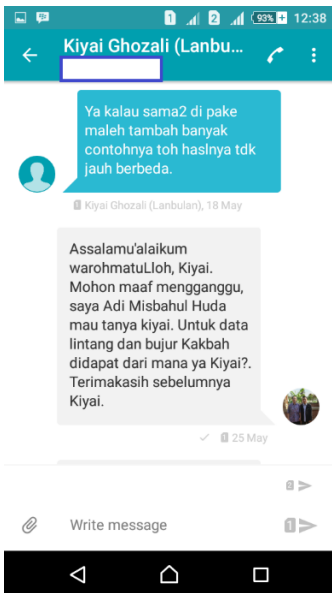
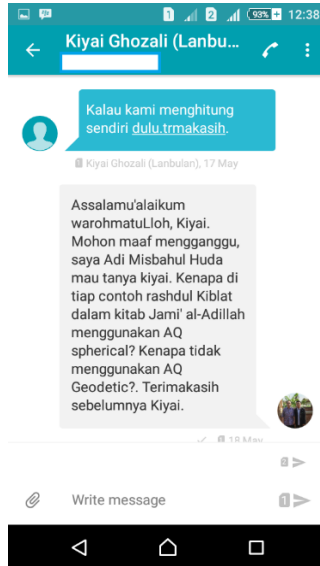
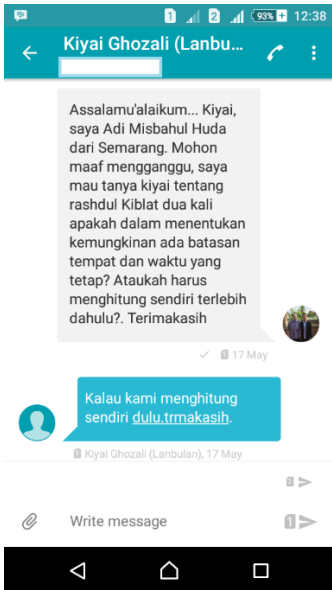


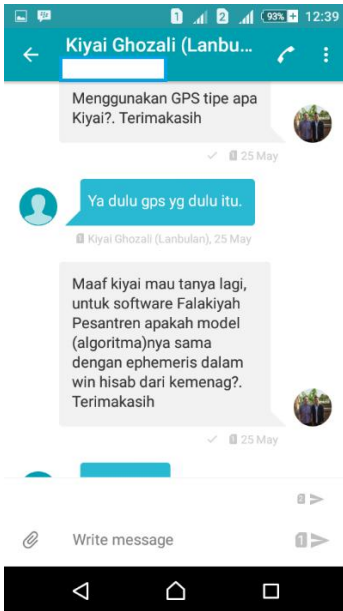
**(FOTO BERSAMA UST. SU'UDI)**











وقوس الحاصل في تمام الجيب ، وما كان هو سمت قبلة الموقع محسوبا من نقطة الشمال على اتجاه إبرة الساعة إن كان فضل الطولين أكثر من مائة وثمانين ، وإن كان أقل منها فاطرح ما كان من ثلاثمائة وستين وما خرج هو سمت القبلة محسوبا من تلك النقطة (Q).

المثال في معرفة سمت قبلة سمفانج (BT 113° 15', LS 11° 7') على الحساب الثامن .

$$\begin{aligned} C &= 360 - \lambda k + \lambda && = 73^\circ 25' 13.73'' \\ h &= \sin^{-1}(\sin \phi \sin \phi k + \cos \phi \cos \phi k \cos C) && = 12^\circ 35' 03.88'' \\ Q &= \cos^{-1}((\sin \phi k - \sin \phi \sin h) / \cos \phi / \cos h) && = 66^\circ 05' 19.85'' \\ &= 360 - 66^\circ 05' 19.58'' && = 293^\circ 54' 40.1'' \end{aligned}$$

وجدنا سمت قبلة مدينة سمفانج على الحساب الثامن ("293° 54' 40.1") محسوبا من نقطة الشمال على اتجاه إبرة الساعة وقس على هذا المثال غيره .

المنهج الثاني لمعرفة سمت القبلة هي معرفة الأطوال والعروض على قاعدة المثلث

الكروي باعتبار أن الأرض مستديرة مفلطحة (oblate spheroid) وفيه طريقتان .

تقدم أن الفرق بين قطر الأرض الإستوائي وقطرها القطبي حوالي (٢١ كلم) بمعنى ان الأرض لا تكون مستديرة تماما كالكرة بل هي إهليلجية وبعبارة أخرى هي مفلطحة وبأخرى هي دائرة إلى الطول كالبيضة (oblate spheroid) كما يشاهد ذلك من الأقمار الصناعية ، فباعتبار فلطحة الأرض وبيضويتها يرى أن نتيجة الحساب لهذا المنهج أدق من المنهج الأول والله أعلم .

#### الطريقة الأولى

المعلومات التي يحتاج إليها قبل الحساب :

١- عرض الموقع المطلوب سمتة ( $\phi$ ) بعلامة النقص (-) في الجنوبي وعلامة الزيادة (+) في الشمالي

٢- طول الموقع المطلوب سمته ( $\lambda$ ) بعلامة النقص (-) في الغربي وعلامة الزيادة (+) في الشرقي

٣- عرض الكعبة المشرفة ( $\phi k$ ) = ( $21^{\circ} 25' 18.89''$ )

٤- طول الكعبة المشرفة ( $\lambda k$ ) = ( $39^{\circ} 49' 46.27''$ )

العمل في الحساب :

١- اعراف نصف قطر الأرض الإستوائي (= (a) semi mayor axis ellipsoid = (radius equator))

وقيمته المعول عليها عندنا (6378137.0) من بين سائر القيم المكتوبة في الجدول الآتي .

٢- اعراف قيمة الفلطحه (= (f) flattening ellipsoid) والتي نفضلها من بين قيمها المسطوره

في الجدول هي (1/298.257223563) وإنما نفضل القيمة المذكورة لأنها المستخدمة كثيرا في

قياس الأطوال والعروض بالآلة الحديثة (GPS)

٣- اعراف نصف قطر الأرض القطبي (b) (semi minor axis ellipsoid (radius pole)) وذلك بأن

تضرب نصف قطر الأرض الإستوائي في الباقي من طرح قيمة الفلطحه من واحد . وهذا هو

جدول القيم لنصف قطر الأرض الإستوائي وقيم الفلطحه :

TABEL ELLIPSOID BUMI

ألقاب الحساب وموعد صدوره	نصف قطر الأرض الإستوائي (a) meter	قيم الفلطحه (1/f)
Geodetic Reference System 1980	6378137	298.257222101
MERIT 1983	6378137	298.257
WGS84	6378137	298.257223563
IERS 1989	6378136	298.257
Geodetic Reference System 1967	6378160	298.2471674273
WGS72	6378135	298.26
IAG 1975	6378140	298.256
IAU 1976	6378140	298.257
Australian National 1965	6378160	298.25
WGS66	6378145	298.25
South American 1969	6378160	298.25
WGS60	6378165	298.3
IAU 1964	6378160	298.25

٤- امش بهذه المعادلات :

$$U1 = \tan^{-1} [(1 - f) \tan \phi k]$$

$$U2 = \tan^{-1} [(1 - f) \tan \phi]$$

$$L0 = \lambda - \lambda k$$

$$\cos \sigma = \sin U1 \sin U2 + \cos U1 \cos U2 \cos L0$$

$$\sin \sigma = \sqrt{((\cos U2 \sin L0)^2 + (\cos U1 \sin U2 - \sin U1 \cos U2 \cos L0)^2)}$$

$$\sigma = \tan^{-1} (\sin \sigma / \cos \sigma)$$

انظر قيمة (cos σ) وقيمة (sin σ) إذا كانت قيمة (cos σ) سلبية فزد على الحاصل (180) وإن

كانت قيمة (cos σ) إيجابية وقيمة (sin σ) سلبية فزد على الحاصل (360) (σ)

$$\sin \alpha = (\cos U1 \cos U2 \sin L0) / \sin \sigma$$

$$\cos^2 \alpha = 1 - \sin^2 \alpha$$

$$\cos (2\sigma m) = \cos \sigma - (2 \sin U1 \sin U2) / \cos^2 \alpha$$

$$C = (f/16) \cos^2 \alpha [4 + f(4 - 3 \cos^2 \alpha)]$$

$$L1 = L0 + (1 - C) f \sin \alpha (\sigma + C \sin \sigma (\cos(2\sigma m) + C \cos \sigma (-1 + 2 \cos(2\sigma m)^2)))$$

أعد حساب (L) حتى يكون الفضل بينها وبين ما قبلها صغيراً هكذا (0.0000000000000)

٥- احسب سمت قبلة الموقع وسمت الموقع من الكعبة بهذه المعادلات :

$$x = \cos U1 \sin U2 - \sin U1 \cos U2 \cos L \text{ terakhir}$$

$$y = \cos U2 \sin L \text{ terakhir}$$

$$\alpha 1 = \tan^{-1}(y/x)$$

$$x = -\sin U1 \cos U2 + \cos U1 \sin U2 \cos L \text{ terakhir}$$

$$y = \cos U1 \sin L \text{ terakhir}$$

$$\alpha 2 = \tan^{-1}(y/x)$$

Azimut Tempat dari Ka'bah = α1 (سمت الموقع من الكعبة من نقطة الشمال باتجاه إبرة الساعة)

Azimut Ka'bah dari Tempat = α2

= α2 (سمت الكعبة من الموقع من نقطة الجنوب باتجاه إبرة الساعة)

= α2 - 180 (سمت الكعبة من الموقع من نقطة الشمال باتجاه إبرة الساعة)

إن كان الحاصل إيجابياً، ويعكسه إن كان سلبياً)

= α2 - 180 + 360 (سمت الكعبة من الموقع من نقطة الشمال باتجاه إبرة الساعة)

٦- احسب المسافة بين الموقع والكعبة بدقة عالية بهذه المعادلات :

$$- u^2 = \cos^2 \alpha (a^2 - b^2) / b^2$$

$$- A = 1 + (u^2/16384) (4096 + u^2 (-768 + u^2(320 - 175 u^2)))$$

$$B = (u^2/1024)(256 + u^2 (-128 + u^2 (74 - 47 u^2)))$$

$$\Delta\sigma = B \sin \sigma (\cos (2\sigma m) + (1/4) B (\cos \sigma (-1 + 2 \cos (2\sigma m)^2 - (1/6) B \cos (2\sigma m) (-3 + 4 \sin \sigma^2) (-3 + 4 \cos (2\sigma m)^2)))$$

$$S \text{ (Jarak dalam satuan meter)} = b A((\sigma \times \pi / 180) - \Delta\sigma) \text{ (مسافة ما بين الموقع والكعبة)}$$

\*\*\*\*\*

المثال في معرفة سمت قبة سمفانج (BT) 15' 113° LS، والمسافة بين سمفانج والكعبة على هذا المنهج الإهليلجي المشهور بفانشتي .

$$\begin{aligned} \phi_k \text{ (عرض مكة)} &= 21^\circ 25' 18.89'' \\ \lambda_k \text{ (طول مكة)} &= 39^\circ 49' 46.27'' \\ \phi \text{ (جنوبي (-) شمالي (+) عرض الموقع/سمفانج)} &= -7^\circ 11' \\ \lambda \text{ (غربي (-) شرقي (+) طول الموقع/سمفانج)} &= 113^\circ 15' \end{aligned}$$

عملية الحساب :

$$\begin{aligned} a \text{ (semi mayor axis ellipsoid (radius equator))} &= 6378137 \checkmark \\ f \text{ (flattening ellipsoid)} &= 1/298.257223563 = 0.003352810665 \\ b \text{ (semi minor axis ellipsoid (radius pole))} &= a(1 - f) = 6356752.314 \checkmark \\ U1 &= \tan^{-1} [(1 - f) \tan \phi_k] = 21.35656982 \\ U2 &= \tan^{-1} [(1 - f) \tan \phi] = -7.159499314 \\ L0 &= \lambda - \lambda_k = 73.42048056 \end{aligned}$$

احسب لقيمة (L0) بهذه المعادلات :

$$\begin{aligned} - \cos \sigma &= \sin U1 \sin U2 + \cos U1 \cos U2 \cos L0 = 0.218292332 \\ - \sin \sigma &= \sqrt{((\cos U2 \sin L0)^2 + (\cos U1 \sin U2 - \sin U1 \cos U2 \cos L0)^2)} = 0.975883424 \\ - \sigma &= \tan^{-1}(\sin \sigma / \cos \sigma) = 77.39124674 \\ - \sin \alpha &= (\cos U1 \cos U2 \sin L0) / \sin \sigma = 0.907538726 \\ - \cos^2 \alpha &= 1 - \sin^2 \alpha = 0.176373459 \\ - \cos (2\sigma m) &= \cos \sigma - (2 \sin U1 \sin U2) / \cos^2 \alpha = 0.732965213 \\ - C &= (f/16) \cos^2 \alpha [4 + f(4 - 3 \cos^2 \alpha)] = 0.0001482668056 \\ L1 &= L0 + (1 - C) f \sin \alpha (\sigma + C \sin \sigma (\cos(2\sigma m) + C \cos \sigma (-1 + 2 \cos(2\sigma m)^2))) = 73.65593248 \end{aligned}$$



: أعدد الحساب لقيمة (L1)

$$\begin{aligned}
 - \cos \sigma &= \sin U1 \sin U2 + \cos U1 \cos U2 \cos L1 &= 0.214650608 \\
 - \sin \sigma &= \sqrt{((\cos U2 \sin L1)^2 + (\cos U1 \sin U2 - \sin U1 \cos U2 \cos L1)^2)} = 0.976690901 \\
 - \sigma &= \tan^{-1}(\sin \sigma / \cos \sigma) &= 77.60496992 \\
 - \sin \alpha &= (\cos U1 \cos U2 \sin L1) / \sin \sigma &= 0.907890189 \\
 - \cos^2 \alpha &= 1 - \sin^2 \alpha &= 0.175735404 \\
 - \cos(2\sigma m) &= \cos \sigma - (2 \sin U1 \sin U2) / \cos^2 \alpha &= 0.731192148 \\
 - C &= (f/16) \cos^2 \alpha [4 + f(4 - 3 \cos^2 \alpha)] &= 0.0001477306663 \\
 L2 &= L0 + (1 - C) f \sin \alpha (\sigma + C \sin \sigma (\cos(2\sigma m) \\
 &\quad + C \cos \sigma (-1 + 2 \cos(2\sigma m)^2))) &= 73.65667426 \\
 \text{Selisih L} &= \text{abs}(L1 - L2) &= 0.000741782
 \end{aligned}$$

: أعدد الحساب لقيمة (L2)

$$\begin{aligned}
 - \cos \sigma &= \sin U1 \sin U2 + \cos U1 \cos U2 \cos L2 &= 0.214639128 \\
 - \sin \sigma &= \sqrt{((\cos U2 \sin L2)^2 + (\cos U1 \sin U2 - \sin U1 \cos U2 \cos L2)^2)} = 0.976693424 \\
 - \sigma &= \tan^{-1}(\sin \sigma / \cos \sigma) &= 77.60564338 \\
 - \sin \alpha &= (\cos U1 \cos U2 \sin L2) / \sin \sigma &= 0.90789129 \\
 - \cos^2 \alpha &= 1 - \sin^2 \alpha &= 0.175733404 \\
 - \cos(2\sigma m) &= \cos \sigma - (2 \sin U1 \sin U2) / \cos^2 \alpha &= 0.731186548 \\
 - C &= (f/16) \cos^2 \alpha [4 + f(4 - 3 \cos^2 \alpha)] &= 0.0001477289855 \\
 L3 &= L0 + (1 - C) f \sin \alpha (\sigma + C \sin \sigma (\cos(2\sigma m) \\
 &\quad + C \cos \sigma (-1 + 2 \cos(2\sigma m)^2))) &= 73.65667766 \\
 \text{Selisih L} &= \text{abs}(L2 - L3) &= 0.0000023367
 \end{aligned}$$

: أعدد الحساب لقيمة (L3)

$$\begin{aligned}
 - \cos \sigma &= \sin U1 \sin U2 + \cos U1 \cos U2 \cos L3 &= 0.214639092 \\
 - \sin \sigma &= \sqrt{((\cos U2 \sin L3)^2 + (\cos U1 \sin U2 - \sin U1 \cos U2 \cos L3)^2)} = 0.976693432 \\
 - \sigma &= \tan^{-1}(\sin \sigma / \cos \sigma) &= 77.6056455 \\
 - \sin \alpha &= (\cos U1 \cos U2 \sin L3) / \sin \sigma &= 0.907891294 \\
 - \cos^2 \alpha &= 1 - \sin^2 \alpha &= 0.175733397
 \end{aligned}$$

$$\begin{aligned} \cos(2\sigma) &= \cos \sigma - (2 \sin U1 \sin U2) / \cos^2 \alpha &= 0.73118653 \\ C &= (f/16) \cos^2 \alpha [4 + f(4 - 3 \cos^2 \alpha)] &= 0.0001477289802 \\ 4 &= L0 + (1 - C) f \sin \alpha (\sigma + C \sin \sigma (\cos(2\sigma) \\ &\quad + C \cos \sigma (-1 + 2 \cos(2\sigma)^2))) &= 73.6566766 \\ \text{elisih L} &= \text{abs}(L3 - L4) &= 0.0000000074 \end{aligned}$$

أعد الحساب لقيمة (L4) :

$$\begin{aligned} \cos \sigma &= \sin U1 \sin U2 + \cos U1 \cos U2 \cos L4 &= 0.214639092 \\ \sin \sigma &= \sqrt{((\cos U2 \sin L4)^2 + (\cos U1 \sin U2 - \sin U1 \cos U2 \cos L4)^2)} &= 0.976693432 \\ \sigma &= \tan^{-1}(\sin \sigma / \cos \sigma) &= 77.60564551 \\ \sin \alpha &= (\cos U1 \cos U2 \sin L4) / \sin \sigma &= 0.907891294 \\ \cos^2 \alpha &= 1 - \sin^2 \alpha &= 0.175733397 \\ \cos(2\sigma) &= \cos \sigma - (2 \sin U1 \sin U2) / \cos^2 \alpha &= 0.73118653 \\ C &= (f/16) \cos^2 \alpha [4 + f(4 - 3 \cos^2 \alpha)] &= 0.0001477289801 \\ .5 &= L0 + (1 - C) f \sin \alpha (\sigma + C \sin \sigma (\cos(2\sigma) \\ &\quad + C \cos \sigma (-1 + 2 \cos(2\sigma)^2))) &= 73.65667661 \\ \text{elisih L} &= \text{abs}(L4 - L5) &= 0.000000000 \end{aligned}$$

هنا عند (L5) لا يعاد الحساب لأن الفضل يكون صفرا باستخدام الحاسبة (CASIO fx-4500P.A) وربما يكون الفضل مفقودا / صفرا باستخدام الحاسبة (Kalkulator) في حين أن الفضل لا يزال موجودا عند استخدام الحاسوب (Komputer) فيحتاج إلى إعادة الحساب بالحاسوب حتى يكود الفضل (0.000000000) لكن الفرق بينهما ضئيل وإن كان الحساب بالحاسوب أزيد دقة .

ادخل في حساب سمت القبلة بهذه المعادلات

$$\begin{aligned} x &= \cos U1 \sin U2 - \sin U1 \cos U2 \cos L5 &= -0.21774963 \\ y &= \cos U2 \sin L5 &= 0.952110896 \\ x1 &= \tan^{-1}(y/x) &= 102^\circ 52' 55.5'' \\ x &= -\sin U1 \cos U2 + \cos U1 \sin U2 \cos L5 &= -0.393993769 \\ y &= \cos U1 \sin L5 &= 0.893699597 \\ \alpha 2 &= \tan^{-1}(y/x) &= 113^\circ 47' 26.2'' \end{aligned}$$

$$\begin{aligned} \text{Azimut Tempat dari Ka'bah} &= \alpha_1 &&= 102^\circ 52' 55.5'' \\ \text{Azimut Ka'bah dari Tempat} &= \alpha_2 &&= 113^\circ 47' 26.2'' \\ &= \alpha_2 - 180 &&= -66^\circ 12' 33.76'' \\ &= \alpha_2 - 180 + 360 &&= 293^\circ 47' 26.2'' \end{aligned}$$

ادخل في حساب المسافة بين موقع سمفانج وبين الكعبة المعظمة بوحدات المتر كما يلي :

$$\begin{aligned} - u^2 &= \cos^2 \alpha (a^2 - b^2)/b^2 &&= 0.001184354671 \\ - A &= 1 + (u^2/16384) (4096 + u^2 (-768 + u^2(320 - 175 u^2))) &&= 1.000296023 \\ - B &= (u^2/1024)(256 + u^2 (-128 + u^2 (74 - 47 u^2))) &&= 0.0002959134506 \\ - \Delta\sigma &= B \sin \sigma (\cos (2\sigma m) + (1/4) B (\cos \sigma (-1 + 2 \cos (2\sigma m)^2) - (1/6) \\ &\quad B \cos (2\sigma m) (-3 + 4 \sin^2 \sigma) (-3 + 4 \cos (2\sigma m)^2))) &&= 0.0002113254538 \\ S (\text{Jarak dalam satuan meter}) &= b A((\sigma \times \pi / 180) - \Delta\sigma) &&= 8611260.972 \end{aligned}$$

نتيجة حساب سمت القبلة على الطريقة الأولى من المنهج الثاني الإهليلجي المعروف بالفانشتي :

- سمت موقع سمفانج من الكعبة : ( $102^\circ 52' 55.5''$ ) من نقطة الشمال باتجاه إبرة الساعة
  - سمت الكعبة من موقع سمفانج : ( $113^\circ 47' 26.2''$ ) من نقطة الجنوب باتجاه إبرة الساعة .
  - سمت الكعبة من موقع سمفانج : ( $-66^\circ 12' 33.76''$ ) من نقطة الشمال عكس اتجاه إبرة الساعة .
  - سمت الكعبة من موقع سمفانج : ( $293^\circ 47' 26.2''$ ) من نقطة الشمال باتجاه إبرة الساعة .
- المسافة بين سمفانج والكعبة بالتر : ( $8611260.972 \text{ mtr} / 1000 = 8611.261 \text{ km}$ )

$$\begin{aligned} \text{Waktu} &= \text{zawal matahari} - t/15 \\ &= 10:19 \text{ WIS} = \text{LAT (Local Apparent Time)} \quad (\text{الساعة المستوية المحلية}) \\ \text{WD} &= \text{LAT} + ((\text{TZ} \times 15) - \lambda) / 15 - 13 \text{ (e)} \\ &= 10:46 \text{ WD} \quad (\text{الساعة الوسطية الدائرية}) \end{aligned}$$

معرفة ساعة رصد القبلة بالآلة الحاسبة على إمكان واحد في اليوم

الأمور التي يحتاج إليها لمعرفة ساعة رصد القبلة .

١- عرض الموقع المطلوب سمته ( $\phi$ ) بعلامة النقص (-) في الجنوبي ، وعلامة الزيادة (+) في الشمالي .

٢- طول الموقع المطلوب سمته ( $\lambda$ ) بعلامة النقص (-) في الغربي وعلامة الزيادة (+) في الشرقي .

٣- سمت القبلة (AQ)

٤- فارق التوقيت (TZ)

٥- ميل الشمس ( $\delta$ ) في ساعة (00.00) يؤخذ من برنامج فلكية بسانترين رقم (1.0) (software Falakiyah Pesantren 1.0)

٦- تعديل الزمن (e) في ساعة (00.00) يؤخذ من برنامج فلكية بسانترين

٧- فضل الدائر (t) وارتفاع الشمس (h) ولتحصيلهما طريقتان .

الطريقة الأولى : أن تعمل لهما بهذه المعادلة :

$$\begin{aligned} - C &= 90 - \phi \\ - M1 &= 90 - \delta \\ - M2 &= 90 - \tan^{-1}(\cos C \tan AQ) \\ - M3 &= \cos^{-1}((\tan M1)^{-1} \tan C \cos M2) \\ - t &= M3 - M2 \quad (\text{بالقيمة المطلقة}) \\ - h &= \sin^{-1}(\sin \phi \sin \phi + \cos \delta \cos \delta \cos t) \end{aligned}$$

الطريقة الثانية : أن تحصل لهما بهذه المعادلة :

$$\begin{aligned} - t_i &= \tan^{-1}((\tan \phi)^{-1} \cos AQ) \\ - M1 &= \sin^{-1}(\cos t_i \sin \delta / \sin \phi) \\ - h &= t_i +/- M1 \end{aligned}$$

وانظر تعديل الإرتفاع (ii) والمخفوظ (MI) إن كان تعديل الإرتفاع سلبيا والمخفوظ إيجابيا فانقص تعديل الإرتفاع من المخفوظ، وإن كان تعديل الإرتفاع إيجابيا والمخفوظ سلبيا فزد تعديل الإرتفاع إلى المخفوظ وخذ الحاصل بالقيمة المطلقة، وإن كان تعديل الإرتفاع والمخفوظ سلبيين فانقص المخفوظ من تعديل الإرتفاع وخذ الباقي بالقيمة المطلقة، وإن كان تعديل الإرتفاع والمخفوظ إيجابيين فزد تعديل الإرتفاع إلى المخفوظ .

$$- t = \cos^{-1}((\sin h - \sin \phi \sin \delta) / (\cos \delta \cos \phi))$$
$$- h = \text{harga mutlak (بالقيمة المطلقة)}$$

حساب ساعة رصد القبلة بهذه المعادلة :

$$- BQ = (12 - e) \pm t/15$$

وانظر زاوية التكميل (C) والمخفوظ (MI) وسمت القبلة (AQ) إن كانت زاوية التكميل أقل من المخفوظ وسمت القبلة أكثر من مائة وثمانين فساعة رصد القبلة على هذه المعادلة :

$$(12 - e) - t/15$$

وإن كانت زاوية التكميل أقل من المخفوظ وسمت القبلة أقل من مائة وثمانين فساعة رصد القبلة على هذه المعادلة :

$$(12 - e) - t/15$$

وإن كانت الحالة غير هاتين الحالتين فساعة رصد القبلة على هذه المعادلة :

$$(12 - e) + t/15$$

وما خرج هي ساعة رصد القبلة (BQ) بالساعة الوسطية (LMT) وإن أردت تحويلها إلى الساعة الدائرية للموقع المطلوب فعليك بهذه المعادلة :

$$LMT + ((TZ \times 15) - \lambda) / 15$$

المثال في معرفة ساعة رصد القبلة في ٩ - يناير ٢٠١٤ م بمدينة سمفانج مدورا جاوى الشرقية .

$$AQ = \text{سمت القبلة} = 293^\circ 54' 40.1''$$

$$\phi = \text{عرض الموقع} = -7^\circ 11' LS$$

$$\lambda = \text{طول الموقع} = 113^\circ 15' BT$$

$$TZ = \text{فارق التوقيت} = 7$$

$$\delta = \text{ميل الشمس} = -22^\circ 08' 22.08'' \text{ في ساعة } 00 \text{ بالتوقيت العالمي}$$

$$e = \text{تعديل الزمن} = -00^\circ 06' 54'' \text{ في ساعة } 00 \text{ بالتوقيت العالمي}$$

الطريقة الأولى لعمل الإرتفاع وفضل الدائر

- C	= 90 - φ	= 97° 11' 00"
- M1	= 90 - δ	= 112° 08' 22.08"
- M2	= 90 - tan <sup>-1</sup> (cos C tan AQ)	= 74° 14' 59.61"
- M3	= cos <sup>-1</sup> ((tan M1) <sup>-1</sup> tan C cos M2)	= 28° 48' 17.56"
- t	= M3 - M2	= 45° 26' 42.05" (بالقيمة المطلقة)
- h	= sin <sup>-1</sup> (sin φ sin δ + cos φ cos δ cos t)	= 43° 46' 47.19"

الطريقة الثانية لعمل الإرتفاع وفضل الدائر

- ti	= tan <sup>-1</sup> ((tan φ) <sup>-1</sup> cos AQ)	= -72° 43' 36.99"
- M1	= sin <sup>-1</sup> (cos ti sin δ / sin φ)	= 63° 29' 35.83"
- h	= M1 - ti	= 136° 13' 12.8" (بالقيمة المطلقة)

لأن تعديل الإرتفاع سلبى واغفوظ إيجابى

- t	= cos <sup>-1</sup> ((sin h - sin φ sin δ) / (cos δ cos φ))	= 45° 26' 42.04"
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ولأجل أن زاوية التكميل أقل من المحفوظ وسمت قبلة سمفانج أكثر من مائة وثمانين فيكون

العمل في حساب ساعة رصد القبلة كما يلي :

- BQ	= (12 - e) - t/15	= 09° 05' 07.2" LMT
	= LMT + ((TZ x 15) - λ) / 15	= 08° 32' 07.2" WD/WIB.

نتيجة العمل : وقعت ساعة رصد القبلة في ٩- يناير ٢٠١٤ م بمدينة سمفانج سدورا جاوى

الشرقية في ساعة (09° 05' 07.2" LMT) (08° 32' 07.2" WD/WIB)

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معرفة ساعة رصد القبلة بالآلة الحاسبة على إمكانيين

العمل في الحساب كما تقدم في ساعة الرصد لإمكان واحد غير أن في هذا الحساب ساعتين لإمكان الرصد، فيكون لها إمكانان عند ما كانت الشمس باتجاه القبلة بحيث يكون الظل متجهها من الكعبة إلى الموقع أو كان ظل الشمس باتجاه القبلة بحيث يكون الظل متجهها من الموقع إلى الكعبة ، وفيه أيضا إعادة الحساب لمرتين لزيادة الدقة ، وحساب سمت الشمس وبه يعرف هل تكون الشمس أو ظلها الذي يحاذي سمت القبلة ، وقد يمكن الرصد في أحد الوقتين لأن

الشمس فوق الأفق دون الآخر لأن الشمس تحته ، وقد يمكن الرصد في كلا الوقتين ، وربما لا يمكن في الوقتين معا ، وسيوضح لك كل ذلك من الأمثلة الآتية إن شاء الله تعالى .

### عملية الحساب مع المثال الأول لساعة الرصد

عند ما كانت الشمس باتجاه القبلة في ١٥ - مايو - ٢٠١٤ م بمدينة سمفانج .

$$\begin{aligned} \text{AQ} &= \text{سمت القبلة} = 293^\circ 54' 40.1'' \\ \phi &= \text{عرض الموقع} = -7^\circ 11' \text{ LS} \\ \lambda &= \text{طول الموقع} = 113^\circ 15' \text{ BT} \\ \text{TZ} &= \text{فارق التوقيت} = 7 \end{aligned}$$

$$\delta = \text{ميل الشمس} = 18^\circ 47' 38.26'' \quad (\text{يؤخذ من برنامج فلكية باسنترين}) \quad (\text{UT}) \quad \text{في ساعة } 00 \text{ بالتوقيت العالمي}$$

$$e = \text{تعديل الزمن} = 00^\circ 03' 39'' \quad (\text{يؤخذ من برنامج فلكية باسنترين}) \quad (\text{UT}) \quad \text{في ساعة } 00 \text{ بالتوقيت العالمي}$$

عملية الحساب :

$$\begin{aligned} b &= 90 - \phi = 97^\circ 11' 00'' \\ a &= 90 - \delta = 71^\circ 12' 21.74'' \\ P &= \tan^{-1}(\cos b \tan \text{AQ})^{-1} = 74^\circ 14' 59.61'' \\ \text{CP} &= \cos^{-1}((\tan a)^{-1} \tan b \cos P) = 137^\circ 07' 58.69'' \\ t1 &= \text{CP} - P = 62^\circ 52' 59.08'' \\ t2 &= -\text{CP} - P = -211^\circ 22' 58.3'' \\ w1 &= 12 - e + t1/15 + ((\text{TZ} \times 15) - \lambda)/15 = 15^\circ 34' 52.94'' \quad \text{WD/WIB} \quad \text{الإمكان الأول قبل الإعاقة} \\ w2 &= 12 - e + t2/15 + ((\text{TZ} \times 15) - \lambda)/15 = 21^\circ 17' 49.11'' \quad \text{WD/WIB} \quad \text{الإمكان الثاني قبل الإعاقة} \end{aligned}$$

أعد الحساب للإمكان الأول باستخراج ميل الشمس وتعديل الزمن من فلكية باسنترين

بساعة الإمكان الأول بالتوقيت العالمي

$$15^\circ 34' 52.94'' - \text{TZ} = 08:34:52.94$$

$$\delta = \text{ميل الشمس} = 18^\circ 52' 42.81'' \quad (\text{يؤخذ من فلكية باسنترين})$$

$$e = \text{تعديل الزمن} = 00^\circ 03' 39'' \quad (\text{يؤخذ من فلكية باسنترين})$$

$$\begin{aligned} a &= 90 - \delta = 71^\circ 07' 17.19'' \\ \text{CP} &= \cos^{-1}((\tan a)^{-1} \tan b \cos P) = 137^\circ 25' 58.1'' \\ t1 &= \text{CP} - P = 63^\circ 10' 58.49'' \end{aligned}$$

$$\begin{aligned}w1 &= 12-e+t1/15+((TZx15)-\lambda)/15 = \mathbf{15:36:04.9} \quad \text{WD الإمكان الأول لساعة الرصد} \\h1 &= \sin^{-1}(\sin \phi \sin \delta + \cos \phi \cos \delta \cos t1) = 22^\circ 31' 25.14'' \quad \text{إرتفاع الشمس عند الإمكان الأول} \\x &= \sin \delta \cos \phi - \cos \delta \sin \phi \cos t1 = 0.374402174 \quad \text{الحفوظ الأول} \\y &= -\cos \delta \sin t1 = -0.844443253 \quad \text{الحفوظ الثاني} \\Az1 &= \tan^{-1}(y / x) = 293^\circ 54' 40.1'' \quad \text{سمت الشمس عند الإمكان الأول}\end{aligned}$$

إن كان الحفوظ الأول سلبيا فزد على الحاصل مائة وثمانين (١٨٠) وإن كان الحفوظ الأول إيجابيا والحفوظ الثاني سلبيا فزد على الحاصل ثلاثمائة وستين (٣٦٠) وما كان هو سمت الشمس .

أعد الحساب للإمكان الثاني باستخراج ميل الشمس وتعديل الزمن من فلكية باسنترين بساعة الإمكان الثاني بالتوقيت العالمي

$$21^\circ 17' 49.11'' - TZ = 14:17:49.11$$

$$\begin{aligned}\delta &= \text{ميل الشمس} = 18^\circ 56' 04.31'' \quad (\text{يؤخذ من فلكية باسنترين}) \\e &= \text{تعديل الزمن} = 00^\circ 03' 39'' \quad (\text{يؤخذ من فلكية باسنترين})\end{aligned}$$

$$\begin{aligned}a &= 90 - \delta = 71^\circ 03' 55.69'' \\CP &= \cos^{-1}((\tan a)^{-1} \tan b \cos P) = 137^\circ 37' 56.2'' \\t2 &= -CP - P = -211^\circ 52' 55.8''\end{aligned}$$

$$\begin{aligned}w2 &= 12-e+t2/15+((TZx15)-\lambda)/15 = \mathbf{21:15:49.28} \quad \text{WD الإمكان الثاني لساعة الرصد} \\h2 &= \sin^{-1}(\sin \phi \sin \delta + \cos \phi \cos \delta \cos t2) = -56^\circ 52' 22.55'' \quad \text{إرتفاع الشمس عند الإمكان الثاني} \\x &= \sin \delta \cos \phi - \cos \delta \sin \phi \cos t2 = 0.221506156 \quad \text{الحفوظ الأول} \\y &= -\cos \delta \sin t2 = -0.499594552 \quad \text{الحفوظ الثاني} \\Az2 &= \tan^{-1}(y / x) = 293^\circ 54' 40.1'' \quad \text{سمت الشمس عند الإمكان الثاني}\end{aligned}$$

نتيجة العمل :

وقعت ساعة رصد القبلة عند ما تكون الشمس باتجاه القبلة في ١٥ - مايو ٢٠١٤ م بمدينة



سمفانج مدورا جاوى الشرقية .

الإمكان الأول في ساعة (15:36:04.9 WD/WIB) ارتفاع الشمس ("22° 31' 25.14")

سمت الشمس ("293° 54' 40.1") يمكن فيها الرصد لأن الشمس فوق الأفق .

الإمكان الثاني في ساعة (21:15:49.28WD/WIB) ارتفاع الشمس ("56° 52' 22.55-")

سمت الشمس ("293° 54' 40.1") لا يمكن فيها الرصد لأن الشمس تحت الأفق .

المثال الثاني لساعة الرصد عند ما كان ظل الشمس باتجاه القبلة في ٩-يناير-٢٠١٤ م بمدينة

سمفانج .

$$AQ = \text{سمت القبلة} = 293^\circ 54' 40.1''$$

$$293^\circ 54' 40.1'' + 180 = 113^\circ 54' 40.1''$$

$$\phi = \text{عرض الموقع} = -7^\circ 11' \text{LS}$$

$$\lambda = \text{طول الموقع} = 113^\circ 15' \text{BT}$$

$$TZ = \text{فارق التوقيت} = 7$$

$$\delta = \text{ميل الشمس} = -22^\circ 08' 22.08'' \text{ بالثوقيت العالمي } \text{ في ساعة } 00 \text{ بالثوقيت العالمي (UT) من برنامج فلكية باسنترين}$$

$$e = \text{تعديل الزمن} = -00^\circ 06' 54'' \text{ بالثوقيت العالمي } \text{ في ساعة } 00 \text{ بالثوقيت العالمي (UT) من برنامج فلكية باسنترين}$$

عملية الحساب :

$$b = 90 - \phi = 97^\circ 11' 00''$$

$$a = 90 - \delta = 112^\circ 08' 22.08''$$

$$P = \tan^{-1}(\cos b \tan AQ)^{-1} = 74^\circ 14' 59.61''$$

$$CP = \cos^{-1}((\tan a)^{-1} \tan b \cos P) = 28^\circ 48' 17.56''$$

$$t1 = CP - P = -45^\circ 26' 42.05''$$

$$t2 = -CP - P = -103^\circ 03' 17.17''$$

$$w1 = 12 - e + t1/15 + ((TZ \times 15) - \lambda)/15 = 08^\circ 32' 07.2'' \text{ WD/WIB الإمكان الأول قبل الإعاقة}$$

$$w2 = 12 - e + t2/15 + ((TZ \times 15) - \lambda)/15 = 04^\circ 41' 40.86'' \text{ WD/WIB الإمكان الثاني قبل الإعاقة}$$

أعد الحساب للإمكان الأول باستخراج ميل الشمس وتعديل الزمن من فلكية باسنترين

بساعة الإمكان الأول بالثوقيت العالمي

DAFTAR ARAH QIBLAT DAN JARAK DARI KA'BAH KOTA-KOTA BESAR DI INDONESIA

Ka'bah: LU = 21° 25' 18.89", BT = 39° 49' 46.27"

I	PROPINSI NANGGROE ACEH				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Banda Aceh	05° 35' LU	095° 20' BT	7	292° 08' 33.60"	6,225.943	292° 02' 57.44"	6,223.741
2	Bireuen	05° 17' LU	096° 41' BT	7	292° 07' 11.68"	6,377.047	292° 01' 37.94"	6,374.968
3	Blang Kejeren	04° 02' LU	097° 18' BT	7	292° 44' 59.07"	6,493.136	292° 39' 05.45"	6,490.738
4	Calang	04° 41' LU	095° 36' BT	7	292° 39' 19.61"	6,291.278	292° 33' 27.66"	6,288.908
5	Idi Rayeuk	04° 58' LU	097° 46' BT	7	292° 08' 43.88"	6,501.523	292° 03' 10.64"	6,499.388
6	Kuala Simpang	04° 19' LU	098° 03' BT	7	292° 28' 09.90"	6,557.935	292° 22' 26.15"	6,555.667
7	Kutacane	03° 30' LU	097° 51' BT	7	292° 57' 18.71"	6,572.371	292° 51' 18.67"	6,569.888
8	Langsa	08° 31' LU	097° 58' BT	7	290° 02' 31.56"	6,380.565	289° 58' 09.52"	6,379.213
9	Lhokseumawe	05° 15' LU	097° 07' BT	7	292° 04' 33.30"	6,422.941	291° 59' 01.55"	6,420.826
10	Lhoksukon	05° 07' LU	097° 19' BT	7	292° 07' 28.46"	6,449.041	292° 01' 55.37"	6,446.209
11	Meulaboh	04° 11' LU	096° 07' BT	7	292° 51' 58.91"	6,365.586	292° 46' 00.71"	6,363.129
12	Meureudu	05° 15' LU	096° 15' BT	7	292° 12' 19.65"	6,335.955	292° 06' 42.62"	6,331.777
13	Sabang	05° 54' LU	095° 21' BT	7	291° 56' 28.31"	6,214.485	291° 50' 58.50"	6,212.404
14	Sigli	05° 24' LU	095° 57' BT	7	292° 09' 37.73"	6,296.890	292° 04' 01.78"	6,294.727
15	Sinabang	02° 28' LU	096° 22' BT	7	293° 49' 01.50"	6,466.450	293° 42' 33.43"	6,463.564
16	Singkil	02° 18' LU	097° 45' BT	7	293° 37' 47.43"	6,614.716	293° 31' 25.22"	6,611.921
17	Takengon	04° 36' LU	096° 49' BT	7	292° 30' 08.52"	6,419.466	292° 24' 22.54"	6,417.171
18	Tapak Tuan	03° 18' LU	097° 10' BT	7	293° 11' 18.06"	6,511.197	293° 05' 10.11"	6,508.604
2	PROPINSI SUMATERA UTARA				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Baliage	03° 21' LU	099° 02' BT	7	292° 50' 14.80"	6,699.955	292° 44' 19.32"	6,697.533
2	Binjai	03° 35' LU	098° 28' BT	7	292° 48' 20.47"	6,631.902	292° 42' 25.75"	6,629.492
3	Gunung Sitoli	01° 19' LU	097° 36' BT	7	294° 11' 21.05"	6,643.597	294° 04' 40.79"	6,640.531
4	Kabanjahe	03° 07' LU	098° 28' BT	7	293° 03' 25.77"	6,652.039	292° 57' 22.60"	6,649.515
5	Medan	03° 38' LU	098° 38' BT	7	292° 45' 05.25"	6,646.829	292° 39' 12.46"	6,644.445
6	Padang Sidempuan	01° 25' LU	099° 14' BT	7	293° 47' 57.20"	6,805.131	293° 41' 28.99"	6,802.262
7	Pematang Siantar	02° 58' LU	099° 02' BT	7	293° 02' 20.77"	6,716.499	292° 56' 18.41"	6,713.990
8	Rantau Prapat	02° 07' LU	099° 50' BT	7	293° 20' 04.61"	6,835.327	293° 13' 52.19"	6,832.688
9	Sibolga	01° 47' LU	098° 46' BT	7	293° 42' 13.69"	6,741.257	293° 35' 48.86"	6,738.432
10	Sidikalang	02° 45' LU	098° 20' BT	7	293° 15' 38.27"	6,654.388	293° 10' 27.71"	6,651.762
11	Tanjung Balai	02° 59' LU	099° 47' BT	7	292° 54' 18.83"	6,792.535	292° 48' 21.35"	6,790.096
12	Tarutung	02° 00' LU	098° 57' BT	7	293° 33' 23.92"	6,750.325	293° 27' 03.99"	6,747.572
13	Tebing Tinggi	03° 22' LU	099° 07' BT	7	292° 48' 54.26"	6,707.774	292° 42' 59.59"	6,705.367

DAFTAR ARAH QIBLAT DAN JARAK DARI KA'BAH KOTA-KOTA BESAR DI INDONESIA

Ka'bah: LU = 21° 25' 18.89", BT = 39° 49' 46.27"

1	PROPINSI NANGGROE ACEH				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Banda Aceh	05° 35' LU	095° 20' BT	7	292° 08' 33.60"	6,225.943	292° 02' 57.44"	6,223.781
2	Bireuen	05° 17' LU	096° 41' BT	7	292° 07' 11.68"	6,377.047	292° 01' 37.94"	6,374.908
3	Blang Kejeren	04° 02' LU	097° 18' BT	7	292° 44' 59.07"	6,493.136	292° 39' 05.45"	6,490.738
4	Calang	04° 41' LU	095° 36' BT	7	292° 39' 19.61"	6,291.278	292° 33' 27.66"	6,288.908
5	Idi Rayeuk	04° 58' LU	097° 46' BT	7	292° 08' 43.88"	6,501.523	292° 03' 10.64"	6,499.388
6	Kuala Simpang	04° 19' LU	098° 03' BT	7	292° 28' 09.90"	6,557.935	292° 22' 26.15"	6,555.667
7	Kutacane	03° 30' LU	097° 51' BT	7	292° 57' 18.71"	6,572.371	292° 51' 18.67"	6,569.888
8	Langsa	08° 31' LU	097° 58' BT	7	290° 02' 31.56"	6,380.565	289° 58' 09.52"	6,379.213
9	Lhokseumawe	05° 15' LU	097° 07' BT	7	292° 04' 33.30"	6,422.941	291° 59' 01.55"	6,420.826
10	Lhoksukon	05° 07' LU	097° 19' BT	7	292° 07' 28.46"	6,449.041	292° 01' 55.37"	6,446.909
11	Meulaboh	04° 11' LU	096° 07' BT	7	292° 51' 58.91"	6,365.586	292° 46' 00.71"	6,363.129
12	Meureudu	05° 15' LU	096° 15' BT	7	292° 12' 19.65"	6,335.955	292° 06' 42.62"	6,331.777
13	Sabang	05° 54' LU	095° 21' BT	7	291° 56' 28.31"	6,214.485	291° 50' 58.50"	6,212.404
14	Sigli	05° 24' LU	095° 57' BT	7	292° 09' 37.73"	6,296.890	292° 04' 01.78"	6,294.727
15	Sinabang	02° 28' LU	096° 22' BT	7	293° 49' 01.50"	6,466.450	293° 42' 33.43"	6,463.564
16	Singkil	02° 18' LU	097° 45' BT	7	293° 37' 47.43"	6,614.716	293° 31' 25.22"	6,611.921
17	Takengon	04° 36' LU	096° 49' BT	7	292° 30' 08.52"	6,419.466	292° 24' 22.54"	6,417.171
18	Tapak Tuan	03° 18' LU	097° 10' BT	7	293° 11' 18.06"	6,511.197	293° 05' 10.11"	6,508.604
2	PROPINSI SUMATERA UTARA				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Baliage	03° 21' LU	099° 02' BT	7	292° 50' 14.80"	6,699.955	292° 44' 19.32"	6,697.538
2	Binjai	03° 35' LU	098° 28' BT	7	292° 48' 20.47"	6,631.902	292° 42' 25.75"	6,629.492
3	Gunung Sitoli	01° 19' LU	097° 36' BT	7	294° 11' 21.05"	6,643.597	294° 04' 40.79"	6,640.531
4	Kabanjaha	03° 07' LU	098° 28' BT	7	293° 03' 25.77"	6,652.039	292° 57' 22.60"	6,649.515
5	Medan	03° 38' LU	098° 38' BT	7	292° 45' 05.25"	6,646.829	292° 39' 12.46"	6,644.445
6	Padang Sidempuan	01° 25' LU	099° 14' BT	7	293° 47' 57.20"	6,805.131	293° 41' 28.99"	6,802.262
7	Pematang Siantar	02° 58' LU	099° 02' BT	7	293° 02' 20.77"	6,716.499	292° 56' 18.41"	6,713.990
8	Rantau Prapat	02° 07' LU	099° 50' BT	7	293° 20' 04.61"	6,835.327	293° 13' 52.19"	6,832.688
9	Sibolga	01° 47' LU	098° 46' BT	7	293° 42' 13.69"	6,741.257	293° 35' 48.86"	6,738.432
10	Sidikalang	02° 45' LU	098° 20' BT	7	293° 15' 38.27"	6,654.388	293° 10' 27.71"	6,651.762
11	Tanjung Balai	02° 59' LU	099° 47' BT	7	292° 54' 18.83"	6,792.535	292° 48' 21.35"	6,790.096
12	Tarutung	02° 00' LU	098° 57' BT	7	293° 33' 23.92"	6,750.325	293° 27' 03.99"	6,747.572
13	Tebing Tinggi	03° 22' LU	099° 07' BT	7	292° 48' 54.26"	6,707.774	292° 42' 59.59"	6,705.367

## DAFTAR ARAH QIBLAT DAN JARAK DARI KA'BAH KOTA-KOTA BESAR DI INDONESIA

Ka'bah: LU = 21° 25' 18.89", BT = 39° 49' 46.27"

3	PROPINSI SUMATERA BARAT				SPHERICAL		GEODETIC		
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)	
1	Alahan Panjang	01° 04' LS	100° 47' BT	7	294° 39' 25.52"	7,075.274	294° 32' 26.22"	7,071.972	
2	Batusangkar	00° 27' LS	100° 34' BT	7	294° 25' 24.69"	7,024.996	294° 18' 33.87"	7,021.817	
3	Bukittinggi	00° 18' LS	100° 22' BT	7	294° 23' 50.45"	6,997.867	294° 17' 00.79"	6,994.701	
4	Lubuk Sikaping	00° 05' LU	100° 10' BT	7	294° 15' 35.95"	6,960.106	294° 08' 51.28"	6,957.010	
5	Maninjau	00° 17' LS	100° 13' BT	7	294° 25' 19.80"	6,981.904	294° 18' 29.47"	6,978.724	
6	Muara Labuh	01° 29' LS	101° 02' BT	7	294° 47' 11.39"	7,119.822	294° 40' 07.13"	7,116.451	
7	Padang	00° 57' LS	100° 21' BT	7	294° 42' 08.29"	7,026.071	294° 35' 08.13"	7,022.743	
8	Padang Panjang	00° 27' LS	100° 23' BT	7	294° 27' 48.82"	7,006.422	294° 20' 56.85"	7,003.221	
9	Painan	01° 20' LS	100° 33' BT	7	294° 49' 52.52"	7,064.049	294° 42' 47.57"	7,060.652	
10	Pariaman	00° 37' LS	100° 07' BT	7	294° 36' 01.80"	6,987.085	294° 29' 05.48"	6,983.810	
11	Payakumbuh	00° 13' LS	100° 37' BT	7	294° 18' 17.62"	7,019.411	294° 11' 30.87"	7,016.295	
12	Sawah Lunto	00° 40' LS	100° 46' BT	7	294° 28' 45.33"	7,055.182	294° 21' 52.28"	7,051.974	
13	Sijunjung	00° 41' LS	100° 58' BT	7	294° 26' 35.36"	7,076.204	294° 19' 43.28"	7,073.017	
14	Solok	00° 47' LS	100° 38' BT	7	294° 33' 43.11"	7,047.041	294° 26' 47.36"	7,043.790	
15	Suliki	00° 06' LS	100° 27' BT	7	294° 17' 09.92"	6,997.193	294° 10' 24.02"	6,994.085	
16	Tali	00° 13' LU	099° 58' BT	7	294° 14' 19.91"	6,933.750	294° 07' 36.17"	6,930.664	
4	PROPINSI BENGKULU				SPHERICAL		GEODETIC		
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)	
	1	Bengkulu	03° 48' LS	102° 15' BT	7	295° 28' 02.71"	7,351.118	295° 20' 31.29"	7,347.372
	2	Curup	03° 25' LS	102° 30' BT	7	295° 15' 02.53"	7,358.046	295° 07' 38.20"	7,354.425
3	Mukomuko	02° 33' LS	101° 05' BT	7	295° 14' 29.09"	7,174.768	295° 07' 08.83"	7,171.147	
5	PROPINSI RIAU				SPHERICAL		GEODETIC		
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)	
	1	Bangkinan	00° 22' LU	101° 02' BT	7	293° 56' 58.27"	7,035.342	293° 50' 23.64"	7,032.412
	2	Batam	01° 02' LU	104° 01' BT	7	293° 07' 26.00"	7,310.300	293° 01' 20.49"	7,307.832
	3	Bengkalis	01° 31' LU	102° 08' BT	7	293° 13' 19.56"	7,096.606	293° 07' 10.87"	7,094.053
	4	Dumai	01° 46' LU	101° 22' BT	7	293° 14' 11.50"	7,007.314	293° 08' 02.42"	7,004.741
	5	Pasir Pangarayan	00° 53' LU	100° 17' BT	7	293° 51' 16.56"	6,935.863	293° 44' 45.87"	6,932.974
	6	Pekan Baru	00° 30' LU	101° 28' BT	7	293° 48' 13.60"	7,073.467	293° 41' 43.84"	7,070.616
	7	Rengat	00° 23' LS	102° 34' BT	7	293° 58' 46.92"	7,224.985	293° 52' 09.52"	7,222.058
	8	Selat Panjang	01° 00' LU	102° 15' BT	7	293° 26' 03.64"	7,131.169	293° 19' 46.96"	7,128.514
9	Tembilahan	00° 19' LS	103° 07' BT	7	293° 50' 41.58"	7,277.949	293° 44' 08.60"	7,275.100	
6	PROPINSI KEPULAUAN RIAU				SPHERICAL		GEODETIC		
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)	
1	Tanjung Pinang	00° 55' LU	104° 29' BT	7	293° 05' 52.54"	7,363.128	292° 59' 47.86"	7,360.684	

**DAFTAR ARAH QIBLAT DAN JARAK DARI KA'BAH KOTA-KOTA BESAR DI INDONESIA**

Ka'bah: LU = 21° 25' 18.89", BT = 39° 49' 46.27"

7	PROPINSI JAMBI				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Bangko	02° 07' LS	102° 25' BT	7	294° 44' 27.99"	7,288.886	294° 37' 22.54"	7,285.549
2	Jambi	01° 36' LS	103° 35' BT	7	294° 16' 36.87"	7,383.247	294° 09' 46.49"	7,380.177
3	Kuala Tungkal	00° 50' LS	103° 25' BT	7	294° 00' 02.50"	7,331.644	293° 53' 23.10"	7,328.718
4	Muara Bulian	01° 45' LS	103° 15' BT	7	294° 24' 26.63"	7,356.304	294° 17' 31.90"	7,353.159
5	Muara Bungo	01° 30' LS	102° 07' BT	7	294° 32' 58.63"	7,230.109	294° 26' 00.83"	7,226.874
6	Sungai Penuh	02° 04' LS	101° 24' BT	7	294° 57' 21.52"	7,183.970	294° 50' 10.55"	7,180.508
8	PROPINSI SUMATERA SELATAN				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Baturaja	04° 07' LS	104° 12' BT	7	295° 06' 05.93"	7,561.790	294° 58' 41.82"	7,558.272
2	Kayuagung	03° 24' LS	104° 53' BT	7	294° 40' 49.10"	7,597.264	294° 33' 39.49"	7,593.994
3	Lahat	03° 47' LS	103° 32' BT	7	295° 08' 22.35"	7,479.142	295° 00' 59.01"	7,475.594
4	Lubuk Linggau	03° 17' LS	102° 54' BT	7	295° 05' 58.60"	7,391.985	294° 58' 38.67"	7,388.453
5	Muara Enim	03° 38' LS	103° 47' BT	7	295° 01' 20.08"	7,497.252	294° 54' 00.43"	7,493.774
6	Palembang	02° 59' LS	104° 47' BT	7	294° 33' 02.00"	7,567.975	294° 25' 57.92"	7,564.776
7	Sekayu	02° 53' LS	103° 50' BT	7	294° 43' 30.13"	7,467.406	294° 36' 21.80"	7,464.095
9	PROPINSI LAMPUNG				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Bandar Lampung	05° 26' LS	105° 14' BT	7	295° 18' 33.01"	7,727.438	295° 10' 56.65"	7,723.819
2	Kalianda	05° 47' LS	105° 34' BT	7	295° 20' 28.47"	7,777.343	295° 12' 49.30"	7,773.713
3	Kotabumi	04° 51' LS	104° 51' BT	7	295° 12' 16.57"	7,661.511	295° 04' 46.00"	7,657.945
4	Krui	05° 10' LS	103° 57' BT	7	295° 32' 49.49"	7,586.385	295° 25' 09.13"	7,582.608
5	Metro	05° 07' LS	105° 16' BT	7	295° 11' 35.06"	7,715.848	295° 04' 03.26"	7,712.296
6	Tanjung Karang	05° 25' LS	105° 17' BT	7	295° 17' 26.98"	7,731.657	295° 09' 51.14"	7,728.050
7	Teluk Betung	05° 26' LS	105° 17' BT	7	295° 17' 47.28"	7,732.444	295° 10' 11.21"	7,728.834
10	PROPINSI BANGKA BELITUNG				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Bangka	02° 00' LS	106° 00' BT	7	293° 56' 37.48"	7,646.657	293° 49' 55.50"	7,643.814
2	Pangkal Pinang	02° 07' LS	106° 10' BT	7	293° 57' 10.39"	7,668.831	293° 50' 27.63"	7,665.987
3	Sungai Liat	01° 52' LS	106° 05' BT	7	293° 52' 49.11"	7,649.154	293° 46' 09.66"	7,646.347
4	Tanjung Pandan	02° 45' LS	107° 40' BT	7	293° 52' 43.03"	7,849.650	293° 45' 59.60"	7,846.890
11	PROPINSI DKI JAKARTA				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Jakarta	06° 10' LS	106° 49' BT	7	295° 08' 46.58"	7,920.505	295° 01' 09.57"	7,917.019
2	Jatinegara	06° 15' LS	106° 52' BT	7	295° 09' 33.58"	7,929.423	295° 01' 55.75"	7,925.931
3	Kebayoran	06° 14' LS	106° 48' BT	7	295° 10' 15.70"	7,921.968	295° 02' 37.70"	7,918.467
4	Tanjung Priok	06° 06' LS	106° 49' BT	7	295° 07' 32.47"	7,917.377	294° 59' 56.36"	7,913.902

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 Ka'bah: LU = 21° 25' 18.89", BT = 39° 49' 46.27"

12	PROPINSI BANTEN				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Anyer	06° 03' LS	105° 56' BT	7	295° 20' 03.00"	7,826.625	295° 12' 22.38"	7,823.008
2	Banten	06° 03' LS	106° 08' BT	7	295° 16' 58.28"	7,846.628	295° 09' 18.84"	7,843.045
3	Cilegon	06° 02' LS	106° 05' BT	7	295° 17' 25.09"	7,840.840	295° 09' 45.58"	7,837.251
4	Malingping	06° 47' LS	106° 01' BT	7	295° 32' 46.98"	7,869.751	295° 24' 57.09"	7,866.014
5	Merak	05° 56' LS	106° 00' BT	7	295° 16' 45.85"	7,827.783	295° 09' 07.20"	7,824.199
6	Pandegelang	06° 19' LS	106° 06' BT	7	295° 22' 35.50"	7,855.901	295° 14' 52.29"	7,852.264
7	Rangkasbitung	06° 22' LS	106° 13' BT	7	295° 21' 43.42"	7,869.923	295° 14' 00.23"	7,866.297
8	Serang	06° 08' LS	106° 09' BT	7	295° 18' 18.73"	7,852.229	295° 10' 38.27"	7,848.633
9	Tangerang	06° 12' LS	106° 38' BT	7	295° 12' 10.37"	7,903.721	295° 04' 31.84"	7,900.197
13	PROPINSI JAWA BARAT				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Bandung	06° 57' LS	107° 37' BT	7	295° 10' 39.26"	8,037.318	295° 02' 56.47"	8,033.841
2	Banjar Ciamis	07° 23' LS	108° 32' BT	7	295° 03' 54.51"	8,149.235	294° 56' 11.30"	8,145.859
3	Banjarnegara	07° 23' LS	109° 40' BT	7	294° 46' 53.18"	8,262.615	294° 39' 16.42"	8,259.447
4	Batang	06° 56' LS	109° 43' BT	7	294° 39' 12.85"	8,246.856	294° 31' 42.32"	8,243.759
5	Bekasi	06° 19' LS	107° 08' BT	7	295° 06' 45.21"	7,959.247	294° 59' 08.03"	7,955.790
6	Bogor	06° 37' LS	106° 48' BT	7	295° 17' 18.85"	7,940.018	295° 09' 35.73"	7,936.451
7	Ciamis	07° 21' LS	108° 27' BT	7	295° 04' 38.23"	8,139.349	294° 56' 54.98"	8,135.962
8	Cianjur	06° 51' LS	107° 08' BT	7	295° 16' 21.73"	7,984.324	295° 08' 37.46"	7,980.776
9	Cibinong	06° 29' LS	106° 51' BT	7	295° 14' 06.06"	7,938.730	295° 06' 25.00"	7,935.195
10	Cijulang	07° 20' LS	108° 33' BT	7	295° 02' 50.12"	8,148.563	294° 55' 07.66"	8,145.197
11	Cikajang	07° 20' LS	107° 48' BT	7	295° 14' 24.86"	8,073.658	295° 06' 38.11"	8,070.153
12	Cimahi	06° 56' LS	107° 30' BT	7	295° 12' 09.62"	8,024.877	295° 04' 26.37"	8,021.382
13	Cirebon	06° 45' LS	108° 33' BT	7	294° 53' 12.10"	8,121.375	294° 45' 37.33"	8,118.097
14	Garut	07° 13' LS	107° 54' BT	7	295° 10' 52.33"	8,078.153	295° 03' 07.66"	8,074.685
15	Indramayu	06° 20' LS	108° 18' BT	7	294° 49' 49.45"	8,076.962	294° 42' 18.81"	8,073.704
16	Karang Nunggal	07° 38' LS	108° 08' BT	7	295° 14' 14.17"	8,121.036	295° 06' 25.44"	8,117.547
17	Karawang	06° 18' LS	107° 18' BT	7	295° 03' 57.09"	7,975.156	294° 56' 21.10"	7,971.731
18	Kuningan	06° 58' LS	108° 28' BT	7	294° 58' 02.63"	8,123.112	294° 50' 24.50"	8,119.786
19	Majalengka	06° 50' LS	108° 12' BT	7	294° 59' 47.91"	8,090.200	294° 52' 10.01"	8,086.847
20	Pamanukan	06° 18' LS	107° 50' BT	7	294° 56' 02.97"	8,028.604	294° 48' 30.08"	8,025.271
21	Pameungpeuk	07° 38' LS	107° 42' BT	7	295° 21' 05.98"	8,077.842	295° 13' 14.77"	8,074.271
22	Pelabuhan Ratu	07° 00' LS	106° 34' BT	7	295° 28' 00.38"	7,934.880	295° 20' 10.86"	7,931.204
23	Pengalengan	07° 10' LS	107° 34' BT	7	295° 15' 11.53"	8,042.518	295° 07' 25.61"	8,038.998
24	Purwakarta	06° 36' LS	107° 27' BT	7	295° 07' 03.15"	8,004.225	294° 59' 24.02"	8,000.776
25	Sindang Barang	07° 26' LS	108° 55' BT	7	294° 58' 52.82"	8,189.886	294° 51' 11.14"	8,186.573
26	Subang	06° 34' LS	107° 46' BT	7	295° 01' 41.99"	8,034.362	294° 54' 05.14"	8,030.974
27	Sukabumi	06° 55' LS	106° 55' BT	7	295° 20' 56.74"	7,965.840	295° 13' 10.34"	7,962.242
28	Sumedang	06° 53' LS	107° 53' BT	7	295° 05' 25.59"	8,060.851	294° 57' 45.21"	8,057.433
29	Tasikmalaya	07° 20' LS	108° 13' BT	7	295° 07' 56.78"	8,115.257	295° 00' 12.41"	8,111.830
30	Ujung Kulon	06° 45' LS	105° 20' BT	7	295° 43' 14.39"	7,800.099	295° 35' 20.95"	7,796.245

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Ka'bah: LU = 21° 25' 18.89", BT = 39° 49' 46.27"

14	PROPINSI JAWA TENGAH				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Bantul	07° 56' LS	110° 20' BT	7	294° 45' 12.95"	8,354.779	294° 37' 32.80"	8,351.665
2	Banyumas	07° 32' LS	109° 18' BT	7	294° 54' 40.26"	8,232.875	294° 46' 59.46"	8,229.619
3	Blora	06° 58' LS	111° 25' BT	7	294° 16' 02.56"	8,419.246	294° 08' 41.24"	8,416.449
4	Boyolali	07° 33' LS	110° 35' BT	7	294° 35' 59.67"	8,362.155	294° 28' 25.91"	8,359.136
5	Brebes	06° 54' LS	109° 02' BT	7	294° 48' 34.24"	8,176.778	294° 41' 00.25"	8,173.563
6	Cepu	07° 10' LS	111° 35' BT	7	294° 16' 33.03"	8,445.090	294° 09' 09.98"	8,442.299
7	Cilacap	07° 45' LS	109° 02' BT	7	295° 02' 07.56"	8,216.323	294° 54' 22.44"	8,212.986
8	Demak	06° 54' LS	110° 37' BT	7	294° 26' 02.29"	8,335.733	294° 18' 37.32"	8,332.801
9	Gombong	07° 35' LS	109° 31' BT	7	294° 52' 11.47"	8,256.870	294° 44' 31.25"	8,253.647
10	Jepara	06° 36' LS	110° 39' BT	7	294° 21' 08.90"	8,325.411	294° 13' 48.15"	8,322.524
11	Karanganyar	07° 35' LS	110° 57' BT	7	294° 31' 12.02"	8,400.456	294° 23' 39.90"	8,397.500
12	Kebumen	07° 42' LS	109° 39' BT	7	294° 51' 58.54"	8,275.622	294° 44' 17.56"	8,272.408
13	Kendal	06° 57' LS	110° 11' BT	7	294° 32' 50.36"	8,294.475	294° 25' 22.27"	8,291.459
14	Klaten	07° 44' LS	110° 35' BT	7	294° 38' 38.27"	8,370.585	294° 31' 02.12"	8,367.542
15	Kudus	06° 50' LS	110° 50' BT	7	294° 22' 04.74"	8,354.484	294° 14' 41.90"	8,351.600
16	Pati	06° 45' LS	111° 02' BT	7	294° 18' 09.07"	8,370.823	294° 10' 48.48"	8,367.984
17	Pekalongan	06° 55' LS	109° 41' BT	7	294° 39' 25.94"	8,242.743	294° 31' 55.44"	8,239.643
18	Pemalang	06° 55' LS	109° 24' BT	7	294° 43' 30.45"	8,214.315	294° 35' 58.33"	8,211.164
19	Purbalingga	07° 25' LS	109° 22' BT	7	294° 51' 51.05"	8,234.124	294° 44' 12.15"	8,230.897
20	Purwodadi	07° 08' LS	110° 54' BT	7	294° 25' 29.83"	8,374.864	294° 18' 03.37"	8,371.954
21	Purwokerto	07° 26' LS	109° 13' BT	7	294° 54' 21.37"	8,219.889	294° 46' 41.41"	8,216.632
22	Purworejo	07° 43' LS	110° 01' BT	7	294° 46' 44.72"	8,313.076	294° 39' 05.60"	8,309.930
23	Rembang	06° 42' LS	111° 20' BT	7	294° 13' 24.55"	8,398.769	294° 06' 06.34"	8,395.989
24	Salatiga	07° 20' LS	110° 29' BT	7	294° 34' 16.71"	8,342.177	294° 26' 45.24"	8,339.166
25	Semarang	07° 00' LS	110° 24' BT	7	294° 30' 32.37"	8,318.530	294° 23' 04.84"	8,315.547
26	Sleman	07° 42' LS	110° 21' BT	7	294° 41' 34.40"	8,345.678	294° 33' 57.37"	8,342.596
27	Sragen	07° 27' LS	111° 01' BT	7	294° 28' 22.16"	8,401.045	294° 20' 52.17"	8,398.118
28	Sukoharjo	07° 42' LS	110° 50' BT	7	294° 34' 31.70"	8,394.105	294° 26' 57.39"	8,391.114
29	Surakarta	07° 32' LS	110° 50' BT	7	294° 32' 09.62"	8,386.462	294° 24' 37.50"	8,383.491
30	Tegal	06° 54' LS	109° 08' BT	7	294° 47' 06.68"	8,186.803	294° 39' 33.26"	8,183.606
31	Temanggung	07° 19' LS	110° 11' BT	7	294° 38' 20.50"	8,311.318	294° 30' 47.55"	8,308.255
32	Wonogiri	07° 50' LS	110° 55' BT	7	294° 35' 12.02"	8,408.578	294° 27' 36.44"	8,405.586
33	Wonosobo	07° 21' LS	109° 54' BT	7	294° 42' 57.31"	8,284.451	294° 55' 22.31"	8,281.331
15	PROPINSI YOGYAKARTA				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Kulon Progo	07° 36' LS	110° 10' BT	7	294° 42' 47.78"	8,322.704	294° 35' 11.02"	8,319.600
2	Wonosari	07° 58' LS	110° 35' BT	7	294° 41' 58.81"	8,381.333	294° 34' 19.63"	8,378.262
3	Yogyakarta	07° 48' LS	110° 24' BT	7	294° 42' 17.55"	8,355.296	294° 34' 39.51"	8,352.210

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16	PROPINSI JAWA TIMUR				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Bangkalan	07° 03' LS	112° 46' BT	7	293° 59' 15.44"	8,559.027	293° 52' 00.61"	8,556.462
2	Banyuwangi	08° 13' LS	114° 21' BT	7	293° 52' 10.60"	8,770.758	293° 44' 49.12"	8,768.384
3	Blitar	08° 06' LS	112° 09' BT	7	294° 21' 03.60"	8,544.418	294° 13' 31.45"	8,541.631
4	Bojonegoro	07° 10' LS	111° 53' BT	7	294° 12' 28.88"	8,475.279	294° 05' 07.52"	8,472.543
5	Bondowoso	07° 55' LS	113° 50' BT	7	293° 55' 42.67"	8,705.340	293° 48' 22.27"	8,702.891
6	Grajakan	08° 35' LS	114° 13' BT	7	293° 57' 56.63"	8,773.736	293° 50' 29.64"	8,771.308
7	Gresik	07° 10' LS	112° 40' BT	7	294° 02' 03.08"	8,554.182	293° 54' 46.12"	8,551.587
8	Jember	08° 10' LS	113° 42' BT	7	294° 00' 21.37"	8,703.120	293° 52' 56.96"	8,700.625
9	Jombang	07° 32' LS	112° 13' BT	7	294° 12' 48.59"	8,525.407	294° 05' 24.23"	8,522.692
10	Kangean	06° 50' LS	115° 25' BT	7	293° 24' 08.28"	8,817.370	293° 17' 11.21"	8,815.294
11	Kediri	07° 49' LS	112° 00' BT	7	294° 19' 30.37"	8,516.482	294° 1° 01.08"	8,513.696
12	Lamongan	07° 08' LS	112° 25' BT	7	294° 04' 54.97"	8,527.488	293° 57' 37.06"	8,524.852
13	Lanbulan Sampang	07° 05' LS	113° 07' BT	7	293° 55' 09.19"	8,595.828	293° 47' 55.87"	8,593.323
14	Lumajang	08° 08' LS	113° 14' BT	7	294° 06' 20.29"	8,654.705	293° 58' 53.73"	8,652.123
15	Madiun	07° 37' LS	111° 32' BT	7	294° 23' 23.44"	8,460.523	294° 15' 54.16"	8,457.672
16	Magetan	07° 38' LS	111° 21' BT	7	294° 26' 12.29"	8,442.879	294° 18' 41.76"	8,439.992
17	Malang	07° 59' LS	112° 36' BT	7	294° 13' 15.78"	8,584.298	294° 05' 47.66"	8,581.609
18	Mojokerto	07° 28' LS	112° 26' BT	7	294° 09' 00.20"	8,544.191	294° 01' 37.95"	8,541.523
19	Nganjuk	07° 38' LS	111° 53' BT	7	294° 18' 43.20"	8,496.435	294° 11' 15.67"	8,493.647
20	Ngawi	07° 26' LS	111° 26' BT	7	294° 22' 17.07"	8,442.129	294° 14' 49.64"	8,439.280
21	Pamekasan	07° 09' LS	113° 30' BT	7	293° 51' 03.59"	8,637.492	293° 43' 51.53"	8,635.049
22	Pasuruan	07° 40' LS	112° 55' BT	7	294° 05' 00.13"	8,601.846	293° 57' 37.93"	8,599.247
23	Ponorogo	07° 53' LS	111° 29' BT	7	294° 27' 42.77"	8,467.672	294° 20' 09.72"	8,464.782
24	Probolinggo	07° 45' LS	113° 13' BT	7	294° 01' 59.16"	8,635.787	293° 54' 37.54"	8,633.236
25	Sampang	07° 11' LS	113° 15' BT	7	293° 54' 40.15"	8,613.752	293° 47' 26.24"	8,611.261
26	Sidoarjo	07° 29' LS	112° 42' BT	7	294° 05' 24.23"	8,573.462	293° 58' 03.34"	8,570.844
27	Situbondo	07° 42' LS	114° 01' BT	7	293° 50' 50.13"	8,714.137	293° 43' 33.61"	8,711.740
28	Sumenep	07° 00' LS	113° 51' BT	7	293° 44' 51.70"	8,666.165	293° 37' 43.62"	8,663.798
29	Surabaya	07° 15' LS	112° 45' BT	7	294° 02' 00.89"	8,566.325	293° 54' 43.29"	8,563.736
30	Trenggalek	08° 04' LS	111° 44' BT	7	294° 26' 34.61"	8,501.113	294° 19' 00.58"	8,498.250
31	Tuban	06° 56' LS	112° 04' BT	7	294° 06' 53.89"	8,483.207	293° 59' 36.68"	8,480.530
32	Tulungagung	08° 05' LS	111° 54' BT	7	294° 24' 24.42"	8,518.584	294° 16' 51.10"	8,515.751
17	PROPINSI BALI				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Denpasar	08° 39' LS	115° 13' BT	8	293° 45' 07.22"	8,877.272	293° 37' 44.85"	8,875.037
2	Negara Bali	08° 19' LS	114° 36' BT	8	293° 49' 55.17"	8,800.381	293° 42' 33.77"	8,798.048
3	Singaraja	08° 07' LS	115° 05' BT	8	293° 41' 30.28"	8,840.192	293° 34' 14.16"	8,837.966
4	Tabanan	08° 32' LS	115° 07' BT	8	293° 45' 17.29"	8,862.027	293° 37' 55.89"	8,859.780



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18	PROPINSI KALIMANTAN BARAT				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Ketapang	01° 51' LS	109° 58' BT	7	293° 11' 59.77"	8,044.395	293° 05' 43.37"	8,042.076
2	Pontianak	00° 05' LS	109° 22' BT	7	292° 44' 54.51"	7,906.722	292° 39' 02.14"	7,904.606
3	Putussibau	00° 49' LU	112° 56' BT	7	292° 04' 50.61"	8,235.782	291° 59' 32.81"	8,234.152
4	Sambas	01° 18' LU	109° 18' BT	7	292° 18' 37.06"	7,841.276	292° 13' 06.59"	7,839.369
5	Sanggau	00° 08' LU	110° 43' BT	7	292° 30' 36.09"	8,036.178	292° 24' 54.89"	8,034.236
6	Singkawang	00° 52' LU	109° 00' BT	7	292° 29' 17.04"	7,828.668	292° 23' 37.81"	7,826.665
7	Sintang	00° 06' LU	111° 34' BT	7	292° 25' 10.67"	8,124.998	292° 19' 33.77"	8,123.140
19	PROPINSI KALIMANTAN TENGAH				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Buntok	01° 40' LS	114° 53' BT	7	292° 28' 23.81"	8,540.561	292° 22' 38.31"	8,538.861
2	Kuala Kapuas	03° 00' LS	114° 26' BT	7	292° 49' 16.03"	8,551.060	292° 43' 07.96"	8,549.169
3	Muara Teweh	00° 31' LS	114° 53' BT	7	292° 13' 06.00"	8,492.288	292° 07' 38.17"	8,490.706
4	Palangkaraya	02° 16' LS	113° 56' BT	7	292° 43' 40.36"	8,468.485	292° 37' 40.40"	8,466.606
5	Pangkalan Bun	02° 40' LS	111° 45' BT	7	293° 08' 40.39"	8,262.170	293° 02' 21.95"	8,259.963
6	Sampit	02° 32' LS	112° 58' BT	7	292° 55' 35.44"	8,380.860	292° 49' 25.96"	8,378.828
20	PROPINSI KALIMANTAN SELATAN				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Amuntai	02° 24' LS	115° 18' BT	8	292° 34' 38.51"	8,614.367	292° 28' 44.30"	8,612.647
2	Banjarmasin	03° 20' LS	114° 35' BT	8	292° 52' 13.64"	8,580.699	292° 46' 01.50"	8,578.795
3	Barabai	02° 32' LS	115° 22' BT	8	292° 35' 46.26"	8,626.861	292° 29' 50.43"	8,625.137
4	Kandangan	02° 47' LS	115° 20' BT	8	292° 39' 05.40"	8,634.054	292° 33' 05.65"	8,632.302
5	Marabahan	03° 02' LS	114° 44' BT	8	292° 47' 08.14"	8,583.212	292° 41' 01.27"	8,581.357
6	Martapura	03° 23' LS	114° 52' BT	8	292° 50' 21.92"	8,611.840	292° 44' 10.64"	8,609.970
7	Negara Kalsel	02° 42' LS	115° 05' BT	8	292° 40' 03.91"	8,604.873	292° 34' 03.99"	8,603.095
8	Rantau	02° 55' LS	115° 09' BT	8	292° 42' 12.42"	8,620.930	292° 36' 09.66"	8,619.141
9	Tanjung	02° 08' LS	115° 26' BT	8	292° 30' 20.54"	8,616.775	292° 24' 31.10"	8,615.097
21	PROPINSI KALIMANTAN TIMUR				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Balikpapan	01° 13' LS	116° 51' BT	8	292° 10' 02.34"	8,724.074	292° 04' 34.82"	8,722.644
2	Bontang	00° 04' LU	117° 30' BT	8	291° 52' 04.13"	8,738.025	291° 47' 00.05"	8,736.769
3	Kotabaru	03° 17' LS	116° 13' BT	8	292° 37' 49.69"	8,745.868	292° 31' 47.54"	8,744.191
4	Kutai	00° 30' LU	117° 00' BT	8	291° 49' 12.59"	8,668.583	291° 44' 12.49"	8,667.313
5	Nunukan	04° 06' LU	117° 40' BT	8	291° 03' 07.83"	8,592.275	290° 59' 09.05"	8,591.361
6	Samarinda	00° 28' LS	117° 11' BT	8	291° 59' 38.61"	8,727.324	291° 54' 24.49"	8,725.993
7	Tanah Grogot	01° 52' LS	116° 13' BT	8	292° 21' 35.50"	8,686.058	292° 15' 54.51"	8,684.500
8	Tanjung Redep	02° 08' LU	117° 28' BT	8	291° 27' 55.47"	8,650.327	291° 23' 23.82"	8,649.236
9	Tanjung Selor	02° 46' LU	117° 22' BT	8	291° 20' 20.50"	8,614.451	291° 15' 58.48"	8,613.405

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22	PROPINSI SULAWESI BARAT				SPHERICAL		GEODETTIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Majene	03° 33' LS	118° 59' BT	8	292° 19' 17.73"	9,041.025	292° 13' 27.29"	9,039.709
2	Mamuju	02° 43' LS	118° 54' BT	8	292° 12' 34.66"	8,997.641	292° 06' 56.07"	8,996.358
3	Polewali	03° 25' LS	119° 22' BT	8	292° 15' 27.64"	9,074.836	292° 09' 41.32"	9,073.579
23	PROPINSI SULAWESI SELATAN				SPHERICAL		GEODETTIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Bantaeng	05° 32' LS	119° 57' BT	7	292° 26' 58.01"	9,223.399	292° 20' 44.34"	9,222.152
2	Bulukumba	05° 33' LS	120° 12' BT	8	292° 24' 55.98"	9,249.683	292° 18' 43.48"	9,248.476
3	Enrekang	03° 35' LS	119° 47' BT	8	292° 13' 54.41"	9,124.614	292° 08' 07.99"	9,123.408
4	Jeneponto	05° 41' LS	119° 43' BT	8	292° 30' 03.34"	9,205.849	292° 23' 46.24"	9,204.559
5	Makale	03° 08' LS	119° 51' BT	8	292° 09' 55.17"	9,112.727	292° 04' 15.77"	9,111.548
6	Maros	05° 00' LS	119° 35' BT	8	292° 26' 14.33"	9,163.428	292° 20' 06.22"	9,162.138
7	Palopo	03° 01' LS	120° 13' BT	8	292° 06' 40.43"	9,145.610	292° 01' 04.82"	9,144.486
8	Pangkajene	04° 50' LS	119° 34' BT	8	292° 25' 07.66"	9,154.713	292° 19' 01.85"	9,153.427
9	Parepare	04° 01' LS	119° 40' BT	8	292° 18' 06.77"	9,130.729	292° 12' 13.35"	9,129.489
10	Pinrang	03° 47' LS	119° 40' BT	8	292° 16' 17.65"	9,120.975	292° 10' 27.64"	9,119.744
11	Sidenreng	04° 00' LS	119° 55' BT	8	292° 16' 09.37"	9,155.703	292° 10' 17.60"	9,154.499
12	Sinjai	05° 05' LS	120° 08' BT	8	292° 22' 18.87"	9,223.270	292° 16' 12.65"	9,222.063
13	Sunggu Minasa	05° 12' LS	119° 30' BT	8	292° 28' 25.71"	9,163.313	292° 22' 14.27"	9,162.004
14	Takalar	05° 30' LS	119° 25' BT	8	292° 31' 22.69"	9,167.435	292° 25' 06.51"	9,166.103
15	Ujung Pandang	05° 09' LS	119° 28' BT	8	292° 28' 20.27"	9,157.795	292° 22' 09.36"	9,156.482
16	Watan Soppeng	04° 21' LS	119° 55' BT	8	292° 18' 46.10"	9,170.334	292° 12' 49.24"	9,169.118
17	Watanpone	04° 34' LS	120° 20' BT	8	292° 17' 09.41"	9,222.148	292° 11' 11.76"	9,220.987
24	PROPINSI SULAWESI TENGAH				SPHERICAL		GEODETTIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Banggai	01° 34' LS	123° 34' BT	8	291° 40' 48.25"	9,431.621	291° 35' 53.40"	9,430.954
2	Donggala	00° 42' LS	119° 45' BT	8	291° 49' 56.94"	9,001.882	291° 44' 53.65"	9,000.811
3	Luwuk	00° 55' LS	122° 49' BT	8	291° 39' 48.79"	9,327.635	291° 34' 59.53"	9,326.892
4	Palu	00° 50' LS	119° 54' BT	8	291° 50' 28.57"	9,022.844	291° 45' 24.08"	9,021.782
5	Poso	01° 24' LS	120° 47' BT	8	291° 51' 11.65"	9,137.309	291° 46' 03.51"	9,136.320
6	Tolitoli	01° 03' LU	120° 50' BT	8	291° 31' 01.60"	9,042.604	291° 26' 31.48"	9,041.734
25	PROPINSI SULAWESI TENGGARA				SPHERICAL		GEODETTIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Baubau	05° 30' LS	122° 39' BT	8	292° 04' 54.89"	9,498.651	291° 58' 56.83"	9,497.842
2	Kendari	03° 57' LS	122° 35' BT	8	291° 57' 53.84"	9,427.790	291° 52' 17.87"	9,426.971
3	Kolaka	04° 02' LS	121° 37' BT	8	292° 04' 34.03"	9,331.786	291° 58' 51.37"	9,330.827
4	Raha	04° 50' LS	122° 43' BT	8	292° 01' 21.84"	9,477.936	291° 55' 33.75"	9,477.135

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26	PROPINSI GORONTALO				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Gorontalo	00° 34' LU	123° 05' BT	8	291° 29' 55.12"	9,295.063	291° 25' 30.15"	9,294.387
27	PROPINSI SULAWESI UTARA				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Manado	01° 33' LU	124° 53' BT	8	291° 22' 16.77"	9,441.852	291° 18' 17.26"	9,441.363
2	Mobagu	00° 48' LU	124° 21' BT	8	291° 26' 34.54"	9,416.800	291° 22' 20.37"	9,416.250
3	Tahuna	03° 36' LU	125° 30' BT	8	291° 12' 09.89"	9,423.630	291° 08' 45.90"	9,423.224
28	PROPINSI NUSA TENGGARA BARAT				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Bima	08° 27' LS	118° 45' BT	8	292° 59' 16.11"	9,225.256	292° 52' 15.63"	9,223.727
2	Dompu	08° 30' LS	118° 28' BT	8	293° 02' 57.21"	9,198.725	292° 55' 54.53"	9,197.140
3	Mataram	08° 36' LS	116° 08' BT	8	293° 32' 37.65"	8,967.391	293° 25' 20.94"	8,965.340
4	Raba	08° 30' LS	118° 45' BT	8	292° 59' 36.67"	9,227.406	292° 52' 35.52"	9,225.877
5	Selong	08° 38' LS	116° 30' BT	8	293° 28' 13.20"	9,005.827	293° 20' 58.05"	9,003.848
6	Sumbawa Besar	08° 30' LS	117° 25' BT	8	293° 15' 37.26"	9,092.541	293° 08' 28.85"	9,090.749
29	PROPINSI NUSA TENGGARA TIMUR				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Ende	08° 50' LS	121° 40' BT	8	292° 28' 25.76"	9,537.310	292° 21' 35.96"	9,536.367
2	Jampea	07° 06' LS	120° 41' BT	8	292° 30' 05.03"	9,364.277	292° 23' 33.48"	9,363.130
3	Kalabahi	08° 12' LS	124° 32' BT	8	291° 57' 35.66"	9,802.840	291° 51' 10.06"	9,802.450
4	Kefamenanu	09° 25' LS	124° 30' BT	8	291° 59' 54.20"	9,849.495	291° 53' 11.78"	9,849.172
5	Kupang	10° 12' LS	123° 35' BT	8	292° 11' 12.58"	9,788.817	292° 04' 14.81"	9,788.343
6	Larantuka	08° 15' LS	123° 00' BT	8	292° 12' 25.57"	9,648.539	292° 05' 50.90"	9,647.846
7	Maumere	08° 30' LS	122° 08' BT	8	292° 22' 06.95"	9,570.746	292° 15' 24.16"	9,569.889
8	Ruteng	08° 40' LS	120° 30' BT	8	292° 40' 32.70"	9,411.873	292° 33' 38.82"	9,410.691
9	Waikabubak	09° 40' LS	119° 25' BT	8	292° 58' 54.47"	9,344.956	292° 51' 41.58"	9,343.553
10	Waingapu	09° 40' LS	120° 15' BT	8	292° 48' 37.45"	9,429.104	292° 41' 29.00"	9,427.880
30	PROPINSI MALUKU UTARA				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Labuha	00° 30' LS	127° 29' BT	9	291° 27' 18.94"	9,793.671	291° 23' 02.96"	9,793.443
2	Morotai	02° 10' LU	128° 10' BT	9	291° 21' 42.00"	9,757.175	291° 18' 11.04"	9,756.969
3	Temate	01° 49' LU	127° 24' BT	9	291° 21' 46.19"	9,691.829	291° 18' 05.33"	9,691.561
4	Tobelo	01° 45' LU	128° 00' BT	9	291° 22' 27.51"	9,756.651	291° 18' 49.13"	9,756.436

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31	PROPINSI MALUKU				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Amboina	03° 42' LS	128° 09' BT	9	291° 29' 00.92"	9,991.625	291° 24' 00.61"	9,991.606
2	Ambon	03° 42' LS	128° 47' BT	9	291° 26' 35.02"	10,057.047	291° 21' 38.42"	10,057.120
3	Dobo	05° 47' LS	134° 15' BT	9	290° 59' 33.17"	10,704.634	290° 54' 38.13"	10,705.835
32	PROPINSI PAPUA BARAT				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Fakfak	02° 55' LS	132° 18' BT	9	291° 18' 20.45"	10,389.329	291° 13' 56.73"	10,389.845
2	Manokwari	01° 00' LS	134° 05' BT	9	291° 24' 29.86"	10,497.232	291° 20' 46.52"	10,497.792
3	Sorong	00° 50' LS	131° 15' BT	9	291° 24' 28.56"	10,197.134	291° 20' 30.06"	10,197.345
33	PROPINSI PAPUA				SPHERICAL		GEODETIC	
	KOTA	LINTANG	BUJUR	TZ	ARAH QIBLAT	JARAK (km)	ARAH QIBLAT	JARAK (km)
1	Agats	05° 34' LS	138° 08' BT	9	290° 49' 48.42"	11,097.518	290° 45' 21.04"	11,099.403
2	Jayapura	02° 28' LU	140° 38' BT	9	292° 09' 32.69"	11,032.938	292° 07' 27.31"	11,033.788
3	Merauke	08° 30' LS	140° 27' BT	9	290° 09' 24.74"	11,449.344	290° 04' 26.50"	11,452.490
4	Nabire	03° 18' LS	135° 33' BT	9	291° 12' 01.06"	10,740.977	291° 07' 51.88"	10,742.016
5	Sentani	02° 38' LS	140° 34' BT	9	291° 18' 55.65"	11,233.758	291° 15' 30.58"	11,235.445
6	Timika	04° 33' LS	136° 53' BT	9	291° 01' 12.47"	10,928.393	290° 56' 52.70"	10,929.851
7	Wamena	03° 54' LS	138° 41' BT	9	291° 05' 03.66"	11,089.065	291° 01' 05.78"	11,090.704

## DAFTAR RIWAYAT HIDUP

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Tempat/Tanggal Lahir : Sidomukti, 14 Juni 1994

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Pendidikan Formal :

- SDN 04 Sidomukti, Tulang Bawang. Tahun 2000 – 2006
- MTs Al-Ikhlas Sidomukti, Tulang Bawang. Tahun 2006 – 2009
- MA Al-Hikmah, Bandar Lampung. Tahun 2009 – 2012

Pendidikan Non Formal :

- PP. Darussalam Simpang Mesir, Tulang Bawang. Tahun 2007 – 2009
- PP. Al-Hikmah, Bandar Lampung. Tahun 2009-2012
- PP. Daarun Najaah, Semarang. Tahun 2012 – 2016
- NANO English Course, Pare, Kediri. Tahun 2013

Pengalaman Organisasi :

- Ketua *Jam'iyah Bahtsul Kutub* PP. Al-Hikmah 2010/2011
- Anggota *farabi Institute* 2012
- Anggota P3M (Pengembangan Pesantren dan Pengabdian Masyarakat)  
CSSMoRA UIN Walisongo 2013/2014
- Koor. *al-Miqaat* PP. Daarun Najaah 2013/2014
- Wartawan majalah *Zenith* 2013/2014
- Redaktur pelaksana majalah *Zenith* 2014/2015
- Koor. Departemen P3M (Pengembangan Pesantren dan Pengabdian Masyarakat)  
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CSSMoRA Nasional 2015/2016

Demikian riwayat hidup ini penulis buat dengan sebenar-benarnya untuk menjadi maklum dan periksa adanya.

Semarang, 10 Juli 2016

Adi Misbahul Huda

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