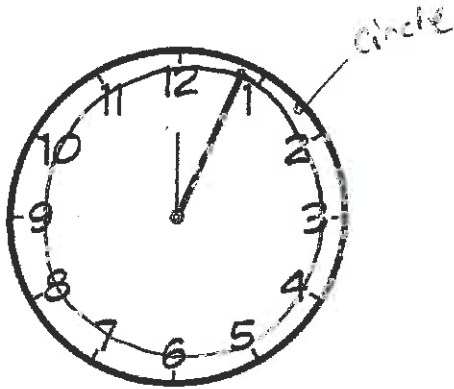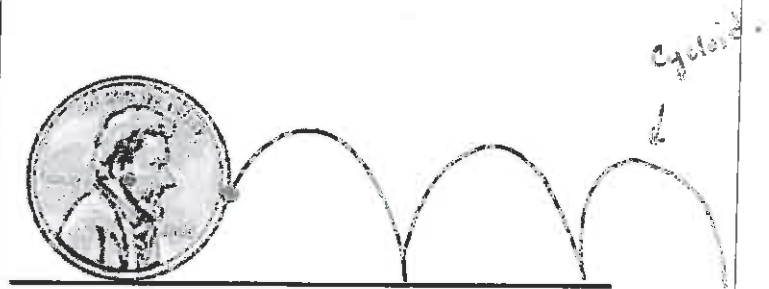Name:_____

Locus

Locus: <u>Location of points that satisfy a given condition.</u>

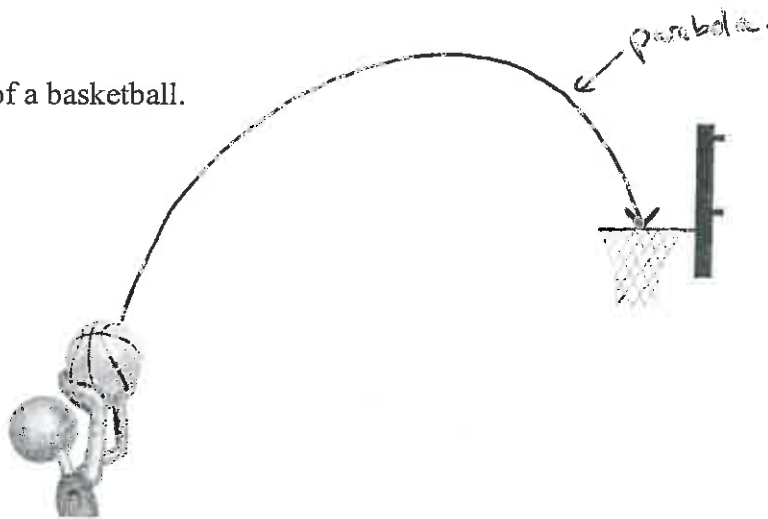Examples:

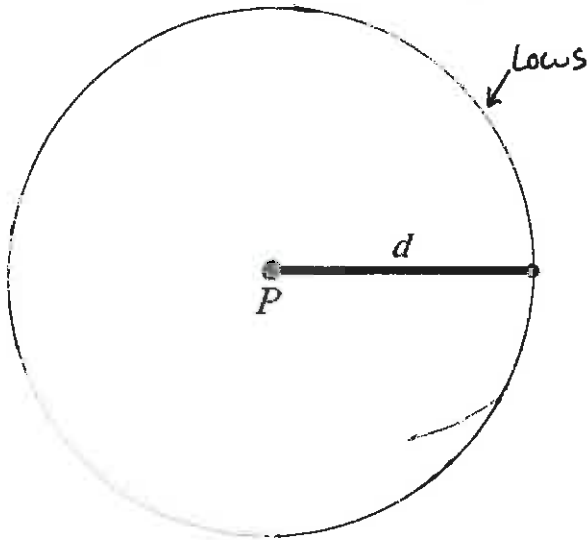|	
1. The locus of points of the tip of the minute hand of a clock.	2. The locus of a point on the edge of a rolling penny.

circle

cycloid

3. The locus of points of a basketball.

parabola

*watch a video of the loci on www.halloxpro.org

Locus #1: The locus of points equidistant to a fixed point.

Two things to look for:

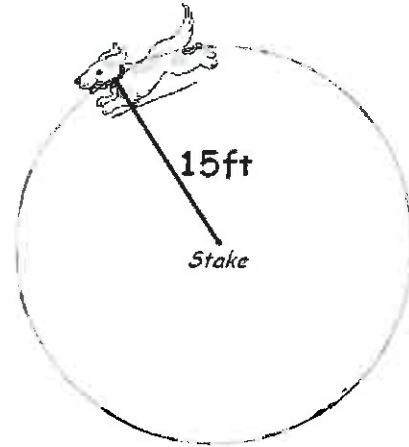A _point_ & a _distance_

Locus

d

P

Description: _Locus is a circle_
Centered at p with radius d.

Example 1: The locus of a dog on a 15 foot leash as he runs around a stake in the ground.
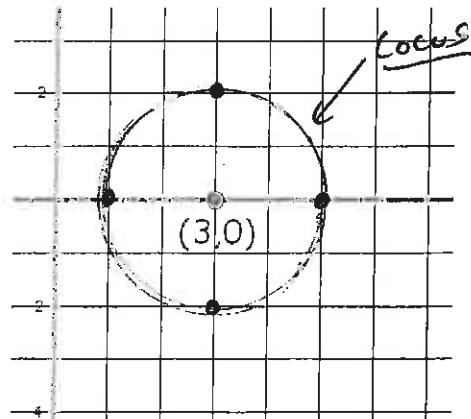
Point = _Stake._

Distance = _15 ft._

15ft

Stake

Description: _Circle Centered at Stake_
with radius of 15 ft.

Example 2: What is the equation of the locus of points 2 units from the point (3,0)?

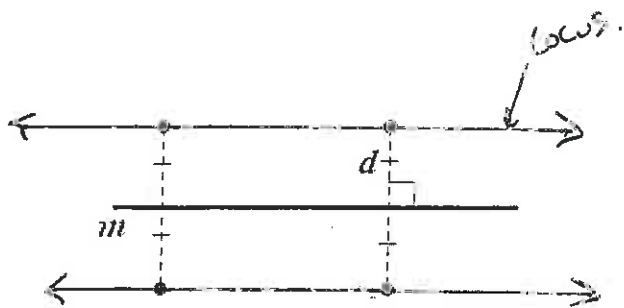Point = _(3,0)_ ← Center

Distance = _2 units_ ← radius.

Locus

(3,0)

Equation: $(x-3)^2 + y^2 = 4$

Locus #2: The locus of points equidistant to a line.

Two things to look for:
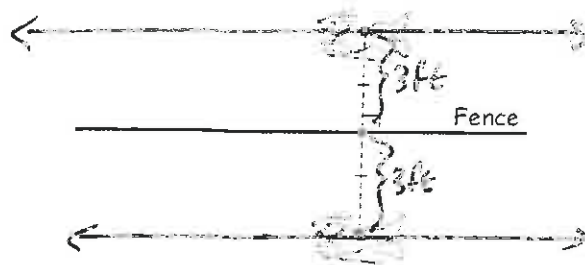
A ___line___ & a ___distance___

Description: _2 // lines each_
d units from the m.

Example 1: The locus of 2 dogs each running 3 feet from a fence.
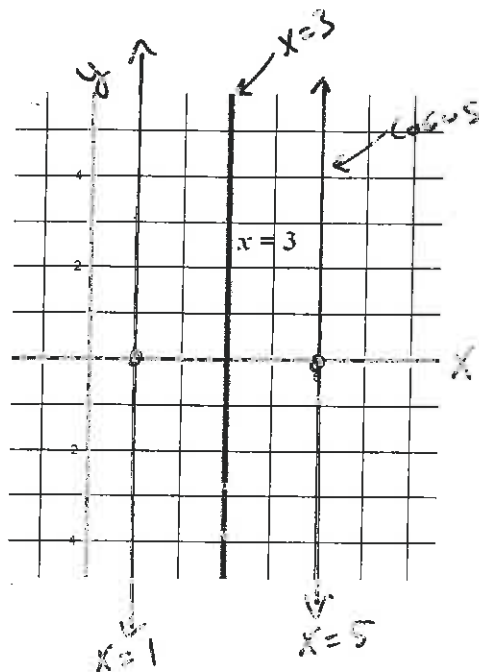
Line = ___fence___

Distance = ___3 ft.___

Description: _2 // lines each 3 ft_
from the fence.

Example 2: What are the equations for the locus of points 2 units from the line x = 3?
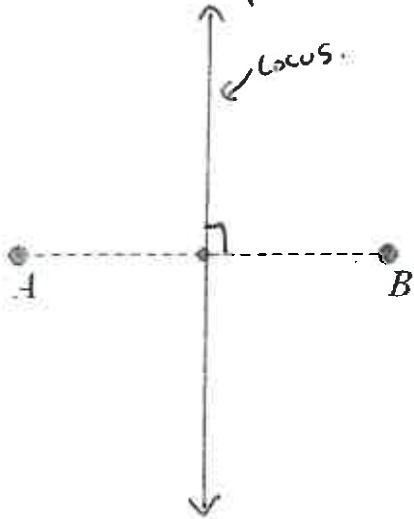
Line = ___x = 3___ ← vertical line

Distance = ___2 units.___

quations: $x = 5$ $x = 1$

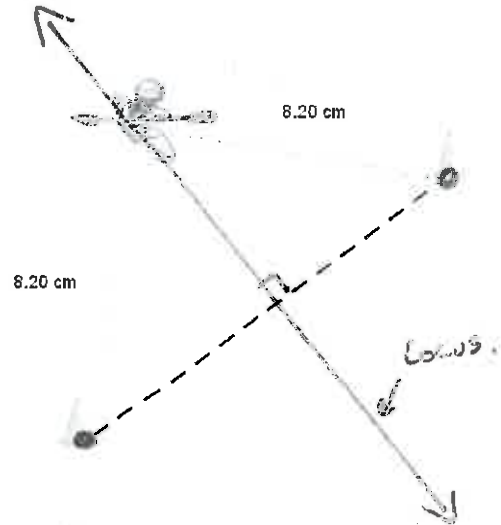# Locus #3: The locus of points equidistant to two points.

What to look for:

2 points _____ & "equidistant" _____

Locus

A ·- - - - -┐- - - - · B

Description: ⊥ bisector of segment AB.

Example 1: A person in a kayak race needs to paddle through the checkpoint cones so that the kayak is equidistant to the cones. What is the locus of the kayak.
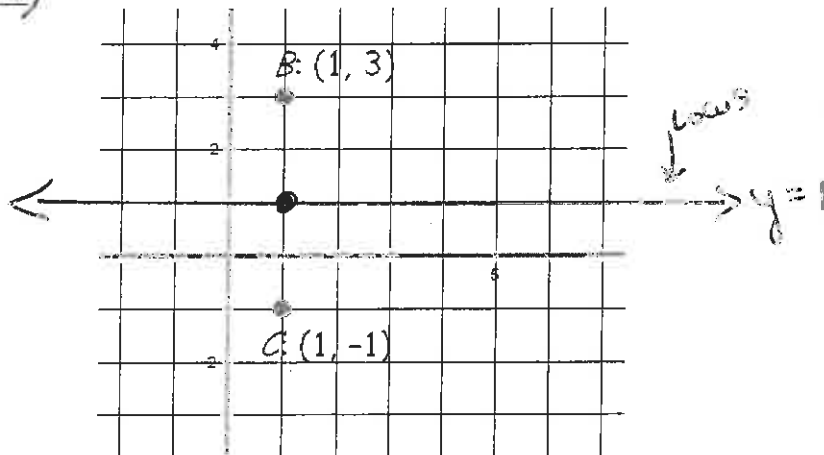
2 points = cones.

8.20 cm

8.20 cm

Locus

Description: ⊥ bisector of the segment connecting the cones.

Example 2: What is the equation for the locus of points equidistant to the points B(1,3) and C(1,-1).
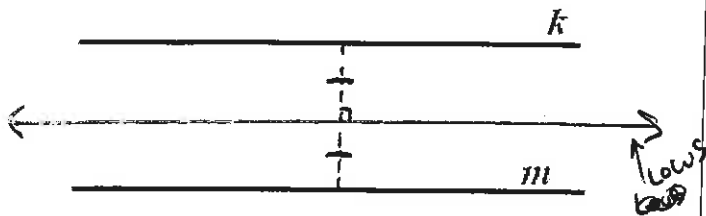
2 points = $(1,3)$ $(1,-1)$

B: (1, 3)

Locus
→ y = 1

C (1, -1)

Equation: $y = 1$

ocus #4: The locus of points equidistant to two parallel lines.
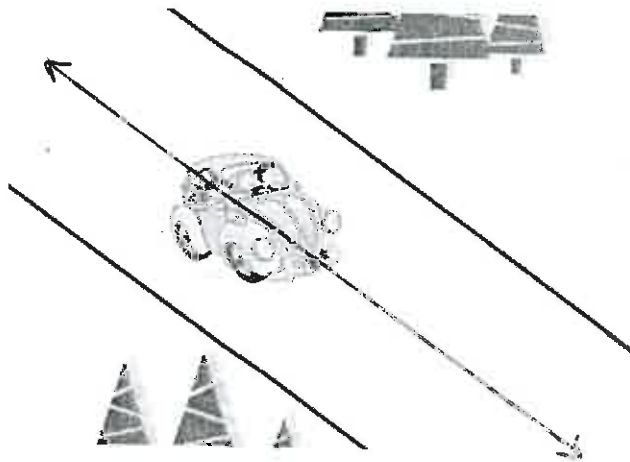
What to look for:

2 // lines & "Equidistant"

k

m

Locus

Description: a // line down the middle.

Example 1: What is the locus of points of a car driving equidistant to the sides of the road?
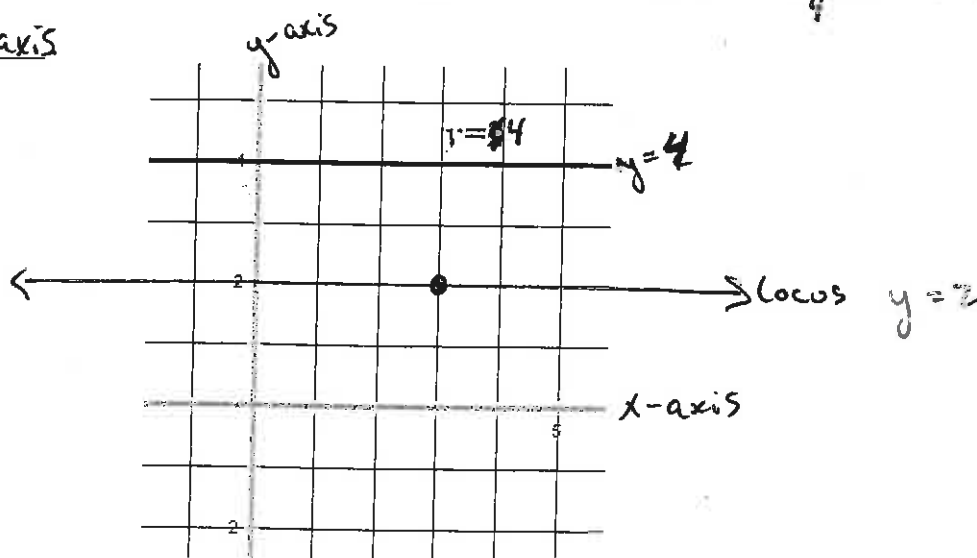
2 // lines = Sides of the road.

Description: a // line down middle of the road.

Example 2: What is the equation for the locus of points equidistant from the graph of $y = 4$ and the x-axis?
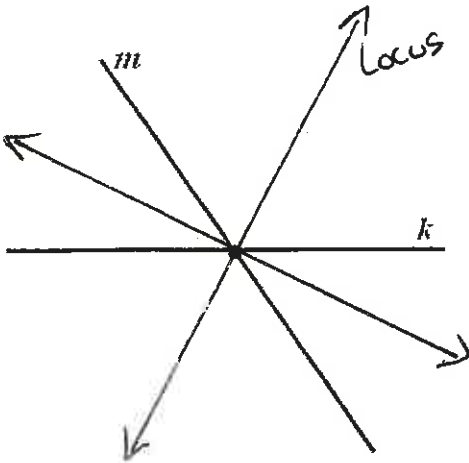
2 // lines = $y = 4$, x-axis

y-axis

$y = 4$

$y = 4$

Locus $y = 2$

x-axis

Equation: $y = 2$

Locus #5: The locus of points equidistant to two intersecting lines.
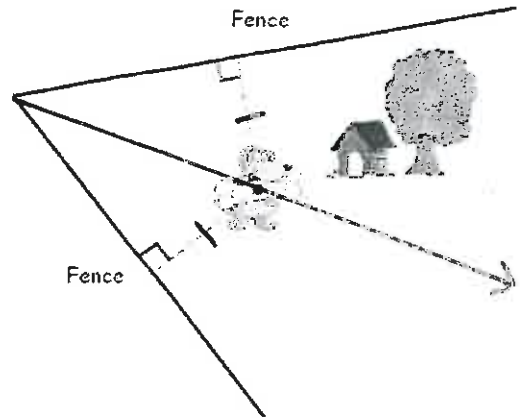
What to look for:

2 int. lines   & "Equidistant"

Description: ∠ bisectors

Example 1: A dog buries his bone equidistant to two intersecting fences. What is the locus of points that represent where the bone could be buried?
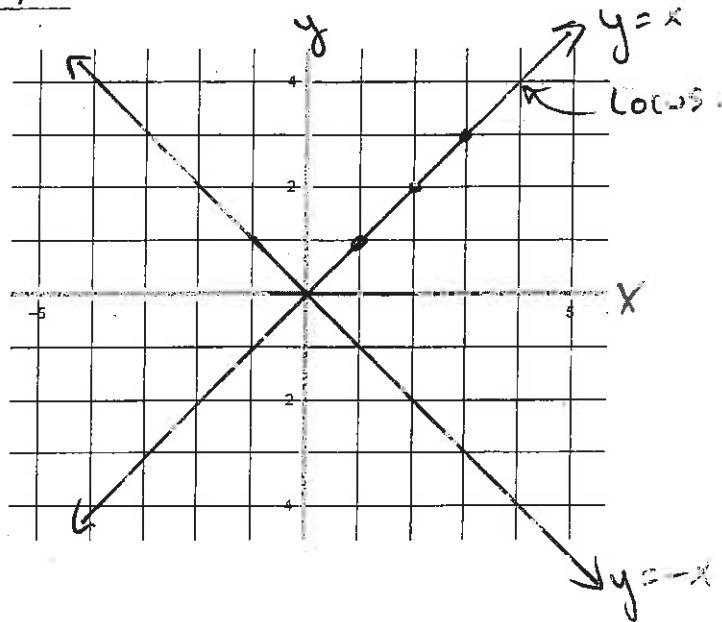
2 intersecting lines = fences.

Description: ∠ bisector

Example 2: What are the equations for the locus of points equidistant from the y-axis and the x-axis?

2 intersecting lines = y-axis, x-axis

Equations: $y = x$
$y = -x$