Lesson 17
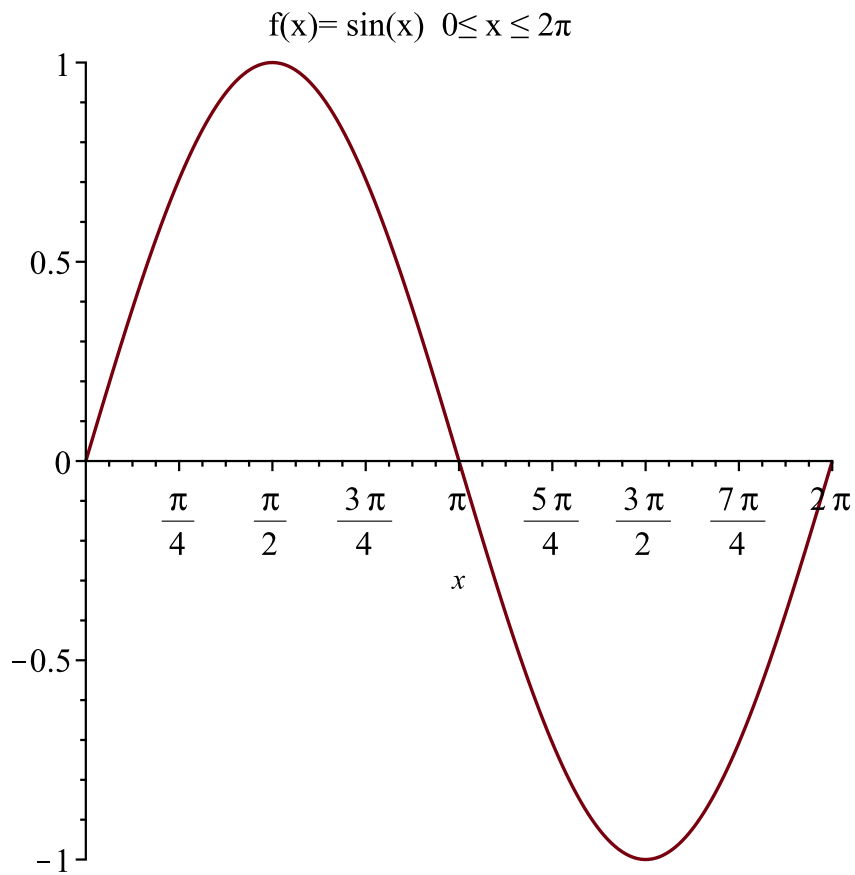
Read Chapter 15

Angles. Arclenght, Area of Wedges

Goal: graph $3\sin(2x-5)+1$

Rewrite as
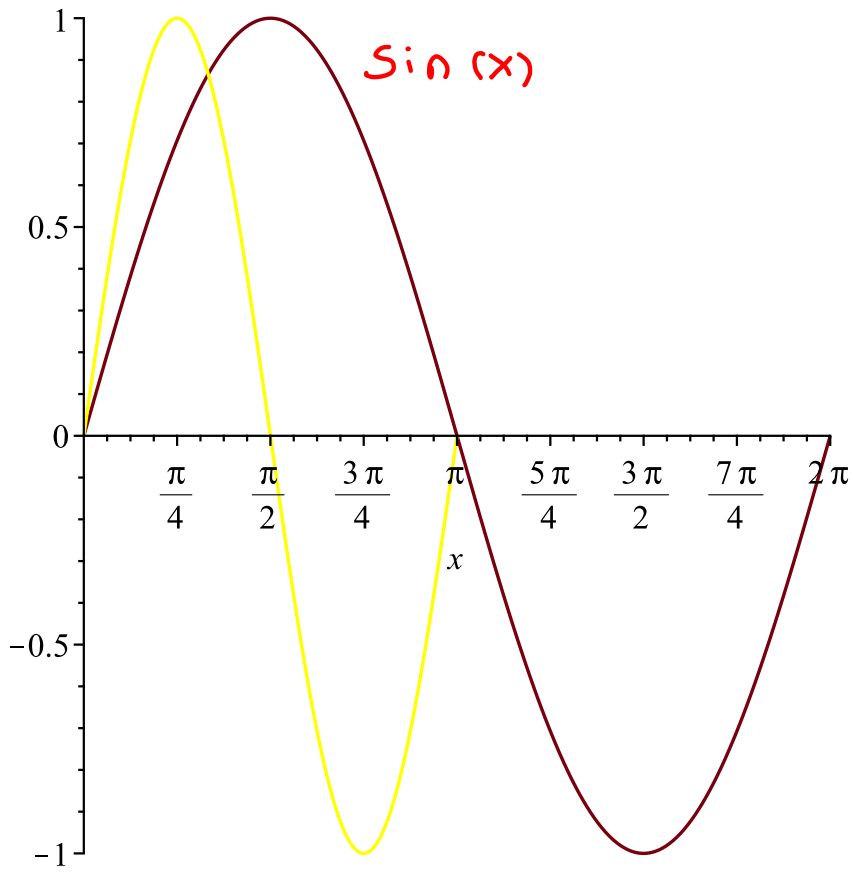
$3\sin\left(2\left(x-\frac{5}{2}\right)\right)+1$
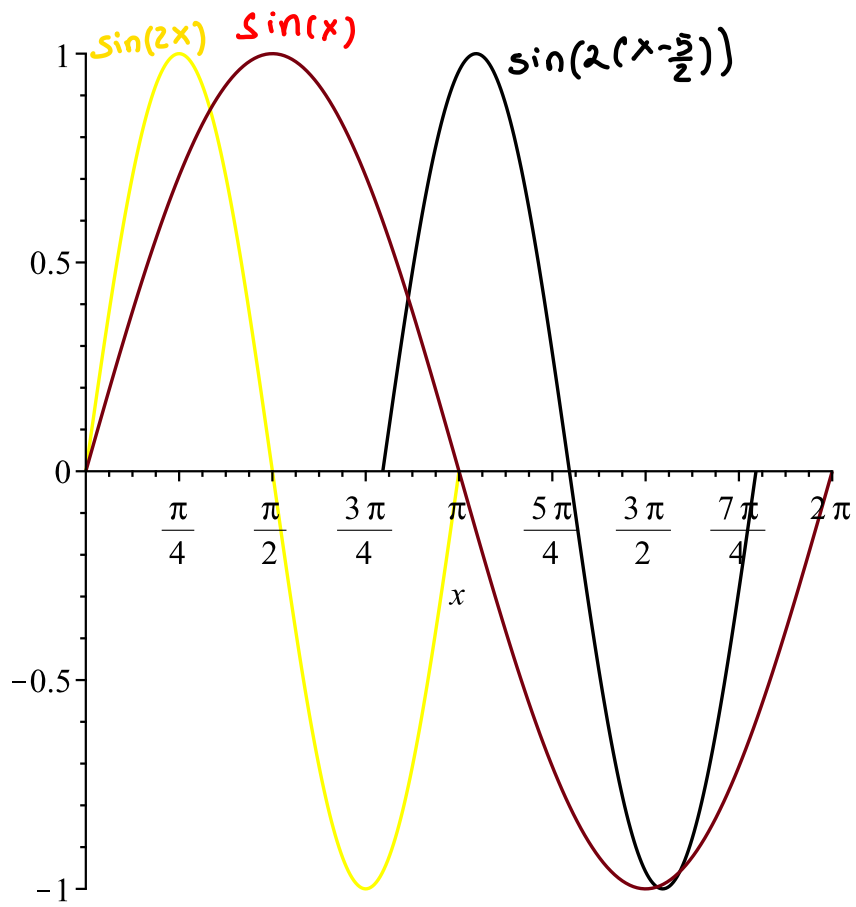
$$f(x)= \sin(x) \quad 0\le x \le 2\pi$$

Sin(2x)

Goal: $3 \sin\left(2\left(x - \frac{5}{2}\right)\right) + 1$

Sin(x)

Axis labels: $\frac{\pi}{4}$, $\frac{\pi}{2}$, $\frac{3\pi}{4}$, π, $\frac{5\pi}{4}$, $\frac{3\pi}{2}$, $\frac{7\pi}{4}$, 2π

x

y-axis values: 1, 0.5, 0, -0.5, -1
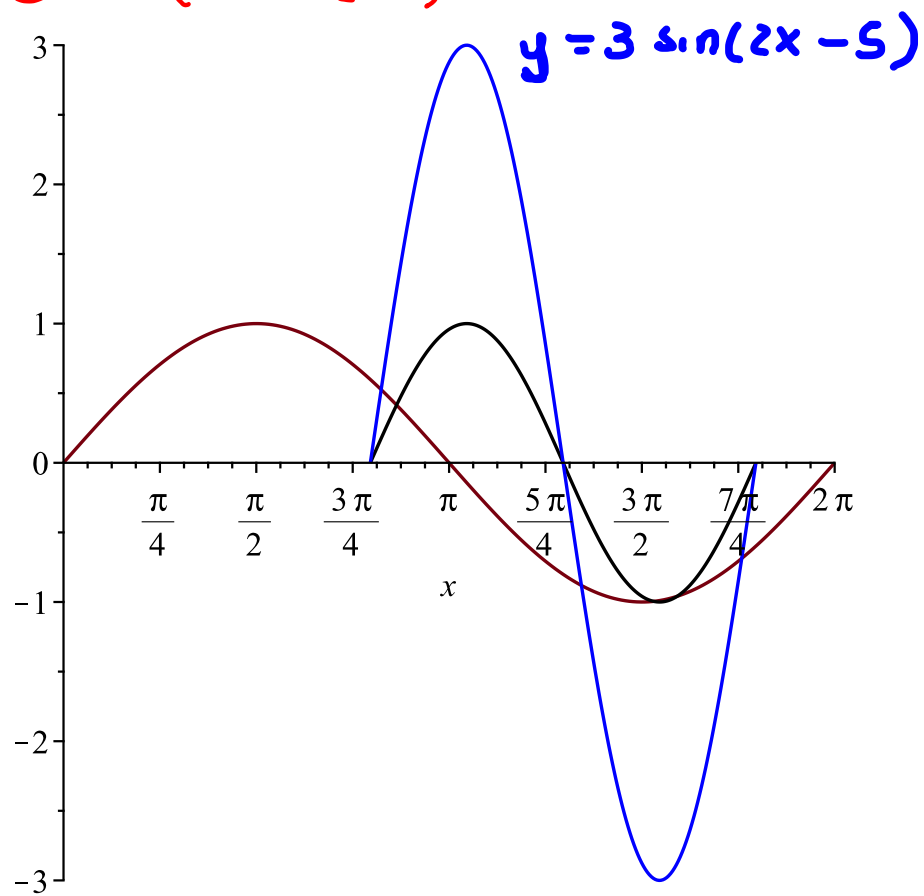
Goal: $3 \sin\left(2\left(x - \frac{s}{2}\right)\right) + 1$

sin(2x) sin(x) $\sin\left(2\left(x - \frac{s}{2}\right)\right)$

Goal: $3 \sin\left(2\left(x-\frac{5}{2}\right)\right)+1$

$y = 3\sin(2x-5)$

$$d := plot\left(3\cdot\sin(2\cdot x - 5) + 1, x = \frac{5}{2} \ldots \frac{(2\cdot\pi+5)}{2}, color = green\right);$$

Goal: $3 \sin\left(2\left(x - \frac{5}{2}\right)\right) + 1$

$y = 3\sin(2x - 5) + 1$
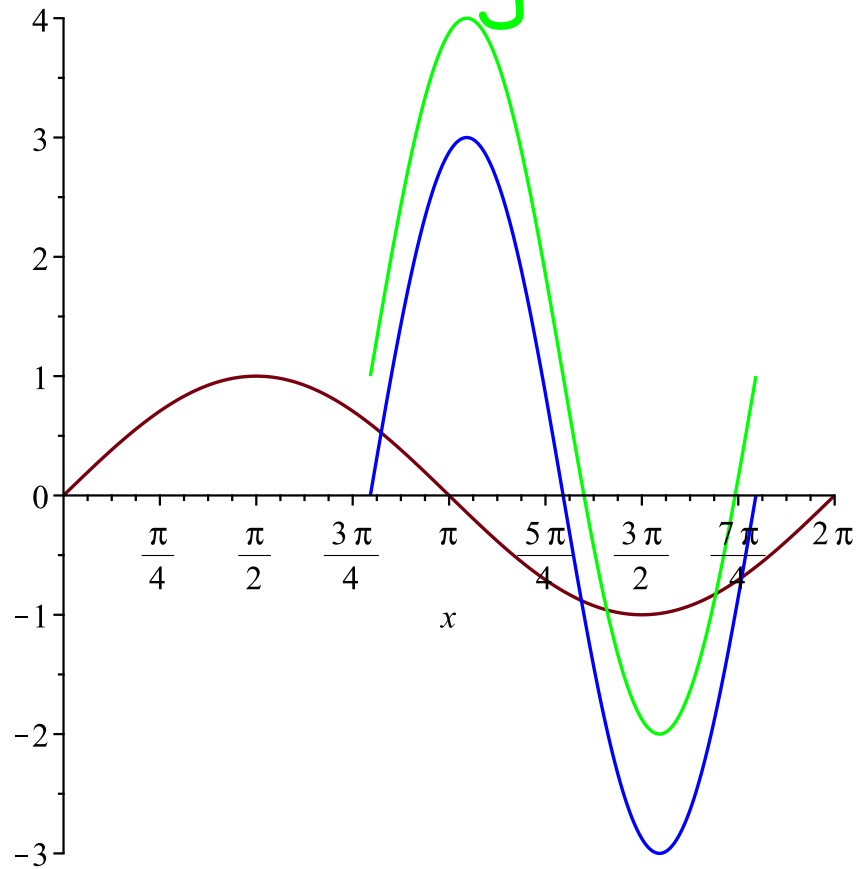
> $q1 := plot\left(x^4, x = -10 .. 10\right);$

If domain of $f(x)$ is $1 \le x \le 5$
and range of $f(x)$ is $2 \le y \le 9$

what are the domain and range of

$3f(6x-1) + 8$?

Add slides for graph

of sinx

An angle is the part of the plane in between two half lines starting at the same points. Angles are measured in degrees or radians. Certain precalculus/calculus formulas assume angles are measured in radians, so we often use radians as units.

$$360 \text{ deg} = 2\pi \text{ rad}$$

$$180 \text{ deg} = \pi \text{ rad}$$

$$90 \text{ deg} = \frac{\pi}{2} \text{ rad}$$

$$60 \text{ deg} = \frac{\pi}{3} \text{ rad}$$

$$45 \text{ deg} = \frac{\pi}{4} \text{ rad}$$

$$30 \text{ deg} = \frac{\pi}{6} \text{ rad}$$

$$x \text{ deg} = y\frac{360}{2\pi} \text{ rad}$$

$$y \text{ rad} = x\frac{2\pi}{360} \text{ deg}$$

If we measure angles in degrees , then $\frac{1}{60}$ of a degree is a minute and $\frac{1}{60}$ of a minute is a second. Convert 0.3 rad into deg, min, second.
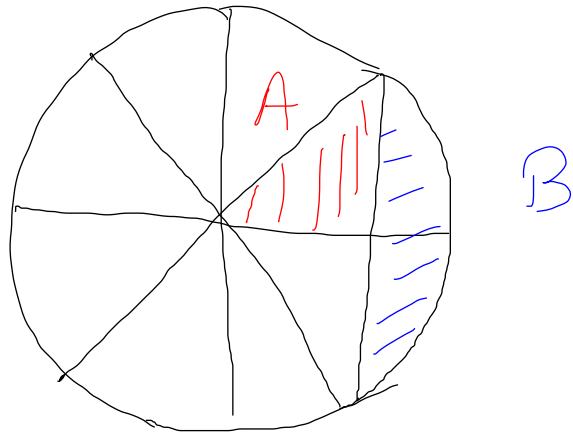
Arclength

$$l = r\theta$$
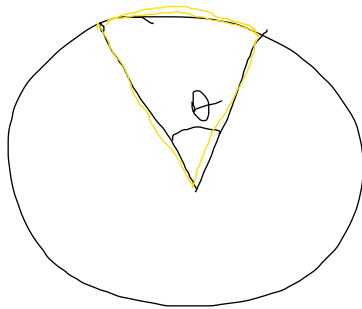
θ measured in radians

Area of wedge

$$A = \frac{1}{2}r^2\theta$$

θ measured in radians

A pizza of radius 8 in is divided into 8 equal slices. Tom eats A and Bob eats B. Who eats more ?

Given that θ is $\frac{pi}{6}$ and the circle has radius $r = 3$, what is the perimeter of the sector ?

A rotating sprinkle reaches 10 m far and completes a full revolution in 5 min. How much area does it irrigate in 2 min ? How long does it take the sprinkle to irrigate 50 square meters ?

3. (12 points)

(a) The rear window wiper blade on a station wagon has a length of 16 inches. The wiper blade is mounted on a 22 inch arm, 6 inches from the pivot point (as illustrated). If the wiper turns through an angle of 105°, how much area is swept clean?
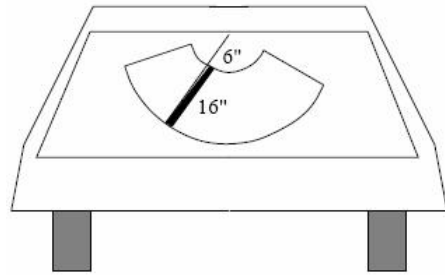
(b) If $f(x) = 3x + c$ and $f(f(x)) = 9x - 10$, find the value of c.

(c) Find the inverse function of $f(x) = \dfrac{(\sqrt{x} - 1)^2}{3}$ when restricted to the domain $0 \le x \le 1$.