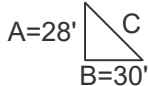


Grades & Stakes Formulas

<p>CONVERT INCHES TO DECIMAL FEET</p> <p>8" - 8/12 = 0.666 = 0.67' 1/4" - 1/4 = /12 = 0.020 = 0.02' 8-1/4" - 1/4 = +8 = /12 = 0.687 = 0.69'</p>	<p style="text-align: center;">"GOLD"EN RULES</p> <p>RISE / RUN = FT/FT (NEVER ROUND) % / 100 = FT/FT (NEVER ROUND) FT/FT X 100 = % RUN / RISE = SLOPE RATIO</p>																												
<p>CONVERT DECIMAL FEET TO INCHES</p> <p>0.25' = 0.25 X 12 = 3"</p>	<p style="text-align: center;">STATIONING</p> <p>EXAMPLES - 16+45 & 14+50 1645.00 - 1450.00 = 195.00' APART NEGATIVE OFFSET = LEFT & POSITIVE OFFSET = RIGHT</p>																												
<p style="text-align: center;">BASIC QUANTITIES</p> <p>FEET X FEET = SQUARE FEET (SQ FT) SQ FT / 9 = SQUARE YARDS (SQ YDS) FEET X FEET X FEET = CUBIC FEET (CU FT) CU FT / 27 = CUBIC YARDS (CU YDS)</p>	<p style="text-align: center;">FG CUT/FILLS TO SUBGRADE</p> <p>SECTION + CUT = TOTAL CUT SECTION - FILL = POSITIVE # = CUT NEGATIVE # = FILL</p>																												
<p style="text-align: center;">A² + B² = C²</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">  <p>A=28' B=30'</p> </div> <div> <p>(28 X 28) + (30 X 30) 784 + 900 = 1684 $\sqrt{1684} = C = 41.04'$</p> </div> </div>	<p style="text-align: center;">SURVEYING</p> <p>1 ACRE = 43560 SQ FT (66' X 660') 640 ACRES IN A SECTION SECTION DIMENSION - 1 MILE X 1 MILE 36 SECTIONS PER TOWNSHIP TOWNSHIP DIMENSION - 6 MILE X 6 MILE</p>																												
<p style="text-align: center;">INCHES & DECIMAL FEET</p> <p>12 INCHES OR 96 EIGHTHS PER FOOT 10 TENTHS OR 100 HUNDREDTHS PER FOOT 5280 FEET - 1 MILE</p>	<p style="text-align: center;">LEVEL LOOPING</p> <p>BENCHMARK (BM) + BACKSIGHT (BS) = HEIGHT OF INSTRUMENT (HI) HI - FORESIGHT (FS) = ELEVATION (EL) HI - EL = FORESIGHT ROD READING</p>																												
<p>Stake Reading with Section-Grade Rod</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Example</th> <th style="width: 15%;">STAKE INFO</th> <th style="width: 15%;">SECTION THICKNESS</th> <th style="width: 15%;">ROD READING ON HUB (RR)</th> <th style="width: 15%;">RR+CUT RR-FILL = FG RR</th> <th style="width: 15%;">FG RR + Section = SG RR</th> <th style="width: 15%;">SG RR - GROUND RR = (-) = Fill (+) = Cut</th> </tr> <tr> <td></td> <td>F-1.56 To FG</td> <td>4" Concrete 4" Sand</td> <td style="text-align: center;">5.06</td> <td style="text-align: center;">(5.06-1.56) 3.50</td> <td style="text-align: center;">(3.50+0.67) 4.17</td> <td style="text-align: center;">(4.17-5.25) F-1.08 SG</td> </tr> </table>	Example	STAKE INFO	SECTION THICKNESS	ROD READING ON HUB (RR)	RR+CUT RR-FILL = FG RR	FG RR + Section = SG RR	SG RR - GROUND RR = (-) = Fill (+) = Cut		F-1.56 To FG	4" Concrete 4" Sand	5.06	(5.06-1.56) 3.50	(3.50+0.67) 4.17	(4.17-5.25) F-1.08 SG	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Example</th> <th style="width: 15%;">STAKE INFO</th> <th style="width: 15%;">SECTION THICKNESS</th> <th style="width: 15%;">ROD READING ON HUB (RR)</th> <th style="width: 15%;">RR-CUT RR+FILL = FG RR</th> <th style="width: 15%;">FG RR - Section = SG RR</th> <th style="width: 15%;">GROUND RR - SG RR = (-) = Fill (+) = Cut</th> </tr> <tr> <td></td> <td>F-1.56 To FG</td> <td>4" Concrete 4" Sand</td> <td style="text-align: center;">3.72</td> <td style="text-align: center;">(3.72+1.56) 5.28</td> <td style="text-align: center;">(5.28-0.67) 4.61</td> <td style="text-align: center;">(3.51-4.61) F-1.10 SG</td> </tr> </table>	Example	STAKE INFO	SECTION THICKNESS	ROD READING ON HUB (RR)	RR-CUT RR+FILL = FG RR	FG RR - Section = SG RR	GROUND RR - SG RR = (-) = Fill (+) = Cut		F-1.56 To FG	4" Concrete 4" Sand	3.72	(3.72+1.56) 5.28	(5.28-0.67) 4.61	(3.51-4.61) F-1.10 SG
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<p>SOLVING FOR STEPS = $\frac{35 \text{ (STEPS)} \times \text{(STEPS)}}{100'} = \frac{\quad}{60'}$ = 35 X 60 = /100 = 21 STEPS</p>																													
<p>SOLVING FOR RISE = $\frac{1' \text{ (RISE)}}{4' \text{ (RUN)}} = \frac{X \text{ (RISE)}}{14' \text{ (RUN)}}$ = 14 X 1 = /4 = X = 3.5' RISE</p>																													
<p>SOLVING FOR RUN = $\frac{1' \text{ (RISE)}}{4' \text{ (RUN)}} = \frac{5' \text{ (RISE)}}{X \text{ (RUN)}}$ = 5 X 4 = /1 = X = 20' RUN 20 X 2 (SIDES) = + DITCH BOTTOM = TOTAL TRENCH</p>																													

Common Abbreviations

•	BC/PC	Begin Curve	•	⊙ or O/S	Offset
•	BM	Bench Mark	•	PI	Point of Intersection
•	℄	Centerline	•	PL	Property Line
•	C	Cut	•	RAD	Radius Point
•	CP	<u>Catch Point</u>	•	R/W	Right-of-Way
•	EC/PT	End Curve	•	SG	Sub Grade
•	EL	Elevation	•	SS	Slope Stake
•	F	Fill	•	STA	Station
•	FG	Finished Grade	•	TBM	Temporary Bench Mark
•	FL	Flow Line	•	TC	Top of Curb
•	HP	<u>High Point</u>	•	TOE	Toe of Slope
•	INV	Invert of Drain	•	TOP	Top of Slope
•	L/O	Line Only	•	TP	Turning Point
•	MH	Manhole	•	TBC	Top Back of Curb

