Plan Preparation Guide

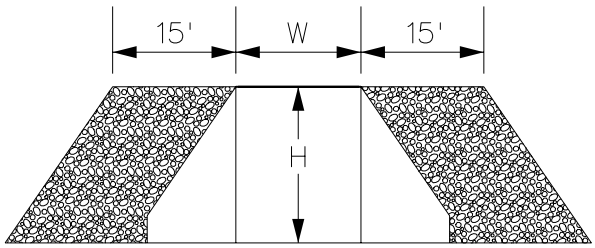
Chapter 16

Miscellaneous Tables, Charts, and Formulas

1. RIPRAP FOR BOX CULVERTS

ESTIMATED RIPRAP QUANTITIES			
HEIGHT OF BOX	2:1 SLOPE TONS	4:1 SLOPE TONS	6:1 SLOPE TONS
4'	14	26	38
5'	18	32	47
6'	21	39	57
7'	25	45	66
8'	28	51	76
9'	31	58	85
10'	35	64	95
11'	38	71	104
12'	42	77	114
13'	45	84	123
14'	49	90	133
15'	52	96	142

QUANTITIES ARE FOR ONE END OF CULVERT
QUANTITIES DO NOT INCLUDE CHANNEL RIPRAP

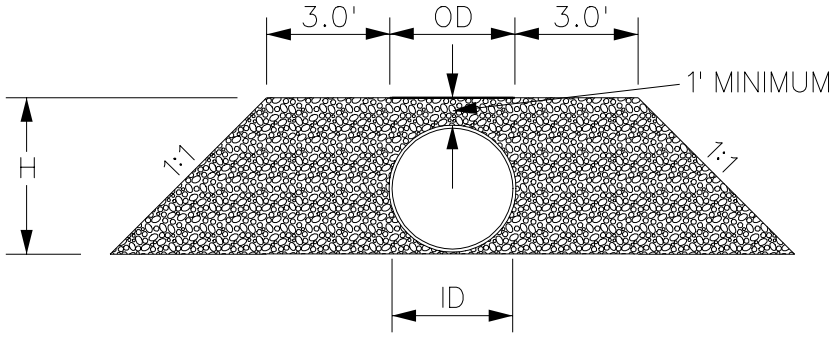


H = VERTICAL HEIGHT OF BOX CULVERT
W = OUTSIDE WIDTH OF BOX CULVERT
RIPRAP WEIGHT = 3400 LBS. PER C.Y.
RIPRAP DEPTH = 1.0'

2. RIPRAP FOR PIPE

ESTIMATED RIPRAP QUANTITIES				
PIPE SIZE		2:1 SLOPE TONS	4:1 SLOPE TONS	6:1 SLOPE TONS
ID	OD			
18''	23''	2	3	4
24''	30''	3	4	5
30''	37''	3	5	7
36''	44''	4	6	9
42''	51''	5	8	11
48''	58''	6	9	13
54''	65''	7	12	16
60''	72''	8	14	19
72''	86''	12	19	27
84''	100''	15	25	36
96''	114''	19	33	46
108''	128''	24	40	58
120''	140''	28	48	68

QUANTITIES ARE FOR ONE END OF PIPE
QUANTITIES DO NOT INCLUDE CHANNEL RIPRAP



ID = INSIDE PIPE DIAMETER
OD = OUTSIDE DIAMETER
H = VERTICAL HEIGHT
VERTICAL HEIGHT = 1.2 OD OR 1.0' MINIMUM ABOVE TOP OF PIPE
WEIGHT OF RIPRAP = 3400 LBS PER C.Y.
DEPTH OF RIPRAP = 1.0'

INCHES and FRACTIONS in DECIMALS of A FOOT

Inches	Decimals of a Foot	Fraction Equivalents of Decimals	Inches	Decimals of a Foot	Fraction Equivalents of Decimals	Inches	Decimals of a Foot	Fraction Equivalents of Decimals
1/32	0.0026		4	0.3333		8	0.6667	
1/16	.0052		4 1/16	.3385		8 1/16	.671875	43/64
3/32	.0104		4 1/8	.34375	11/32	8 1/8	.6771	
1/8	.015625	1/64	4 3/16	.3490		8 3/16	.6823	
5/32	0.0208		4 1/4	0.3542		8 1/4	0.6875	11/16
3/16	.0260		4 5/16	.359375	23/64	8 5/16	.6927	
7/32	.03125	1/32	4 3/8	.3646		8 3/8	.6979	
1/4	.0365		4 7/16	.3698		8 7/16	.703125	45/64
9/32	0.0417		4 1/2	0.3750	3/8	8 1/2	0.7083	
5/16	.046875	3/64	4 9/16	.3802		8 9/16	.7135	
11/32	.0521		4 5/8	.3854		8 5/8	.71875	23/32
3/8	.0573		4 11/16	.390625	25/64	8 11/16	.7240	
13/32	0.0625	1/16	4 3/4	0.3958		8 3/4	0.7292	
7/16	.0677		4 13/16	.4010		8 13/16	.734375	47/64
15/32	.0729		4 7/8	.40625	13/32	8 7/8	.7396	
1/2	.078125	5/64	4 15/16	.4115		8 15/16	.7448	
17/32	0.0833		5	0.4167		9	0.7500	1/2
9/16	.0885		5 1/16	.421875	27/64	9 1/16	.7552	
19/32	.09375	3/32	5 1/8	.4271		9 1/8	.7604	
5/8	.0990		5 3/16	.4323		9 3/16	.765625	49/64
21/32	0.1042		5 1/4	0.4375	7/16	9 1/4	0.7708	
11/16	.109375	7/64	5 5/16	.4427		9 5/16	.7760	
23/32	.1146		5 3/8	.4479		9 3/8	.78125	25/32
3/4	.1198		5 7/16	.453125	29/64	9 7/16	.7865	
25/32	0.1250	1/8	5 1/2	0.4583		9 1/2	0.7917	
13/16	.1302		5 9/16	.4635		9 9/16	.796875	51/64
27/32	.1354		5 5/8	.46875	15/32	9 5/8	.8021	
7/8	.140625	9/64	5 11/16	.4740		9 11/16	.8073	
29/32	0.1458		5 3/4	0.4792		9 3/4	0.8125	13/16
15/16	.1510		5 13/16	.484375	31/64	9 13/16	.8177	
31/32	.15625	5/32	5 7/8	.4896		9 7/8	.8229	
1	.1615		5 15/16	.4948		9 15/16	.828125	53/64
1 1/32	0.1667		6	0.5000	1/2	10	0.8333	
1 1/16	.171875	11/64	6 1/16	.5052		10 1/16	.8385	
1 3/32	.1771		6 1/8	.5104		10 1/8	.84375	27/32
1 1/8	.1823		6 3/16	.515625	33/64	10 3/16	.8490	
1 5/32	0.1875	3/16	6 1/4	0.5208		10 1/4	0.8542	
1 3/16	.1927		6 5/16	.5260		10 5/16	.859375	55/64
1 7/32	.1979		6 3/8	.53125	17/32	10 3/8	.8646	
1 1/4	.203125	13/64	6 7/16	.5365		10 7/16	.8698	
1 9/32	0.2083		6 1/2	0.5417		10 1/2	0.8750	7/8
1 5/16	.2135		6 9/16	.546875	35/64	10 9/16	.8802	
1 11/32	.21875	7/32	6 5/8	.5521		10 5/8	.8854	
1 3/8	.2240		6 11/16	.5573		10 11/16	.890625	57/64
1 13/32	0.2292		6 3/4	0.5625	9/16	10 3/4	0.8958	
1 7/16	.234375	15/64	6 13/16	.5677		10 13/16	.9010	
1 15/32	.2396		6 7/8	.5729		10 7/8	.90625	29/32
1 1/2	.2448		6 15/16	.578125	37/64	10 15/16	.9115	
1 17/32	0.2500	1/4	7	0.5833		11	0.9167	
1 9/16	.2552		7 1/16	.5885		11 1/16	.921875	59/64
1 19/32	.2604		7 1/8	.59375	19/32	11 1/8	.9271	
1 5/8	.265625	17/64	7 3/16	.5990		11 3/16	.9323	
1 21/32	0.2708		7 1/4	0.6042		11 1/4	0.9375	15/16
1 11/16	.2760		7 5/16	.609375	39/64	11 5/16	.9427	
1 23/32	.28125	9/32	7 3/8	.6146		11 3/8	.9479	
1 3/4	.2865		7 7/16	.6198		11 7/16	.953125	61/64
1 25/32	0.2917		7 1/2	0.6250	5/8	11 1/2	0.9583	
1 13/16	.296875	19/64	7 9/16	.6302		11 9/16	.9635	
1 27/32	.3021		7 5/8	.6354		11 5/8	.96875	31/32
1 7/8	.3073		7 11/16	.640625	41/64	11 11/16	.9740	
1 29/32	0.3125	5/16	7 3/4	0.6458		11 3/4	0.9792	
1 15/16	.3177		7 13/16	.6510		11 13/16	.984375	63/64
1 31/32	.3229		7 7/8	.65625	21/32	11 7/8	.9896	
1 31/32	.328125	21/64	7 15/16	.6615		11 15/16	.9948	

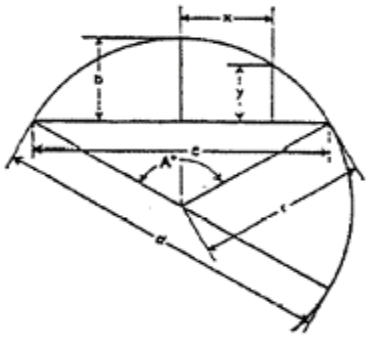
DECIMAL EQUIVALENTS OF FRACTIONAL PARTS OF ONE INCH

1/64	.015625	17/64	.265625	33/64	.515625	49/64	.765625
1/32	.031250	9/32	.281250	17/32	.531250	25/32	.781250
3/64	.046875	19/64	.296875	35/64	.546875	51/64	.796875
1/16	.062500	5/16	.312500	9/16	.562500	13/16	.812500
5/64	.078125	21/64	.328125	37/64	.578125	53/64	.828125
3/32	.093750	11/32	.343750	19/32	.593750	27/32	.843750
7/64	.109375	23/64	.359375	39/64	.609375	55/64	.859375
1/8	.125000	3/8	.375000	5/8	.625000	7/8	.875000
9/64	.140625	25/64	.390625	41/64	.640625	57/64	.890625
5/32	.156250	13/32	.406250	21/32	.656250	29/32	.906250
11/64	.171875	27/64	.421875	43/64	.671875	59/64	.921875
3/16	.187500	7/16	.437500	11/16	.687500	15/16	.937500
13/64	.203125	29/64	.453125	45/64	.703125	61/64	.953125
7/32	.218750	15/32	.468750	23/32	.718750	31/32	.968750
15/64	.234375	31/64	.484375	47/64	.734375	63/64	.984375
1/4	.250000	1/2	.500000	3/4	.750000	1	1.000000

ASTM STANDARD REINFORCING BARS

BAR SIZE DESIGNATION	AREA* SQ. INCHES	WEIGHT POUNDS PER FT.	DIAMETER* INCHES
#3	.11	.376	.375
#4	.20	.668	.500
#5	.31	1.043	.625
#6	.44	1.502	.750
#7	.60	2.044	.875
#8	.79	2.670	1.000
#9	1.00	3.400	1.128
#10	1.27	4.303	1.270
#11	1.56	5.313	1.410
#14	2.25	7.650	1.693
#18	4.00	13.600	2.257

PROPERTIES OF THE CIRCLE



Circumference = 6.28318 r = 3.14159 d
Diameter = 0.31831 circumference
Area = 3.14159 r^2

Arc $a = \frac{\pi r A^\circ}{180^\circ} = 0.017453\, r A^\circ$

Angle $A^\circ = \frac{180^\circ a}{\pi r} = 57.29578 \frac{a}{r}$

Radius $r = \frac{4b^2 + c^2}{8b}$

Chord $c = 2\sqrt{2br - b^2} = 2r \sin \frac{A}{2}$

Rise $b = r - \frac{1}{2}\sqrt{4r^2 - c^2} = \frac{c}{2} \tan \frac{A}{4}$

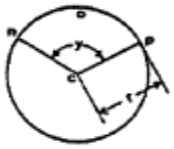
$= 2r \sin^2 \frac{A}{4} = r + y - \sqrt{r^2 - x^2}$

$y = b - r + \sqrt{r^2 - x^2}$

$x = \sqrt{r^2 - (r + y - b)^2}$

Diameter of circle of equal periphery as square = 1.27324 side of square
Side of square of equal periphery as circle = 0.78540 diameter of circle
Diameter of circle circumscribed about square = 1.41421 side of square
Side of square inscribed in circle = 0.70711 diameter of circle

CIRCULAR SECTOR



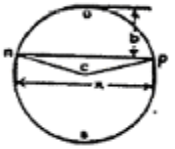
r = radius of circle y = angle ncp in degrees

Area of Sector ncpo = ½ (length of arc nop × r)

= Area of Circle × $\frac{y}{360}$

= 0.0087266 × r^2 × y

CIRCULAR SEGMENT



r = radius of circle x = chord b = rise

Area of Segment nop = Area of Sector ncpo — Area of triangle ncp

$= \frac{(\text{Length of arc nop} \times r) - x(r - b)}{2}$

Area of Segment nsp = Area of Circle — Area of Segment nop

VALUES FOR FUNCTIONS OF π

π = 3.14159265359, log = 0.4971499

π^2 = 9.8696044, log = 0.9942997 $\frac{1}{\pi}$ = 0.3183099, log = $\bar{1}$.5028501 $\sqrt{\frac{1}{\pi}}$ = 0.5641896, log = $\bar{1}$.7514251

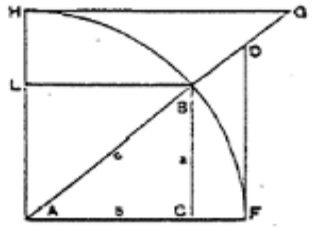
π^3 = 31.0062767, log = 1.4914496 $\frac{1}{\pi^2}$ = 0.1013212, log = $\bar{1}$.0057003 $\frac{\pi}{180}$ = 0.0174533, log = $\bar{2}$.2418774

$\sqrt{\pi}$ = 1.7724539, log = 0.2485749 $\frac{1}{\pi^3}$ = 0.0322515, log = $\bar{2}$.5085500 $\frac{180}{\pi}$ = 57.2957795, log = 1.7581226

Note: Logs of fractions such as $\bar{1}$.5028501 and $\bar{2}$.5085500 may also be written 9.5028501 − 10 and 8.5085500 − 10 respectively.

TRIGONOMETRIC FORMULAS

TRIGONOMETRIC FUNCTIONS



Radius AF $= 1$

$= \sin^2 A + \cos^2 A = \sin A \operatorname{cosec} A$

$= \cos A \sec A = \tan A \cot A$

Sine A $= \dfrac{\cos A}{\cot A} = \dfrac{1}{\operatorname{cosec} A} = \cos A \tan A = \sqrt{1 - \cos^2 A} =$ BC

Cosine A $= \dfrac{\sin A}{\tan A} = \dfrac{1}{\sec A} = \sin A \cot A = \sqrt{1 - \sin^2 A} =$ AC

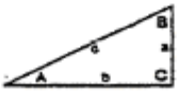
Tangent A $= \dfrac{\sin A}{\cos A} = \dfrac{1}{\cot A} = \sin A \sec A =$ FD

Cotangent A $= \dfrac{\cos A}{\sin A} = \dfrac{1}{\tan A} = \cos A \operatorname{cosec} A =$ HG

Secant A $= \dfrac{\tan A}{\sin A} = \dfrac{1}{\cos A} =$ AD

Cosecant A $= \dfrac{\cot A}{\cos A} = \dfrac{1}{\sin A} =$ AG

RIGHT ANGLED TRIANGLES



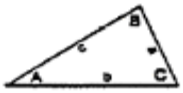
$a^2 = c^2 - b^2$

$b^2 = c^2 - a^2$

$c^2 = a^2 + b^2$

Known	Required					
	A	B	a	b	c	Area
a, b	$\tan A = \frac{a}{b}$	$\tan B = \frac{b}{a}$			$\sqrt{a^2 + b^2}$	$\frac{ab}{2}$
a, c	$\sin A = \frac{a}{c}$	$\cos B = \frac{a}{c}$		$\sqrt{c^2 - a^2}$		$\frac{a\sqrt{c^2 - a^2}}{2}$
A, a		$90° - A$		$a \cot A$	$\frac{a}{\sin A}$	$\frac{a^2 \cot A}{2}$
A, b		$90° - A$	$b \tan A$		$\frac{b}{\cos A}$	$\frac{b^2 \tan A}{2}$
A, c		$90° - A$	$c \sin A$	$c \cos A$		$\frac{c^2 \sin 2A}{4}$

OBLIQUE ANGLED TRIANGLES



$s = \dfrac{a + b + c}{2}$

$K = \sqrt{\dfrac{(s-a)(s-b)(s-c)}{s}}$

$a^2 = b^2 + c^2 - 2bc \cos A$

$b^2 = a^2 + c^2 - 2ac \cos B$

$c^2 = a^2 + b^2 - 2ab \cos C$

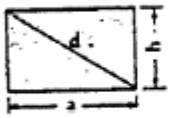
Known	Required					
	A	B	C	b	c	Area
a, b, c	$\tan \frac{1}{2}A = \frac{K}{s-a}$	$\tan \frac{1}{2}B = \frac{K}{s-b}$	$\tan \frac{1}{2}C = \frac{K}{s-c}$			$\sqrt{s(s-a)(s-b)(s-c)}$
a, A, B			$180° - (A+B)$	$\frac{a \sin B}{\sin A}$	$\frac{a \sin C}{\sin A}$	
a, b, A		$\sin B = \frac{b \sin A}{a}$			$\frac{b \sin C}{\sin B}$	
a, b, C	$\tan A = \frac{a \sin C}{b - a \cos C}$				$\sqrt{a^2 + b^2 - 2ab \cos C}$	$\frac{ab \sin C}{2}$

AREAS OF PLANE FIGURES

Square

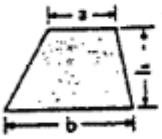
Diagonal $= d = s\sqrt{2}$.
Area $= s^2 = 4b^2 = 0.5d^2$.
Example. $s = 6$; $b = 3$. Area $= (6)^2 = 36$ Ans.
$d = 6 \times 1.414 = 8.484$ Ans.

Rectangle and Parallelogram



Area $= ab$ or $b\sqrt{d^2 - b^2}$
Example. $a = 6$; $b = 3$.
Area $= 3 \times 6 = 18$ Ans

Trapezoid

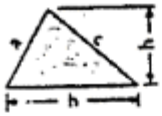


Area $= \frac{1}{2}h(a + b)$
Example. $a = 2$; $b = 4$; $h = 3$.
Area $= \frac{1}{2} \times 3(2 + 4) = 9$. Ans.

Trapezium

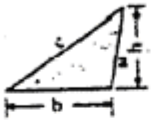
Area $= \frac{1}{2}[a(h + h^1) + bh^1 + ch]$
Example. $a = 4$; $b = 2$; $c = 2$; $h = 3$; $h^1 = 2$.
Area $= \frac{1}{2}[4(3 + 2) + (2 \times 2) + (2 \times 3)] = 15$.
Ans.

Triangles



Both formulas apply to both figures
Area $= \frac{1}{2}bh$.
Example. $h = 3$; $b = 5$.
Area $= \frac{1}{2}(3 \times 5) = 7\frac{1}{2}$. Ans.

Area $= \sqrt{S(S - a)(S - b)(S - c)}$ when $S = \frac{a + b + c}{2}$

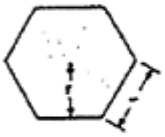


Example. $a = 2$; $b = 3$; $c = 4$.

$$S = \frac{2 + 3 + 4}{2} = 4.5$$

Area $= \sqrt{4.5(4.5 - 2)(4.5 - 3)(4.5 - 4)} = 2.9$.
Ans.

Regular Polygons



Area
- 5 sides $= 1.720477\ S^2 = 3.63271\ r^2$
- 6 " $= 2.598150\ S^2 = 3.46410\ r^2$
- 7 " $= 3.633875\ S^2 = 3.37101\ r^2$
- 8 " $= 4.828427\ S^2 = 3.31368\ r^2$
- 9 " $= 6.181875\ S^2 = 3.27573\ r^2$
- 10 " $= 7.694250\ S^2 = 3.24920\ r^2$
- 11 " $= 9.365675\ S^2 = 3.22993\ r^2$
- 12 " $= 11.196300\ S^2 = 3.21539\ r^2$

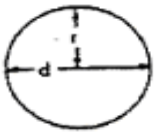
n = number of sides; r = short radius;
S = length of side; R = long radius.

$$\text{Area} = \frac{n}{4} S^2 \cot. \frac{180^\circ}{n} = \frac{n}{2} R^2 \sin. \frac{360^\circ}{n}$$
$$= nr^2 \tan \frac{180^\circ}{n}$$

AREAS OF PLANE FIGURES

Circle

$\pi = 3.1416$; A = area; d = diameter; p = circumference or periphery; r = radius.



$p = \pi d = 3.1416d, \quad p = 2\sqrt{\pi A} = 3.54\sqrt{A}$

$p = 2\pi r = 6.2832r, \quad p = \frac{2A}{r} = \frac{4A}{d}$

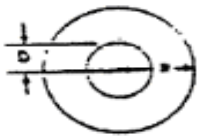
$d = \frac{p}{\pi} = \frac{p}{3.1416}, \quad d = 2\sqrt{\frac{A}{\pi}} = 1.128\sqrt{A}$

$r = \frac{p}{2\pi} = \frac{p}{6.2832}, \quad r = \sqrt{\frac{A}{\pi}} = 0.564\sqrt{A}$

$A = \frac{\pi d^2}{4} = 0.7854d^2, \quad A = \frac{p^2}{4\pi} = \frac{p^2}{12.57}$

$A = \pi r^2 = 3.1416r^2, \quad A = \frac{pr}{2} = \frac{pd}{4}$

Circular Ring



Area $= \pi(R^2 - r^2) = 3.1416(R^2 - r^2)$

Area $= 0.7854(D^2 - d^2) = 0.7854(D - d)(D + d)$

Area = difference in areas between the inner and outer circles.

Example. $R = 4$; $r = 2$.

Area $= 3.1416(4^2 - 2^2) = 37.6992$. Ans.

Quadrant

$\text{Area} = \frac{\pi r^2}{4} = 0.7854r^2 = 0.3927c^2.$

Example. $r = 3$. c = chord.

Area $= .7854 \times 3^2 = 7.0686$. Ans.

Segment

b = length of arc. θ = angle in degrees

c = chord $= \sqrt{4(2hr - h^2)}$

$\text{Area} = \frac{1}{2}|br - c(r - h)|$

$= \pi r^2 \frac{\theta}{360} - \frac{c(r - h)}{2}$

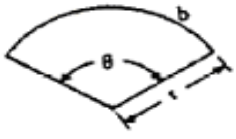
When θ is greater than 180° then $\frac{c}{2} \times$ difference between r and h is added to the fraction $\frac{\pi r^2 \theta}{360}$

Example. $r = 3$, $\theta = 120°$; $h = 1.5$

$\text{Area} = 3.1416 \times 3^2 \times \frac{120}{360} - \frac{5.196(3 - 1.5)}{2}$

$= 5.5278$. Ans.

Sector



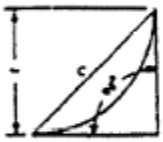
$\text{Area} = \frac{br}{2} = \pi r^2 \frac{\theta}{360°}$

θ = angle in degrees; b = length of arc.

Example. $r = 3$; $\theta = 120°$

$\text{Area} = 3.1416 \times 3^2 \times \frac{120}{360} = 9.4248$. Ans.

AREAS OF PLANE FIGURES



Spandrel

Area $= 0.2146r^2 = 0.1073c^2$

Example. $r = 3$

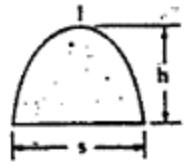
Area $= 0.2146 \times 3^2 = 1.9314$. Ans

Parabola

l = length of curved line = periphery $- s$

$$l = \frac{s^2}{8h}\left[\sqrt{c(1+c)} + 2.0320 \times \log\left(\sqrt{c}+\sqrt{1+c}\right)\right]$$

in which $c = \left(\frac{4h}{s}\right)^2$



$$\text{Area} = \frac{2}{3}sh$$

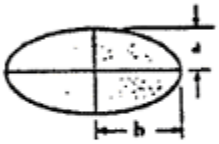
Example. $s = 3$; $h = 4$

$$\text{Area} = \frac{2}{3} \times 3 \times 4 = 8. \text{ Ans.}$$

Ellipse

$$\text{Area} = \pi ab = 3.1416ab$$

$$\text{Circum.} = 2\pi\sqrt{\frac{a^2 + b^2}{2}} \text{ (close approximation)}$$



Example. $a = 3$; $b = 4$.

Area $= 3.1416 \times 3 \times 4 = 37.6992$. Ans.

$$\text{Circum.} = 2 \times 3.1416\sqrt{\frac{(3)^2 + (4)^2}{2}}$$

$$= 6.2832 \times 3.5355 = 22.21 \text{ Ans.}$$

Vertical Height	SLOPE DISTANCE							
	½:1	1:1	1½:1	2:1	2½:1	3:1	4:1	6:1
1	1	1	2	2	3	3	4	6
2	2	3	4	4	5	6	8	12
3	3	4	5	7	8	9	12	18
4	4	6	7	9	11	13	16	24
5	6	7	9	11	14	16	21	30
6	7	8	11	13	16	19	25	36
7	8	10	13	15	19	22	29	43
8	9	11	14	18	22	25	33	49
9	10	13	16	20	24	28	37	55
10	11	14	18	22	27	32	41	61
11	12	19	20	28	30	35	45	67
12	13	17	22	27	32	38	49	73
13	15	18	23	29	35	41	54	79
14	16	20	25	31	38	44	58	85
15	17	21	27	34	40	47	62	91
16	18	23	29	36	43	51	66	97
17	19	24	31	38	46	54	70	103
18	20	25	32	40	49	57	74	109
19	21	27	34	42	51	60	78	116
20	22	28	36	45	54	63	82	122
21	23	30	38	47	57	66	87	128
22	25	31	40	49	59	70	91	134
23	26	33	41	51	62	73	95	140
24	27	34	43	54	65	76	99	146
25	28	35	45	56	67	79	103	152
26	29	37	47	58	70	82	107	158
27	30	38	49	60	73	85	111	164
28	31	40	50	63	75	89	115	170
29	32	41	52	65	78	92	120	176
30	34	42	54	67	81	95	124	182
31	35	44	56	69	83	98	128	188
32	36	45	58	72	86	101	132	195
33	37	47	59	74	89	104	136	201
34	38	48	61	76	92	108	140	207
35	39	50	63	78	94	111	144	213
36	40	51	65	80	97	114	148	219
37	41	52	67	83	100	117	153	225
38	42	54	69	85	102	120	157	231
39	44	55	70	87	105	123	161	237
40	45	57	72	89	108	126	165	243
41	46	58	74	92	110	130	169	249
42	47	59	76	94	113	133	173	255
43	48	61	78	96	116	136	177	261
44	49	62	79	98	118	139	181	268
45	50	64	81	101	121	142	186	274
46	51	65	83	103	124	145	190	280
47	53	66	85	105	126	149	194	286
48	54	68	87	107	129	152	198	292
49	55	69	88	110	132	155	202	298
50	56	71	90	112	135		206	304

Area, Length, and Volume Conversion Factors

Quantity	From Inch-Pound Units	To Metric Units	Multiply by
Length	mile	km	1.609 344
	yard	m	0.914 4
	foot	m	0.304 8
		mm	304.8
	inch	mm	25.4
Area	square mile	km^2	2.590 00
	acre	m^2	4 046.856
		ha (10 000 m^2)	0.404 685 6
	square yard	m^2	0.836 127 36
	square foot	m^2	0.092 903 04
	square inch	mm^2	645.15
Volume	acre foot	m^3	1 233.49
	cubic yard	m^3	0.764 555
	cubic foot	m^3	0.028 316 8
	cubic foot	cm^3	28 316.85
	cubic foot	L(1000 cm^3)	28.316 85
	100 board feet	m^3	0.235 974
	gallon	L(1000 cm^3)	3.785 41
	cubic inch	cm^3	16.387 064
	cubic inch	mm^3	16.387 064

NEW CONCRETE DESIGNATIONS

New	Previous
Class 2500	Class B
Class 3000	Class A
Class 4000	Class D
Class 4000DS (Drill Shaft)	No Previous Designation
Class 4000S (Seal)	No Previous Designation
Class 4000P (Prestressed)	Class AA
Class 5000	Class X
Class 6000	No Previous Designation
Class 6500	Class E
Class 7000	No Previous Designation