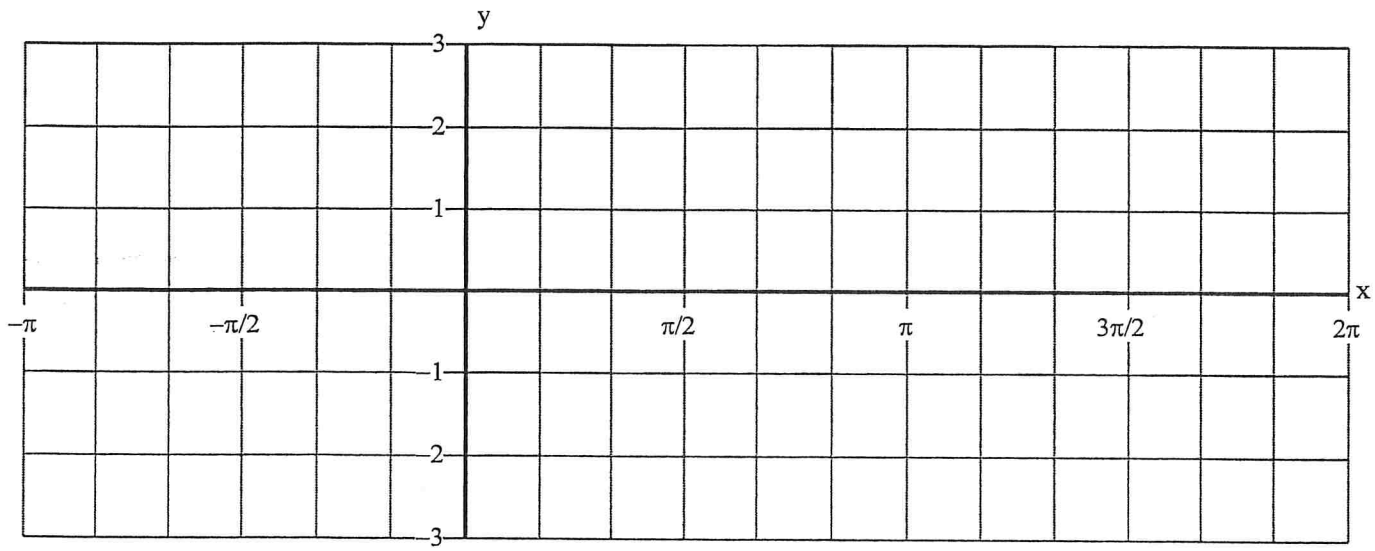
THE TANGENT FUNCTION

Use the Exact Value Worksheet and plot the ordered pairs for $0 \leq \theta \leq 2\pi$ on the graph below.



Now, using the graph, fill the blanks.

DOMAIN _____

RANGE _____

X-INTERCEPTS _____

Y-INTERCEPTS _____

PERIOD _____

AMPLITUDE _____

ASYMPTOTES _____

EVEN OR ODD FUNCTION? _____

Name_____ Class_____ Date_____

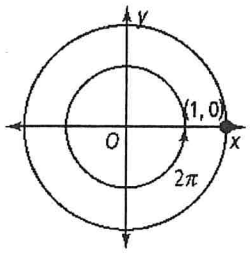
13-6 Practice

Form K

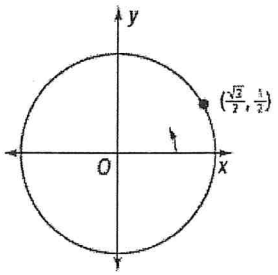
The Tangent Function

Use the unit circle to find the value of each expression.

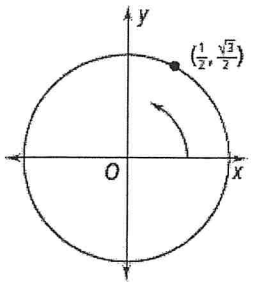
1. $\tan 2\pi$



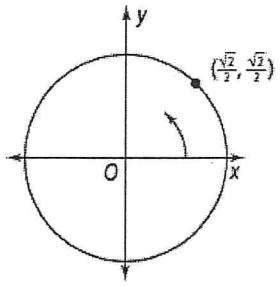
2. $\tan \frac{\pi}{6}$



3. $\tan \frac{\pi}{3}$



4. $\tan \frac{\pi}{4}$



Identify the period and determine where two asymptotes occur for each function.

5. $y = \tan 3\theta$

6. $y = \tan \frac{2}{3}\theta$

7. $y = \tan 3\pi\theta$

8. $y = \tan \frac{1}{2}\theta$

9. $y = \tan 6\theta$

10. $y = \tan \frac{\pi}{2}\theta$

Name_____ Class_____ Date_____

13-6 Practice (continued)

Form K

The Tangent Function

Graph two cycles of each of the following tangent functions.

11. $y = \tan \theta$

period: π

asymptotes: $\theta = -\frac{\pi}{2}$, $\theta = \frac{\pi}{2}$, and $\theta = \frac{3\pi}{2}$

12. $y = \tan \frac{1}{2}\theta$

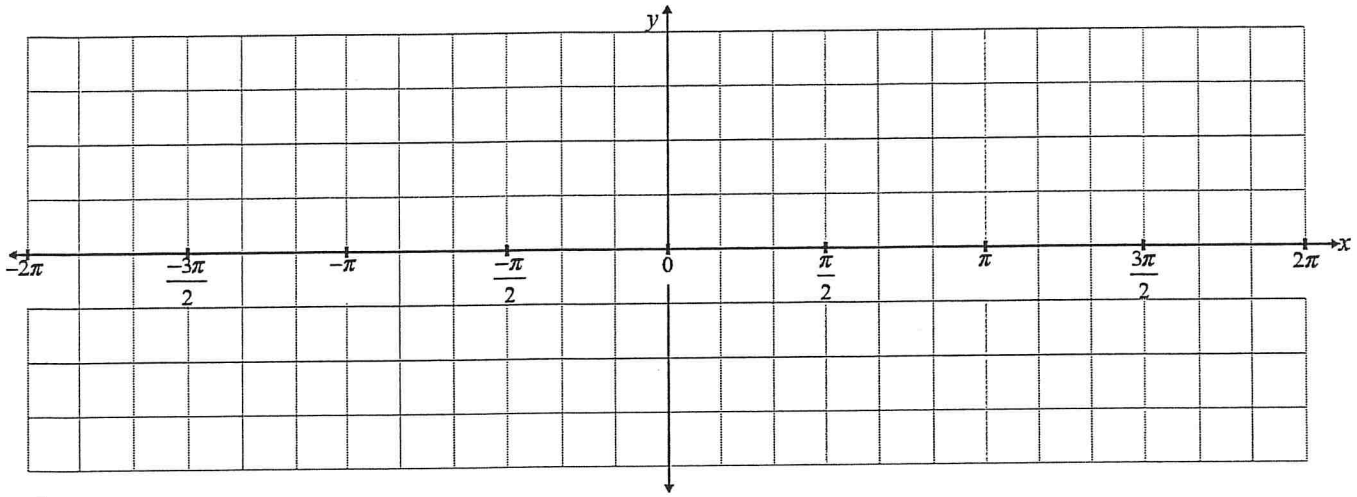
13. $y = \tan 3\pi\theta$

14. $y = \tan \frac{\pi}{4}\theta$

Use a graphing calculator to solve the following problems.

15. A carpenter is building a frame shaped like an isosceles triangle. The function $y = 6 \tan \theta$ models the height of the frame, where θ is the measure of one of the base angles. What is the height of the frame when $\theta = 40°$? Express your answer in feet.

16. Jonah plans to build a pool shaped like an isosceles triangle. The base of the triangle will be 50 ft. The function $y = 25 \tan \theta$ models the height of the triangle, where θ is the measure of one of the base angles. What is the height of the triangle when $\theta = 30°$?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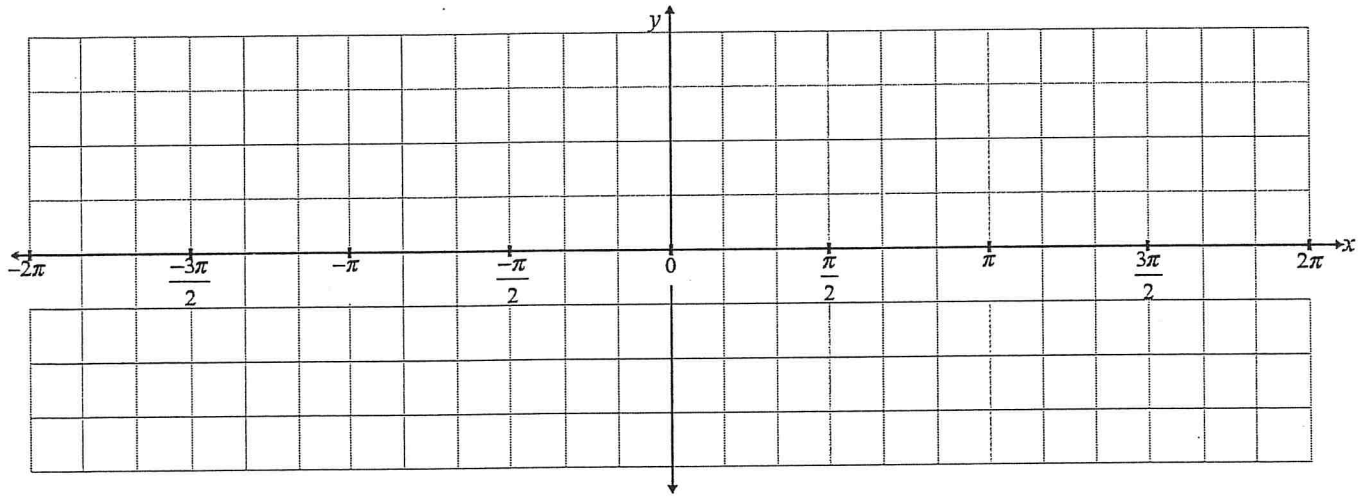
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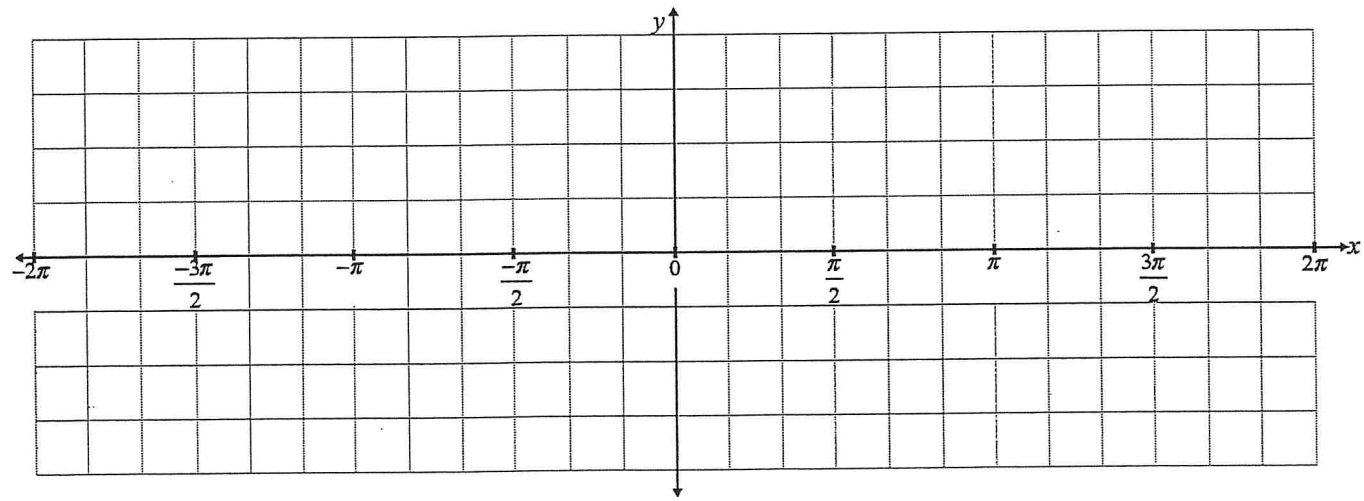
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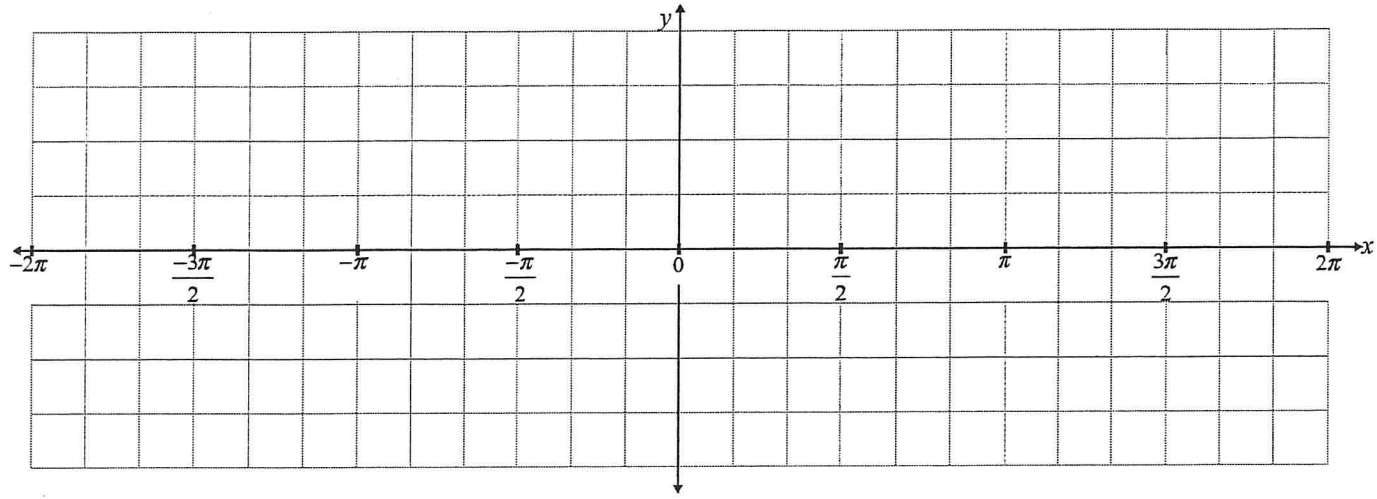
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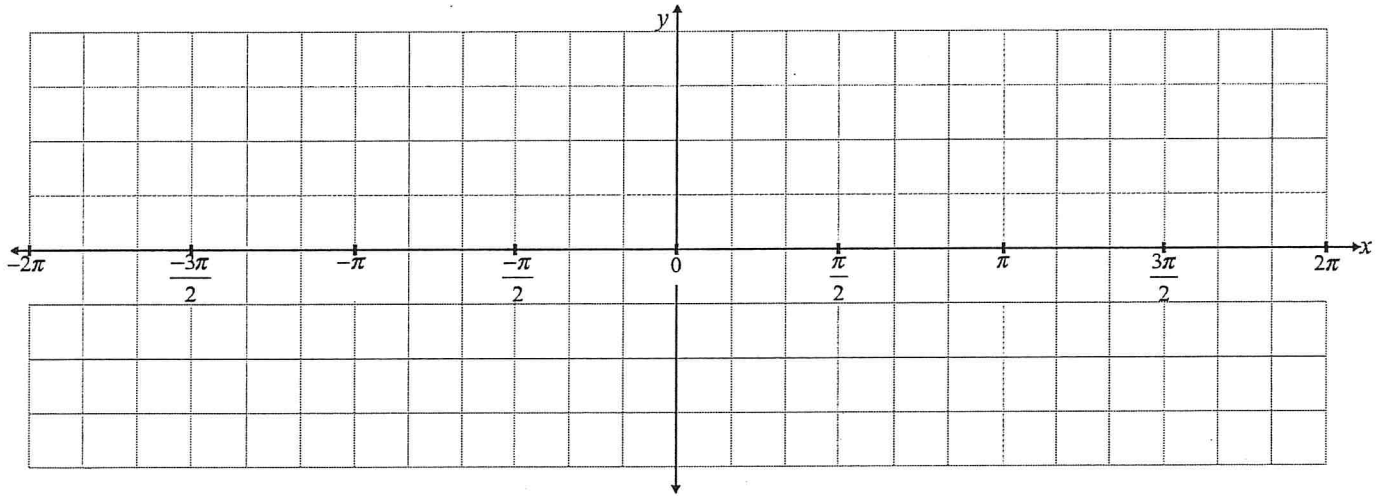
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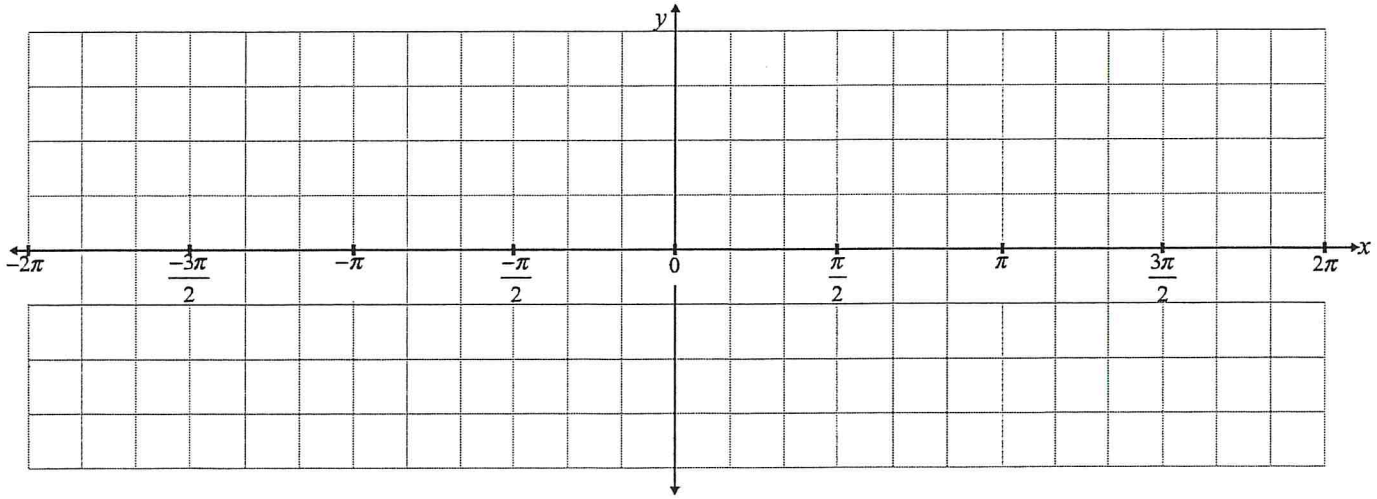
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0
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π
$\frac{3\pi}{2}$
2π

Name _____ Class _____ Date _____

13-6 Practice

Form G

The Tangent Function

Find each value without using a calculator.

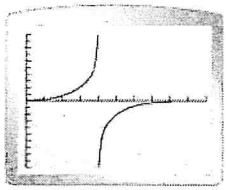
1. $\tan\frac{\pi}{4}$ **2.** $\tan 3\pi$ **3.** $\tan\left(-\frac{\pi}{4}\right)$ **4.** $\tan\left(-\frac{3\pi}{2}\right)$

Graphing Calculator **Graph each function on the interval $0 \le x \le 2\pi$ and $-200 \le y \le 200$. Evaluate each function at $x = \frac{¶}{4}, \frac{¶}{2}$, and $\frac{3¶}{4}$. Round to the nearest tenth, if necessary.**

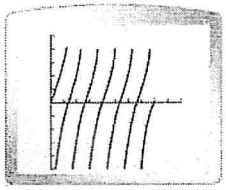
5. $y = 200 \tan x$ **6.** $y = Ğ75 \tan\left(\frac{1}{4}x\right)$ **7.** $y = -50 \tan x$

Each graphing calculator screen shows the interval 0 to 2π. What is the period of each graph?

8.



9.



Identify the period and determine where two asymptotes occur for each function.

10. $y = 2\tan\frac{\theta}{2}$ **11.** $y = -\tan\frac{\pi}{2}\theta$ **12.** $y = 4\tan 2\theta$

Sketch the graph of each tangent curve in the interval from 0 to 2π.

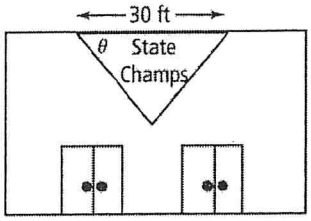
13. $y = -2\tan\theta$ **14.** $y = -0.5\tan 2\theta$

Name_____ Class _____ Date _____

13-6 Practice (continued) Form G

The Tangent Function

15. Graphing Calculator A banner hangs from the ceiling of a school gym as shown at the right. The function $y = 15 \tan \theta$ models the perpendicular distance from the ceiling to the tip of the banner. The base of the banner is 30 ft wide.



a. Graph the function on a graphing calculator.

b. How far down from the ceiling does the banner hang when $\theta = 30°$?

c. How far down from the ceiling does the banner hang when $\theta = 35°$?

Identify the period for each tangent function. Then graph each function in the interval from -2π to 2π.

16. $y = \tan \frac{1}{4}\theta$

17. $y = \tan (0.75\theta)$

Graphing Calculator Solve each equation in the interval from 0 to 2π. Round your answers to the nearest hundredth.

18. $\tan \theta = \frac{1}{2}$

19. $\tan \theta = -1$

20. $3 \tan \theta = 1$

21. a. Graphing Calculator Graph the functions $y = \tan x$, $y = 5 \tan x$, and $y = 25 \tan x$ on the same set of axes on the interval $-2\pi \le x \le 2\pi$ and $-4 \le y \le 4$.

b. Writing Describe the relationship between the values of y for each function for a given x-value.

c. Reasoning Without using a calculator, predict the value of $y = 125 \tan x$ for $x = 4$.

22. a. Open-Ended Write a tangent function that has an asymptote through $\theta = \pi$.

b. Graph the function on the interval -2π to 2π.

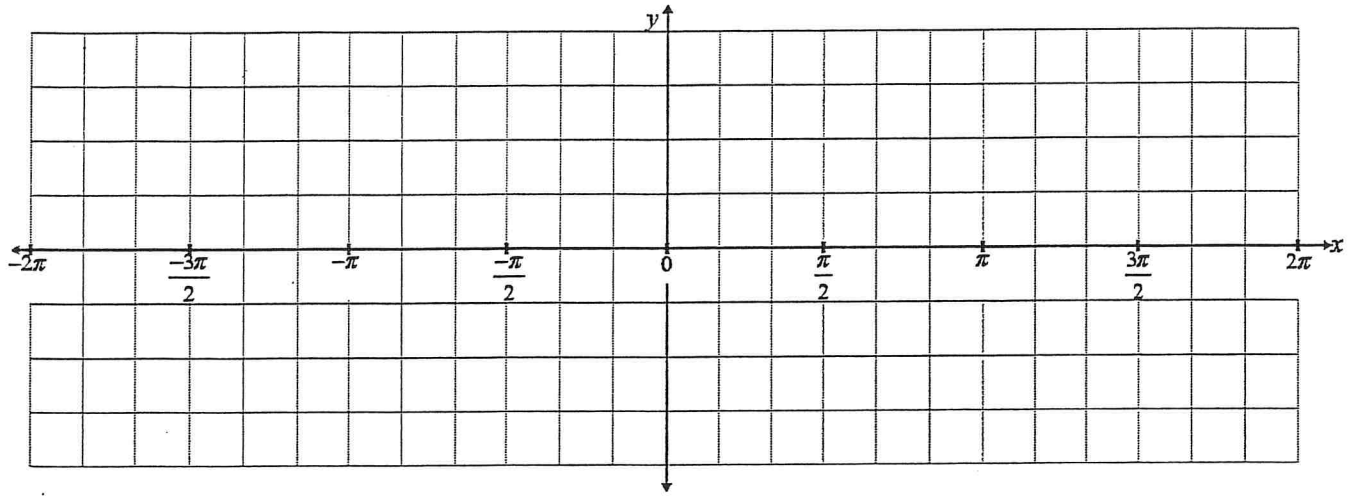
Use the function $y = 150 \tan x$ on the interval $0° \le x \le 141°$. Complete each ordered pair. Round your answers to the nearest whole number.

23. (45°,)

24. (°, −150)

25. (141°,)

26. (°, 8594)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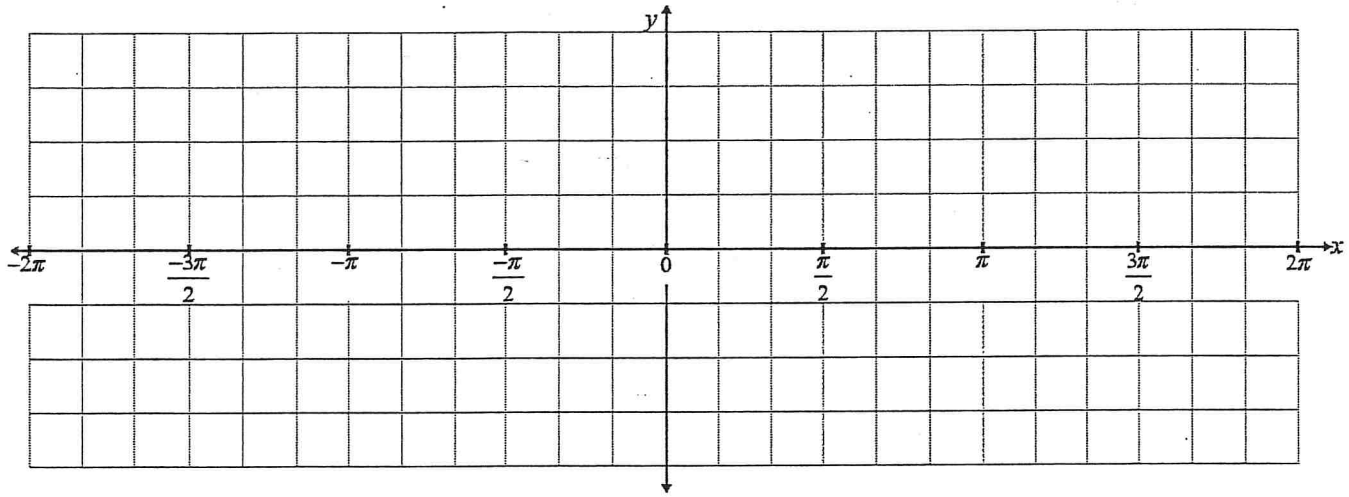
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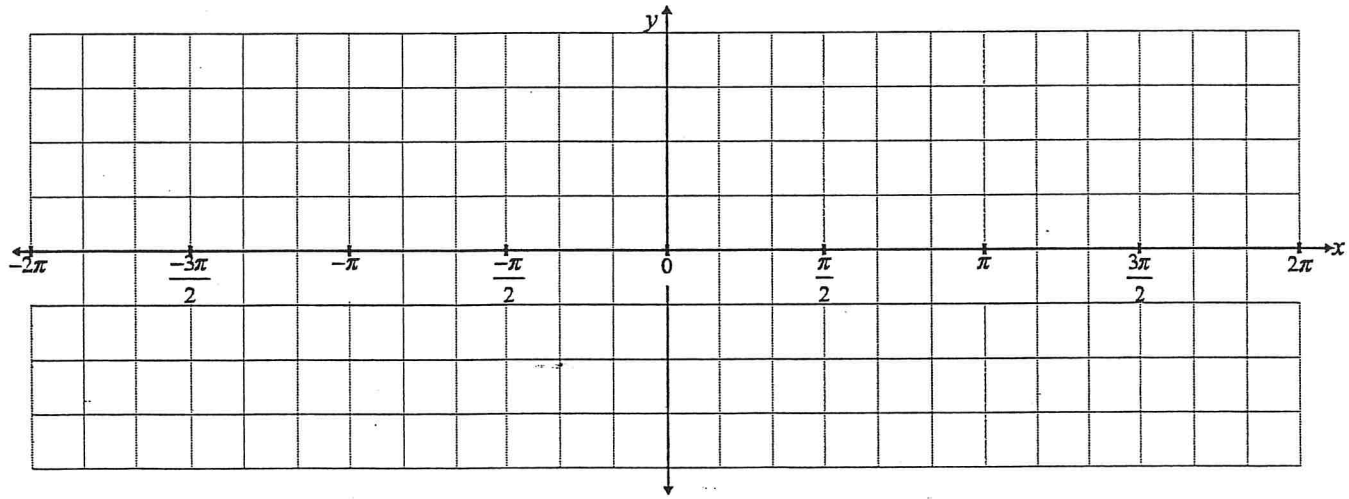
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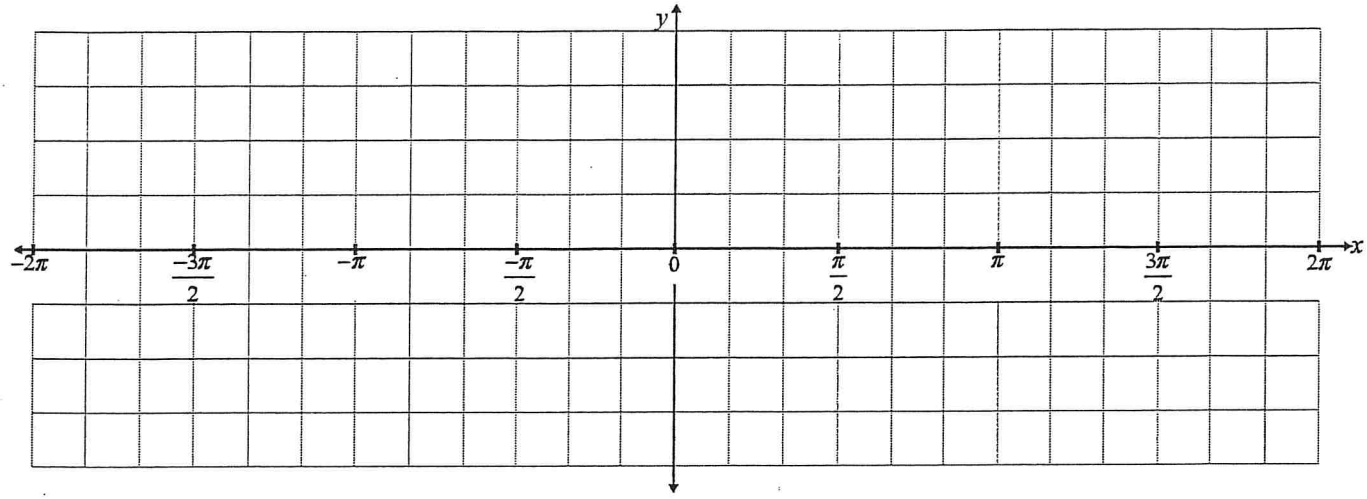
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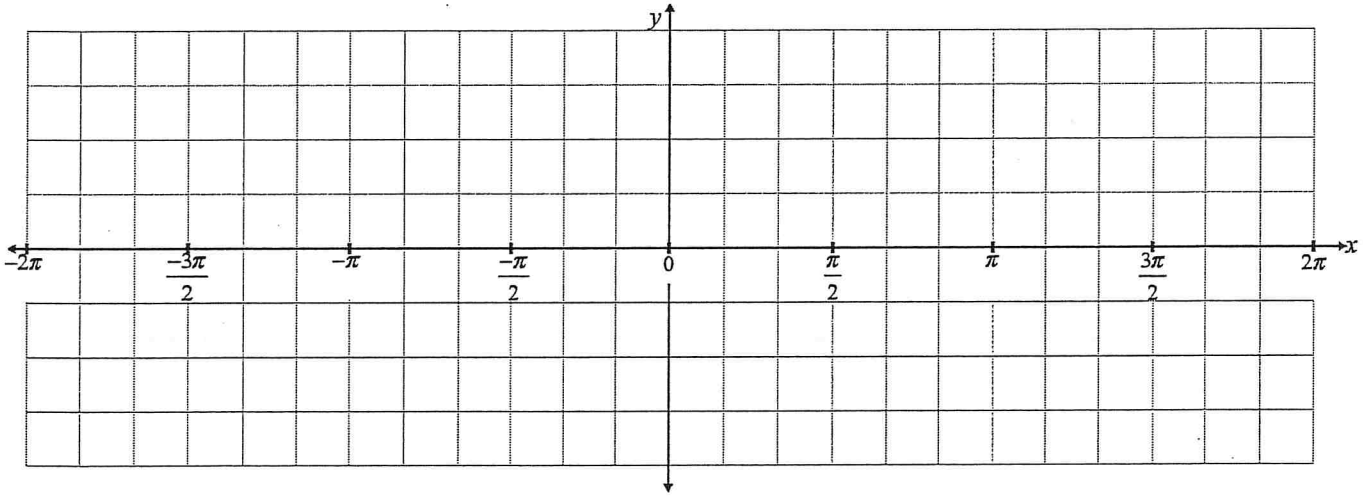
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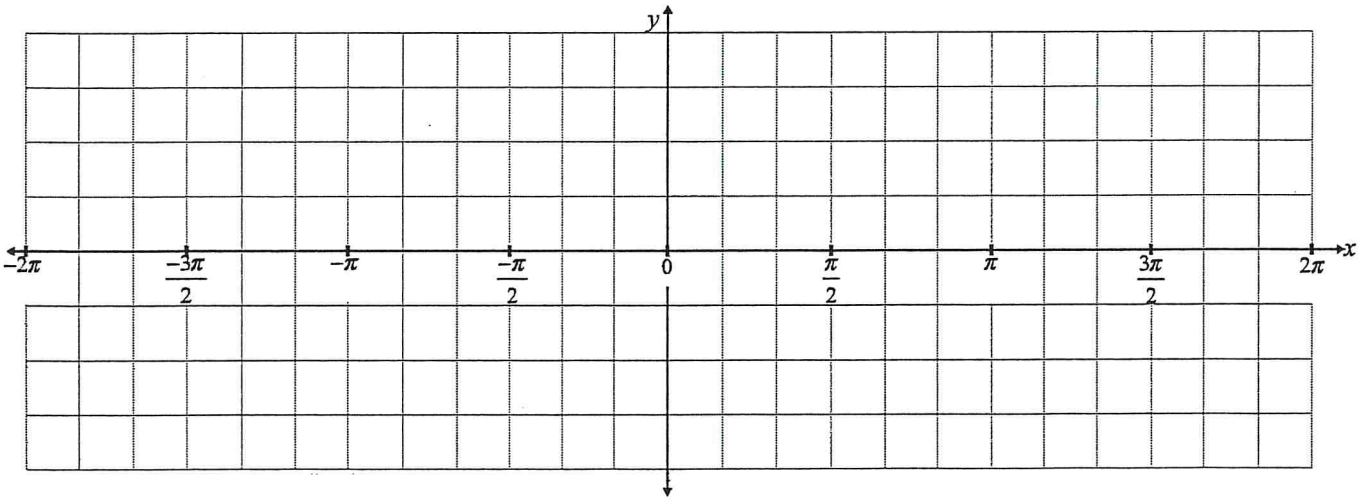
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0
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π
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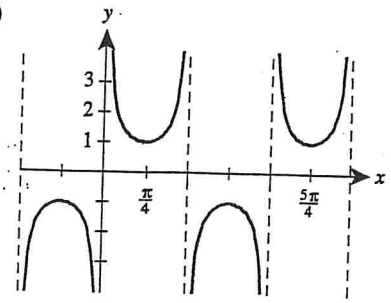
2π

Graphs of Other Trigonometric Functions

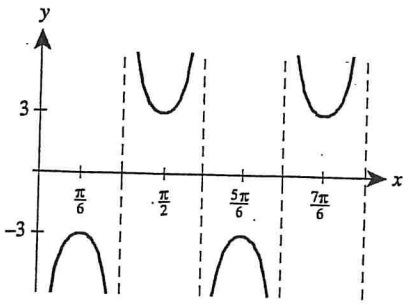
1

Match the correct graph with the function: $y = \csc 3x$

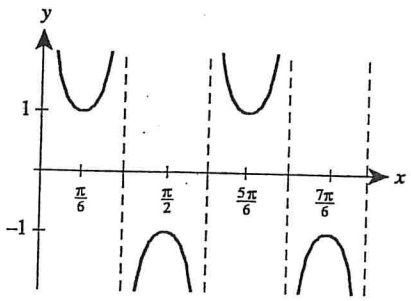
(a)



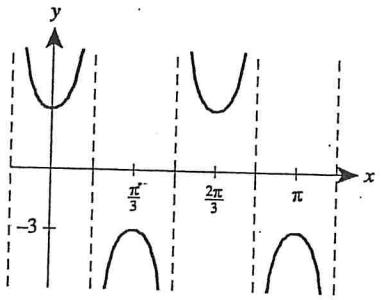
(b)



(c)



(d)

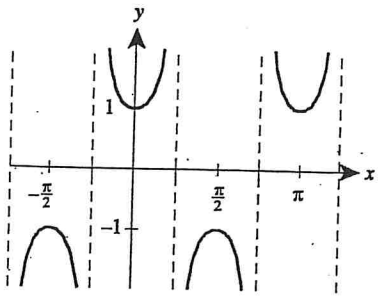


(e) None of these

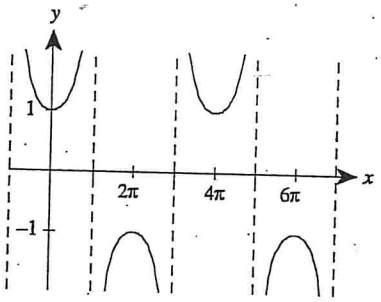
2

Match the correct graph with the function: $y = \sec 2x$

(a)



(b)



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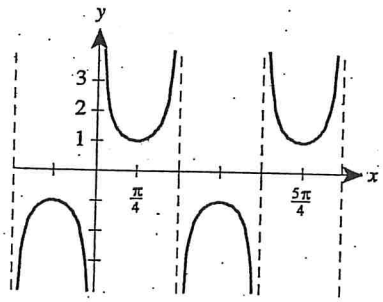

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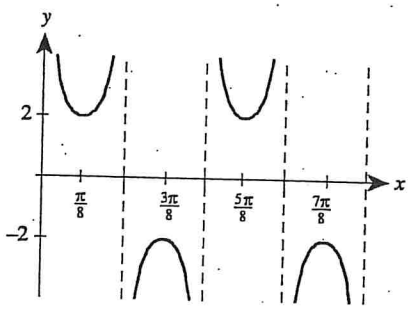
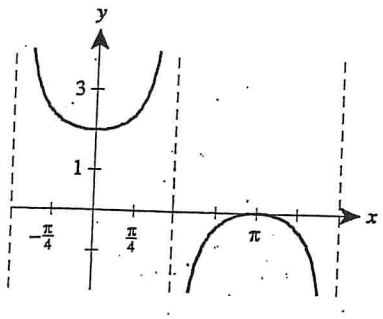


(e) None of these

3. Match the correct graph with the function: $f(x) = 1 + \sec 2x$

(a)



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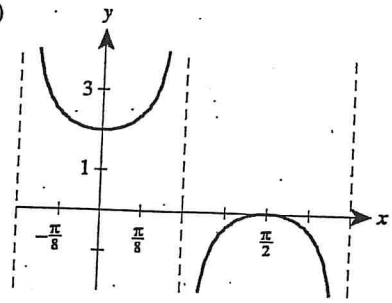

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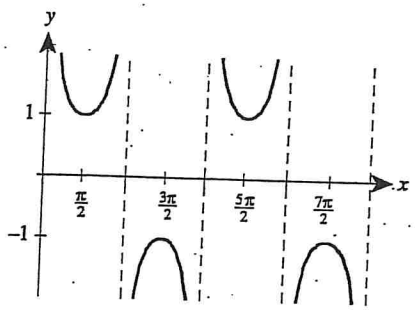

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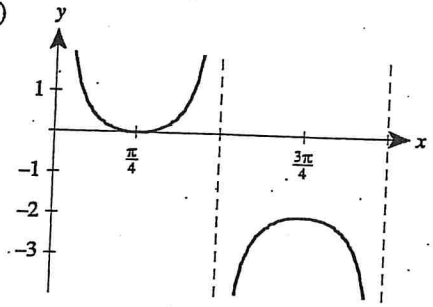


(e) None of these

4. Determine the period of the function: $f(x) = -\sec\left(\frac{x}{2} - \frac{\pi}{3}\right)$

(a) $\frac{\pi}{2}$ (b) π (c) 2π (d) 4π (e) None of these

5. Determine the period of the function: $f(x) = \csc\left(\frac{x}{3} - \frac{\pi}{2}\right)$

(a) 3π (b) $\frac{\pi}{2}$ (c) $\frac{2\pi}{3}$ (d) 6π (e) None of these

6. Determine the period of the function: $f(x) = \tan\left(\frac{x}{2}\right)$

(a) π (b) 2π (c) $\frac{\pi}{2}$ (d) 4π (e) None of these

7. To sketch the graph of the cosecant function, it is convenient to first sketch the graph of the _____ function.

(a) sine (b) cosine (c) tangent

(d) cotangent (e) secant

8. Determine which of the following is a vertical asymptote to the graph of $y = -2\csc\left(3x - \frac{\pi}{3}\right)$.

(a) $x = \frac{2\pi}{3}$ (b) $x = \frac{5\pi}{12}$ (c) $x = \frac{7\pi}{9}$

(d) $x = \frac{8\pi}{15}$ (e) None of these

9. Determine which of the following is a vertical asymptote to the graph of $y = \frac{1}{2}\sec\left(2x - \frac{\pi}{4}\right)$.

(a) $x = \frac{\pi}{8}$ (b) $x = \frac{9\pi}{8}$ (c) $x = \frac{7\pi}{8}$

(d) $x = \frac{\pi}{4}$ (e) None of these

10. To sketch the graph of the secant function, it is convenient to first sketch the graph of the _____ function.

(a) sine (b) cosine (c) tangent

(d) cotangent (e) secant

11. Which of the following is a vertical asymptote to the graph of $y = \csc 3x$?

(a) $x = \frac{\pi}{2}$ (b) $x = \frac{3\pi}{2}$ (c) $x = \frac{\pi}{3}$

(d) $x = \frac{\pi}{4}$ (e) None of these

12. What is the y-intercept of $y = \csc x$?

A) $\frac{\pi}{2}$ B) 1 C) 0 D) none

13. For what numbers x, $-2\pi \le x \le 2\pi$, does the graph of $y = \sec x$ have vertical asymptotes.?

A) $-2\pi, -\pi, 0, \pi, 2\pi$ B) $-\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$ C) $-2, -1, 0, 1, 2$ D) none

14. For what numbers x, $-2\pi \le x \le 2\pi$, does the graph of $y = \cot x$ have vertical asymptotes?

A) $-2\pi, -\pi, 0, \pi, 2\pi$ B) $-2, -1, 0, 1, 2$ C) $-\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$ D) none

15. For what numbers x, $-2\pi \le x \le 2\pi$, does $\sec x = 1$?

A) $-2\pi, 0, 2\pi$ B) $-\pi, \pi$ C) $-\frac{3\pi}{2}, \frac{\pi}{2}$ D) none

16. For what numbers x, $-2\pi \le x \le 2\pi$, does $\csc x = 1$?

A) $-\pi, \pi$ B) $-2\pi, 0, 2\pi$ C) $-\frac{3\pi}{2}, \frac{\pi}{2}$ D) none

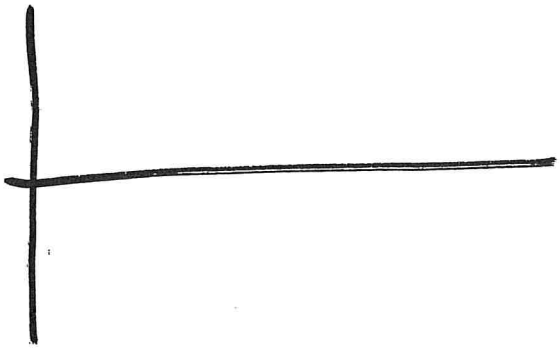
17. For what numbers x, $-2\pi \le x \le 2\pi$, does $\sec x = -1$?

A) $-2\pi, 0, 2\pi$ B) $-\frac{\pi}{2}, \frac{3\pi}{2}$ C) $-\pi, \pi$ D) none

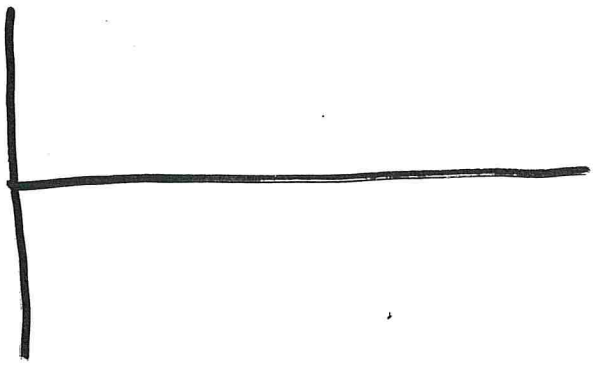
18. For what numbers x, $-2\pi \le x \le 2\pi$, does $\csc x = -1$?

A) $-\frac{\pi}{2}, \frac{3\pi}{2}$ B) $-2\pi, 0, 2\pi$ C) $-\pi, \pi$ D) none

19. Graph $y = \csc x$



20. Graph $y = \sec x$



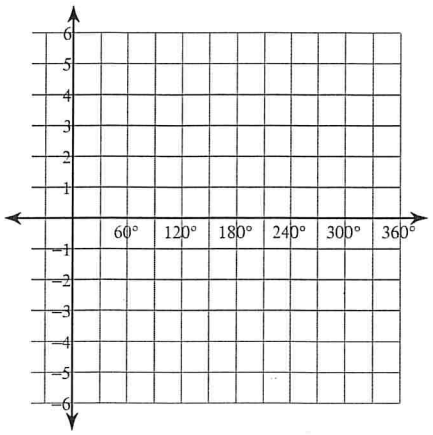
Kuta Software - Infinite Algebra 2 Name_____

Graphing Trig Functions

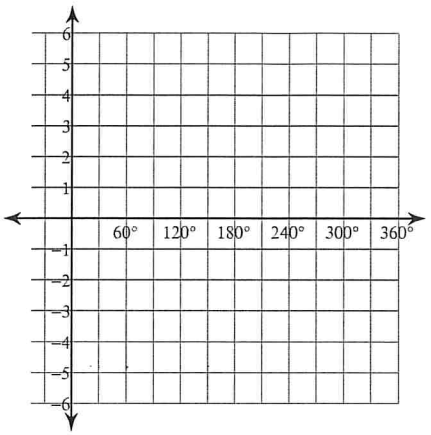
Date_____ Period____

Using find the amplitude and period of each function. Then graph.

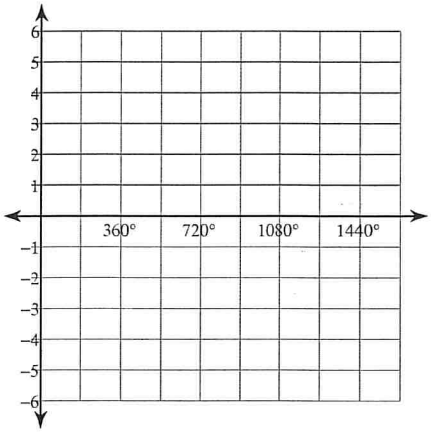
1) $y = \sin 3\theta$



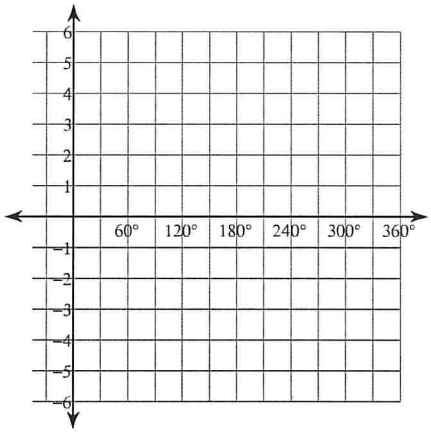
2) $y = 4\cos 3\theta$



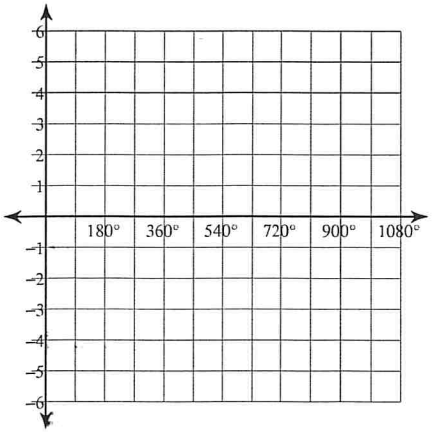
3) $y = 2\sin\frac{\theta}{3}$



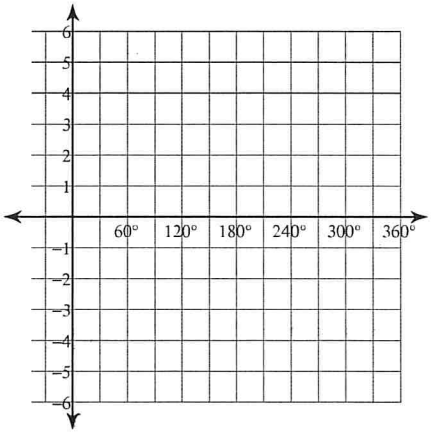
4) $y = \tan 2\theta$



5) $y = 3\cos\frac{\theta}{2}$

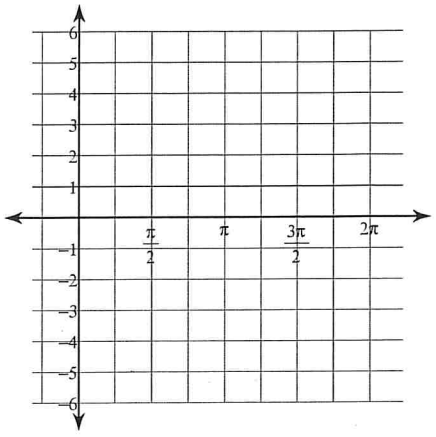


6) $y = \frac{1}{2}\tan\theta$

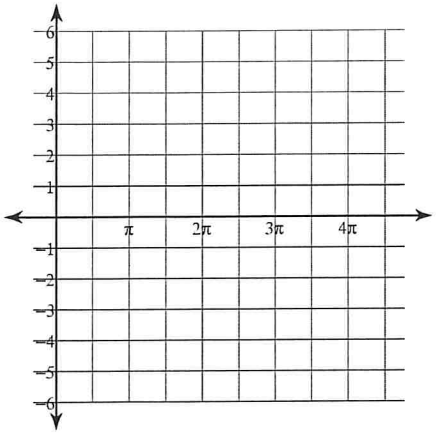


Using radians, find the amplitude and period of each function. Then graph.

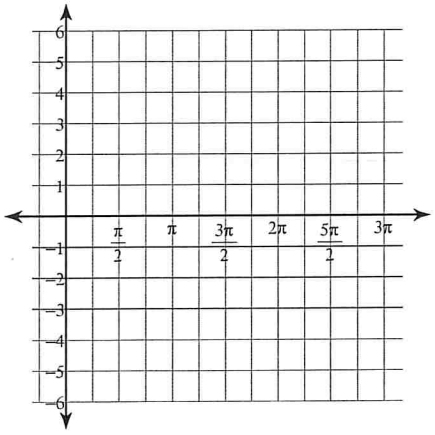
7) $y = \sin 3\theta$



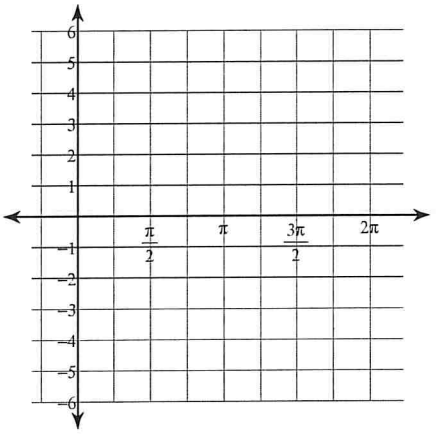
8) $y = \frac{1}{2}\tan\frac{\theta}{3}$



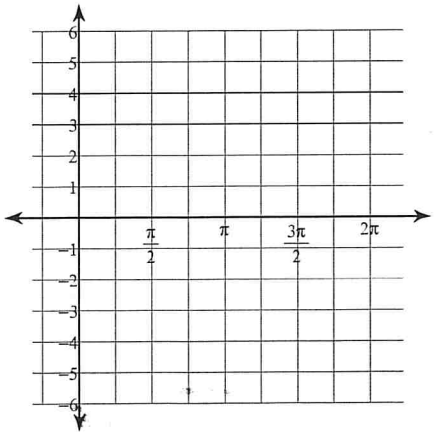
9) $y = \frac{1}{2}\sec\theta$



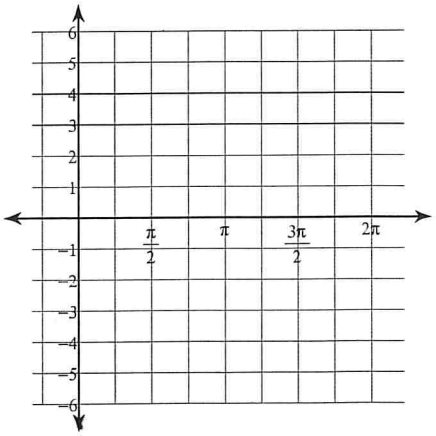
10) $y = 2\cos 4\theta$



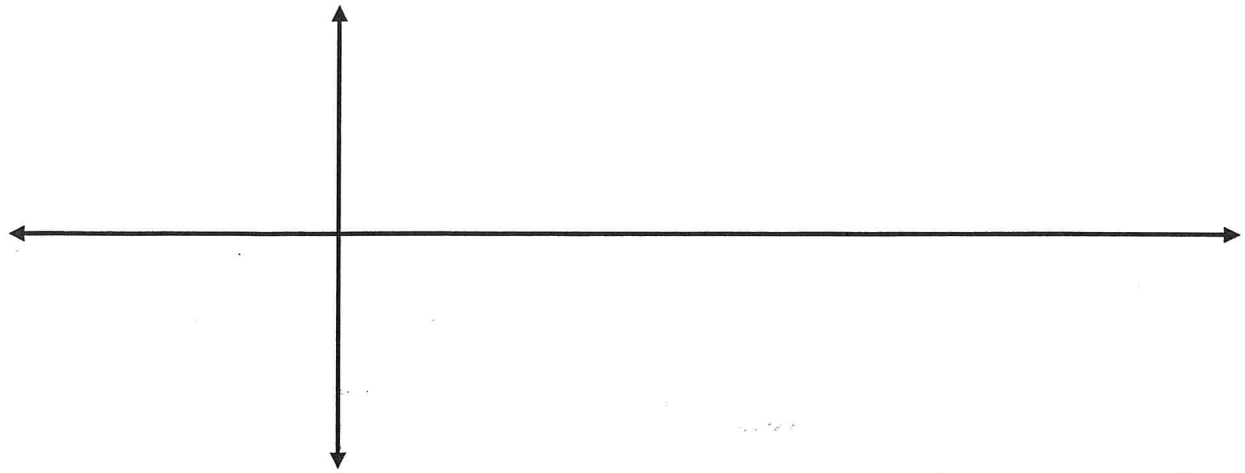
11) $y = 2\csc 2\theta$

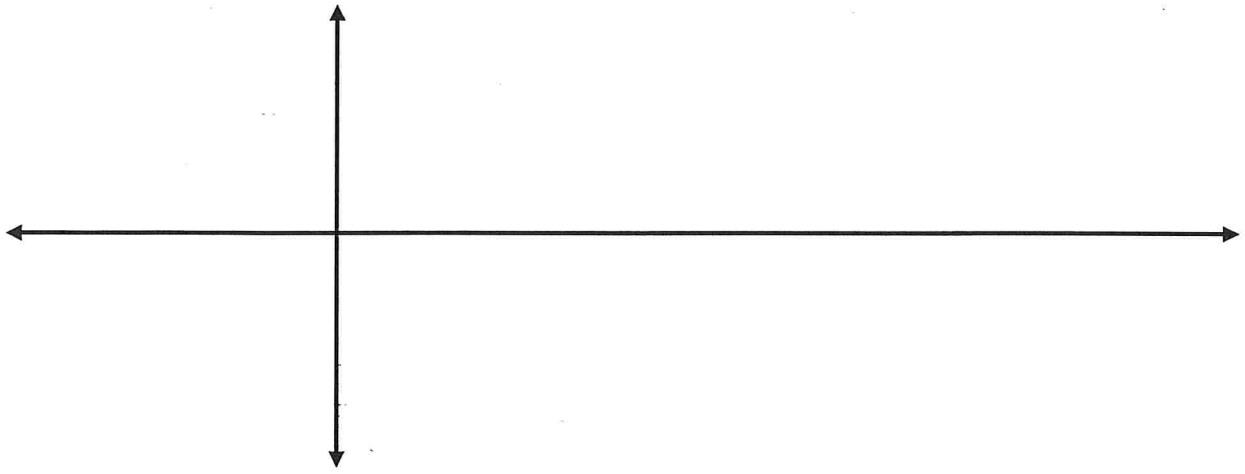


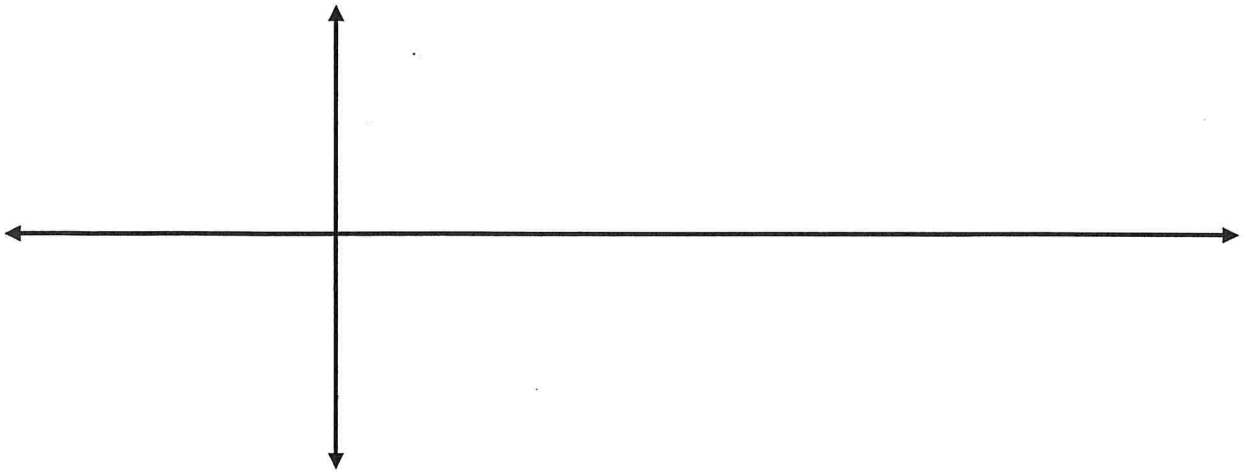
12) $y = 2\cot 2\theta$



Trig Function Graphs







Trig Function Graphs