Graphing Trigonometric Functions

1) Graph $y = \sin\theta$ for $0 \le \theta \le 2\pi$

θ	y
0	0
$\frac{\pi}{2}$	1
π	0
$\frac{3\pi}{2}$	-1
2π	0
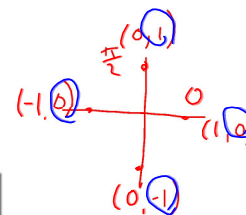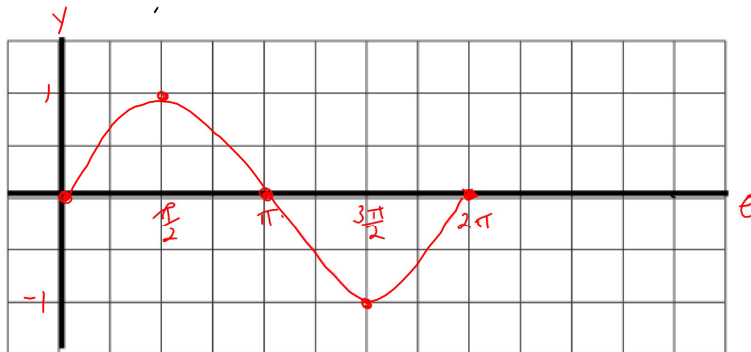
Determine the following for all values of $y = \sin\theta$:

a) Domain

$$(-\infty, \infty) \quad \text{or} \quad \theta \in \mathbb{R}$$

b) Range

$$[-1, 1]$$

c) θ-intercept(s)

$$k\pi, \quad k \in \mathbb{Z}$$

d) y-intercept(s)

$$0$$

e) Amplitude $\frac{1}{2}$ the distance between the max and min

$$1 \qquad A = \frac{max - min}{2}$$
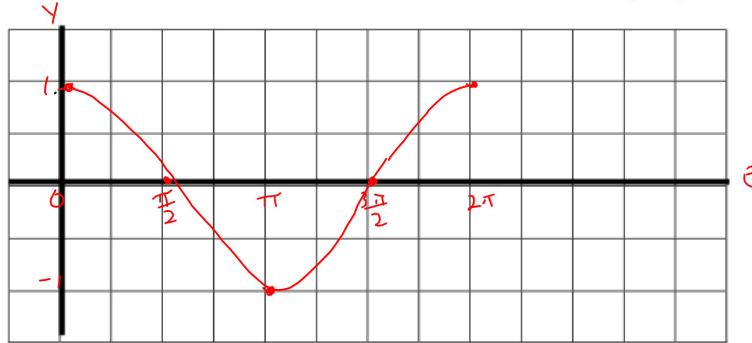
f) Period   time it takes to repeat the cycle

$$2\pi$$

1

2) Graph $y = \cos\theta$ for $0 \leq \theta \leq 2\pi$

Sinusoidal wave

θ	y
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1

Determine the following for <u>all</u> values of $y = \cos\theta$:

a) Domain

$(-\infty, \infty)$

b) Range

$[-1, 1]$

c) x-intercept(s) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2} \ldots$ odd multiples of $\frac{\pi}{2}$

$\frac{\pi}{2} + k\pi$, $k \in \mathbb{Z}$

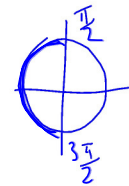or $(2k+1)\frac{\pi}{2}$, $k \in \mathbb{Z}$
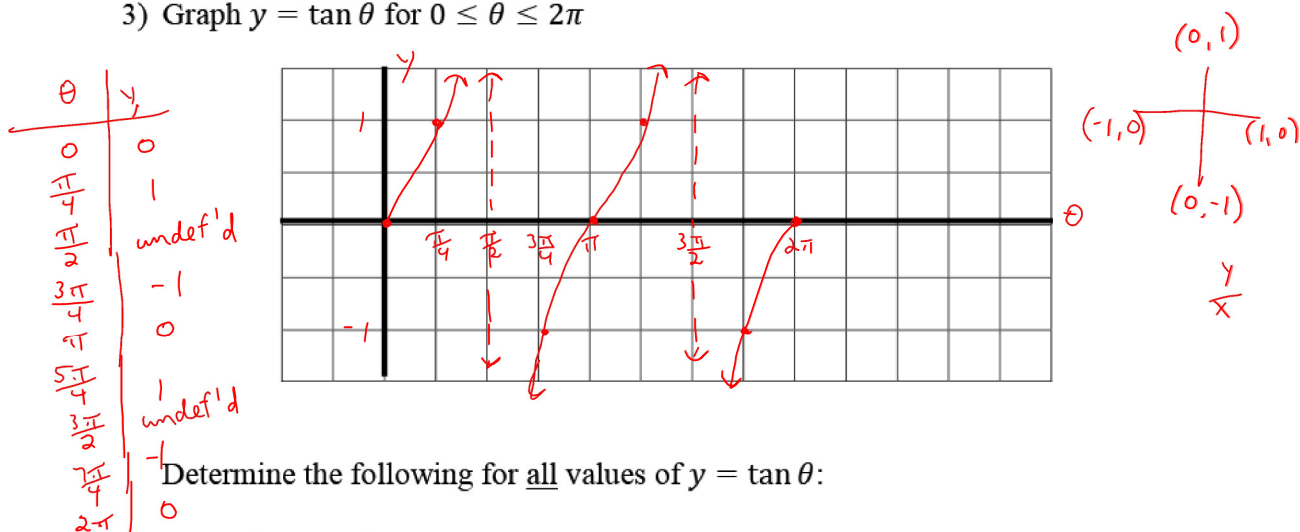
d) y-intercept(s)

1

e) Amplitude

1

f) Period

2π

2

3) Graph $y = \tan \theta$ for $0 \leq \theta \leq 2\pi$

θ	y
0	0
$\frac{\pi}{4}$	1
$\frac{\pi}{2}$	undef'd
$\frac{3\pi}{4}$	-1
π	0
$\frac{5\pi}{4}$	1
$\frac{3\pi}{2}$	undef'd
$\frac{7\pi}{4}$	-1
2π	0

$(0,1)$

$(-1,0)$ $(1,0)$

θ

$(0,-1)$

$\frac{y}{x}$

Determine the following for <u>all</u> values of $y = \tan \theta$:

a) Domain

$$\theta \neq \frac{\pi}{2} + k\pi, \quad k \in \mathbb{Z}$$

b) Range

$$(-\infty, \infty)$$

c) Asymptotes (equations)

$$\theta = \frac{\pi}{2} + k\pi, \quad k \in \mathbb{Z}$$

d) x-intercept(s)

$$k\pi, \; k \in \mathbb{Z}$$

e) y-intercept(s)

$$0$$

f) Period

$$\pi$$

3