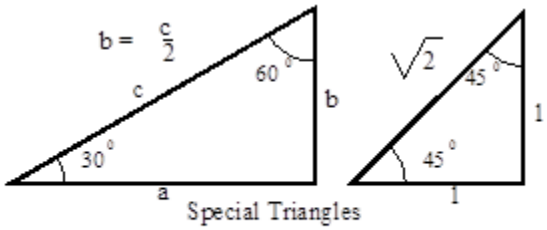
TMTH 205
FINAL EXAM FORMULA SHEET

CHAPTER 6: *Geometry*

NAME	FORMULA
Circle	Circumference = $2\pi r$ or πd
	Area = πr^2 or $\frac{\pi d^2}{4}$
Square	Perimeter = $4s$
	Area = s^2
Rectangle	Perimeter = $2(l + w)$
	Area = $l \cdot w$
Parallelogram	Perimeter = $2(a + b)$
	Area = $b \cdot h$
Rhombus	Perimeter = $4s$
	Area = $s \cdot h$
Trapezoid	Perimeter = $a + b + c + d$
	Area = $\frac{(a+b) \cdot h}{2}$
Triangle	Area = $\frac{b \cdot h}{2}$
Hero's Formula	Area = $\sqrt{s(s-a)(s-b)(s-c)}$ *where* $s = \frac{a+b+c}{2}$

NAME	FORMULA
Cube	Volume = a^3
	Surface Area = $6a^2$
Rectangular Parallelepiped	Volume = lwh
	Surface Area = $2(lw + hw + lh)$
Any cylinder or prism	Volume = (area of base) $\cdot$ (altitude)
Right cylinder or prism	Lateral Area = (perimeter of base) $\cdot$ (altitude) (not including bases)
Sphere	Volume = $\frac{4}{3}\pi r^3$
	Surface area = $4\pi r^2$

Any cone or pyramid	Volume = $\frac{h}{3} \cdot$ (area of base) h = height of cone or pyramid
Right circular cone or regular pyramid	Lateral area = $\frac{s}{2} \cdot$ (perimeter of base) s = length of slant side
Frustum	Volume = $\frac{h}{3} \cdot (A_1 + A_2 + \sqrt{A_1 A_2})$ h = height
Frustum	Lateral area = $\frac{s}{2} \cdot$ (sum of base perimeters) $= \frac{s}{2} \cdot (P_1 + P_2)$: s = length of slant side



Special Triangles

CHAPTER 18: *Trigonometric Identities and Equations*

$\cot\theta = \frac{1}{\tan\theta}$ $\sec\theta = \frac{1}{\tan\theta}$ $\csc\theta = \frac{1}{\sin\theta}$ $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$

$\sin^2\theta + \cos^2\theta = 1$ $1 + \tan^2 = \sec^2\theta$ $1 + \cot^2 = \csc^2\theta$

CHAPTER 20: *Exponential and Logarithmic Functions*

Growth	**Decay**	**Growth to an Upper Limit**
$y = ae^{nt}$	$y = ae^{-nt}$	$y = a(1-e^{-nt})$

Compound Interest		**Doubling Time and Half-Life**
$y = a(1 + n)^t$	$y = a\left(1 + \frac{n}{m}\right)^{mt}$	$t = \frac{\ln 2}{n}$

$\log_b N = a \quad b^a = N$ $\qquad\qquad$ $\log\left(\frac{M}{N}\right) = \log M - \log N$

$\log (M \bullet N) = \log M + \log N$ $\qquad\qquad$ $\log M^n = n \bullet \log M$

CHAPTER 22: *Analytic Geometry*

Straight Line

Distance formula.	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Equation of Straight line (General Form)	$Ax + By + C = 0$
Equation of Straight line (Slope-Intercept Form)	$y = mx + b$
Equation of Straight line (Point-slope Form)	$m = \frac{y - y_1}{x - x_1}$ or $y - y_1 = m(x - x_1)$
Equation of Straight line (Two-point form)	$\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1}$
Intersection angle between two lines	$\tan\phi = \frac{m_2 - m_1}{1 + m_1 m_2}$

Circle

Standard Equation (Circle of Radius r) Centre at (h, k)	$(x - h)^2 + (y - k)^2 = r^2$

Parabola

Standard Equation (Vertex at origin) Axis Horizontal	$y^2 = 4px$
Standard Equation (Vertex at origin) Axis Vertical	$x^2 = 4py$
Focal Width	$L = \|4p\|$

Ellipse

Standard Equation (Centre at origin) Major axis vertical	$\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$
Standard Equation (Centre at origin) Major axis horizontal	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
Distance from centre to focus.	$c = \sqrt{a^2 - b^2}$
Focal width (where *a* is semi-major axis)	$L = \frac{2b^2}{a}$

Hyperbola

Standard equation (Trans. horizontal)	$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$	slopes of asymptote = $\pm \frac{b}{a}$
Standard equation (Trans. vertical)	$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$	slopes of asymptote = $\pm \frac{a}{b}$
Distance from centre to focus	$c = \sqrt{a^2 + b^2}$	
Focal Width	$L = \frac{2b^2}{a}$	