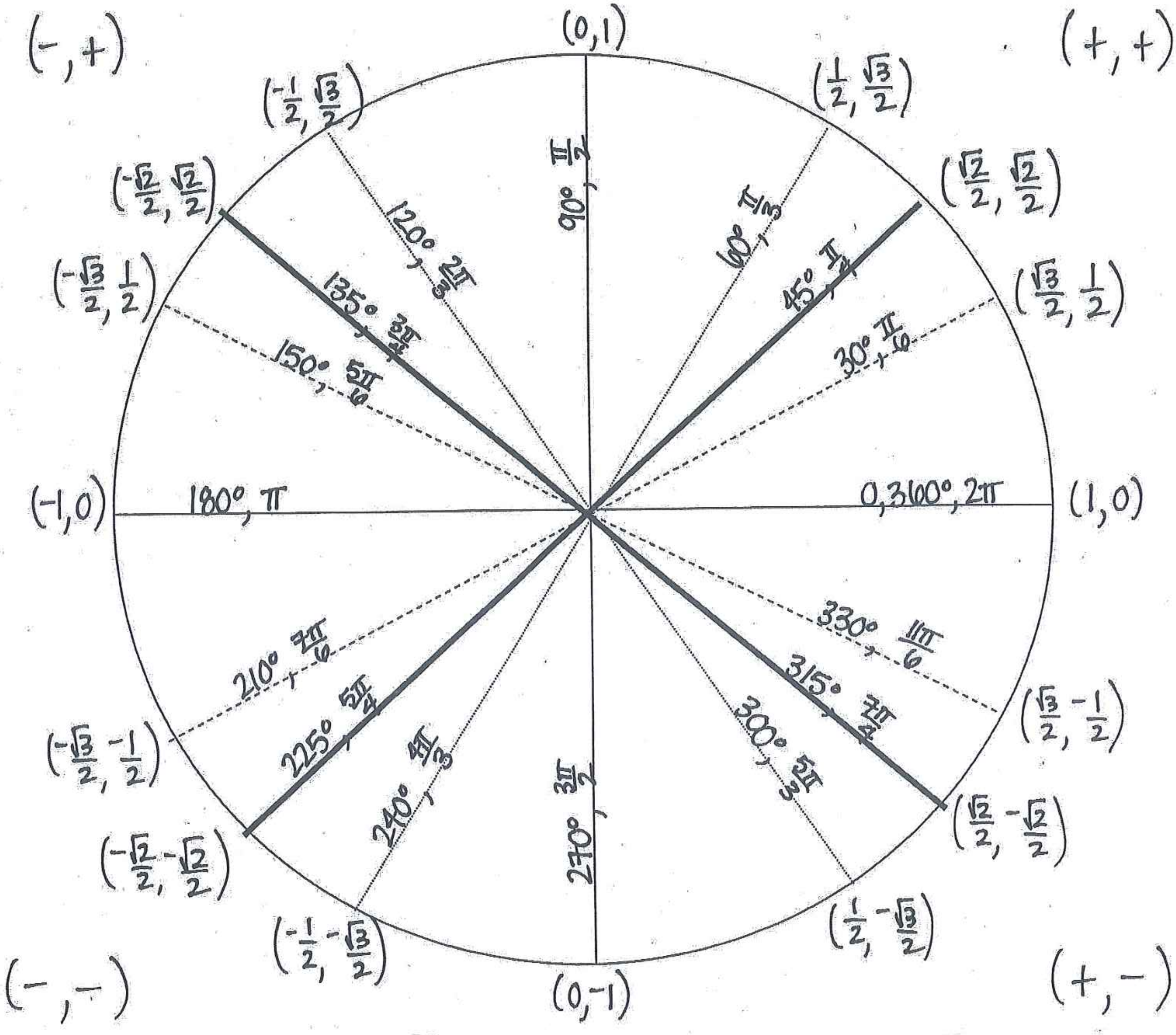
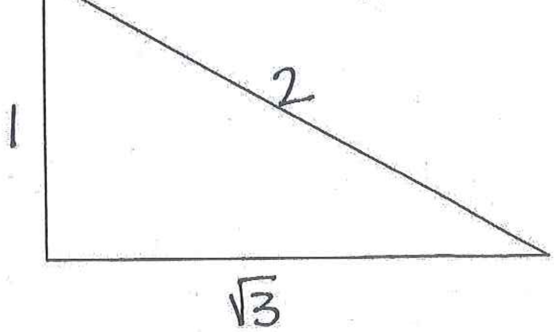
$(\cos\theta, \sin\theta)$



30°-60°-90°



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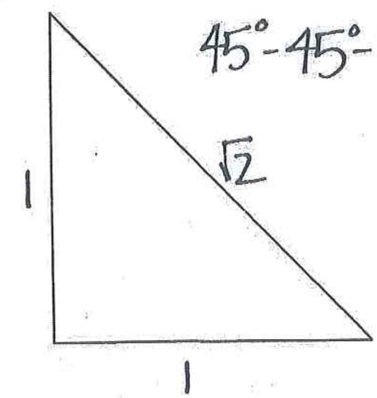
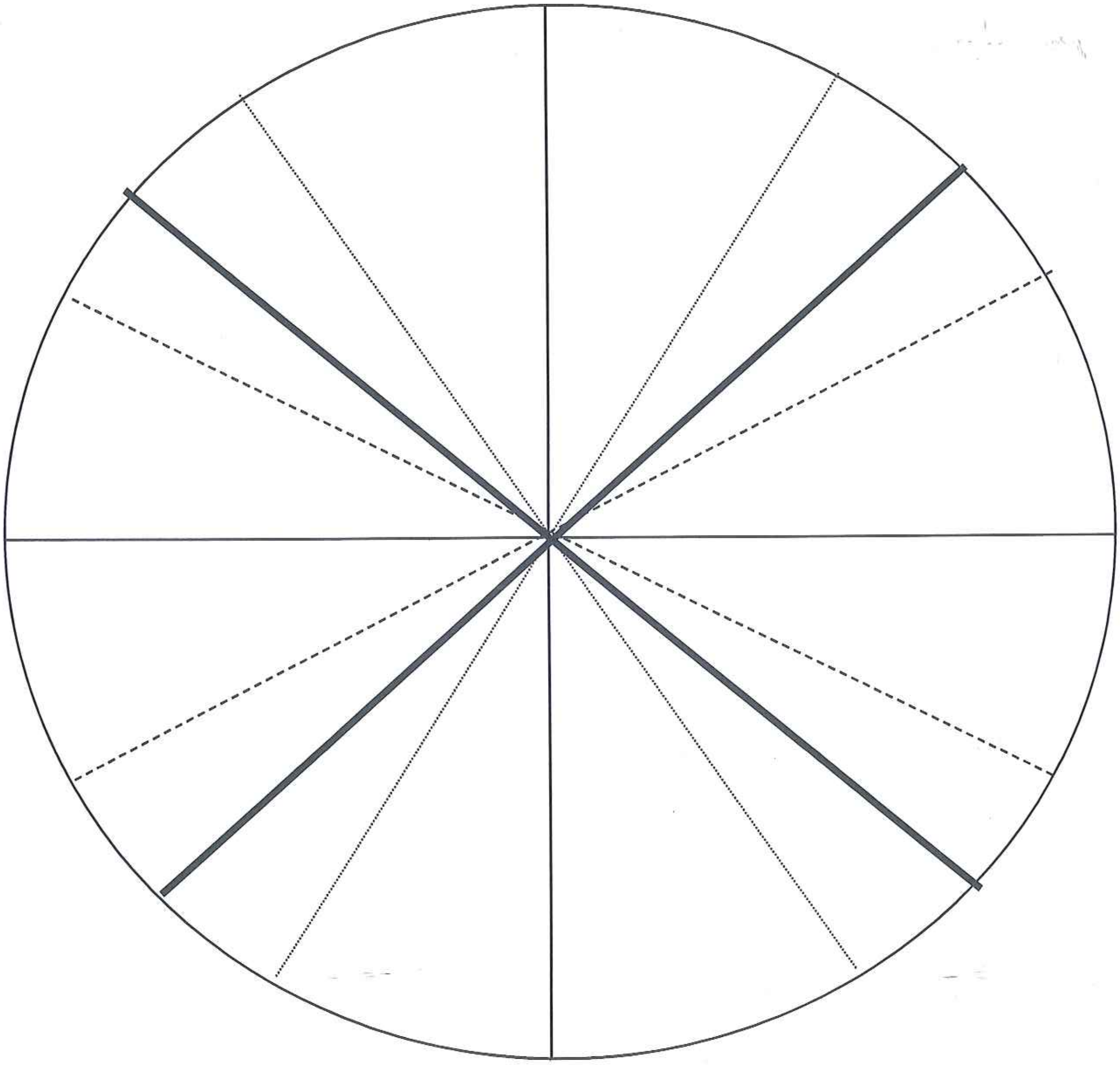
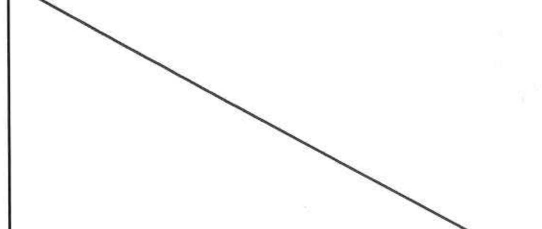
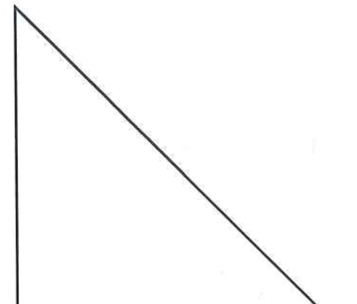


Trig/Precalculus Review **Name:**____________________________







Trigonometric Identities

Reciprocal Identities:

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

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

$\tan\theta = \frac{1}{\cot\theta}$ $\qquad$ $\cot\theta = \frac{1}{\tan\theta}$

Quotient Identities

$\tan\theta = \frac{\sin\theta}{\cos\theta}$

$\cot\theta = \frac{\cos\theta}{\sin\theta}$

Pythagorean Identities

$\sin^2\theta + \cos^2\theta = 1$

$\tan^2\theta + 1 = \sec^2\theta$

$1 + \cot^2\theta = \csc^2\theta$

Sum and Difference Identities

$\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$

$\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$

$\tan(\alpha \pm \beta) = \frac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha\tan\beta}$

Double Angle Identities

$\sin 2\theta = 2\sin\theta\cos\theta$

$\cos 2\theta = \cos^2\theta - \sin^2\theta$

$= 2\cos^2\theta - 1$

$= 1 - 2\sin^2\theta$

$\tan 2\theta =$

$\frac{2\tan\theta}{1-\tan^2\theta}$

Half-Angle Identities

$\sin\frac{\alpha}{2} = \pm\sqrt{\frac{1-\cos\alpha}{2}}$

$\cos\frac{\alpha}{2} = \pm\sqrt{\frac{1+\cos\alpha}{2}}$

$\tan\frac{\alpha}{2} = \pm\sqrt{\frac{1-\cos\alpha}{1+\cos\alpha}}$ $\qquad$ $\cos\alpha \neq -1$

Exponential and Logarithmic Functions

Properties of Exponents: Section 11.1

Property	Definition	Example
Product	$a^m a^n = a^{m+n}$	$5^2 \cdot 5^4 = 5^6$
Power of a Power	$(a^m)^n = a^{mn}$	$(9^3)^2 = 9^6$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ $b \neq 0$	$\left(\frac{3}{5}\right)^4 = \frac{3^4}{5^4} = \frac{81}{625}$
Power of a Product	$(ab)^m = a^m b^m$	$(5x)^3 = 5^3x^3 = 125x^3$
Quotient Same base	$\frac{a^m}{a^n} = a^{m-n}$ $a \neq 0$	$\frac{15^6}{15^3} = 15^{6-3} = 15^3$

Properties of Logarithms: Section 11.4

Property	Definition	Example
Product	$\log_b mn = \log_b m + \log_b n$	$\log_3 9 + \log_3 x = \log_3 9x$
Quotient	$\log_b \frac{m}{n} = \log_b m - \log_b n$	$\log_2 4 - \log_2 x = \log_2 \frac{4}{x}$
Power	$\log_b m^p = p \log_b m$	$\log_2 8^x = x \log_2 8$
Equality	If $\log_b m = \log_b n$, then $m = n$	$\log_8(3x-4) = \log_8(5x+2)$ $3x-4 = 5x+2$

Change of Base Formula:

$$\log_a n = \frac{\log n}{\log a} \qquad \log_4 7 = \frac{\log 7}{\log 4}$$

Natural Logarithms:

$\ln e = 1$

Factoring

Factoring Trinomials:

Find the factors of a · c that add to b

$2x^2 + 9x - 5$ $\qquad 2(-5) = -10$

$\qquad\qquad\qquad\qquad -1 \quad +10$

$2x^2 - 1x + 10x - 5$

$x(2x-1) + 5(2x-1)$

$= (x+5)(2x-1)$

Factoring Perfect Square Trinomials:

$a^2 - 2ab + b^2 = (a-b)^2$

$a^2 + 2ab + b^2 = (a+b)^2$

Factoring Differences of Squares:

$a^2 - b^2 = (a-b)(a+b)$

Solving Equations by Factoring:

$2x^2 + 9x - 5 = 0$

$(x+5)(2x-1) = 0$

$x + 5 = 0$ $\qquad 2x - 1 = 0$

$x = -5$ $\qquad 2x = 1$

$\qquad x = 1/2$