TRANSPARENCY MASTERS

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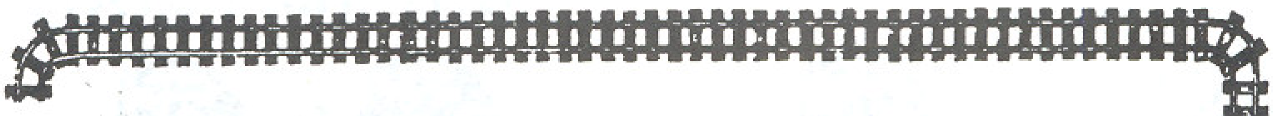
I'VE BEEN WORKING ON THE

RAILROAD

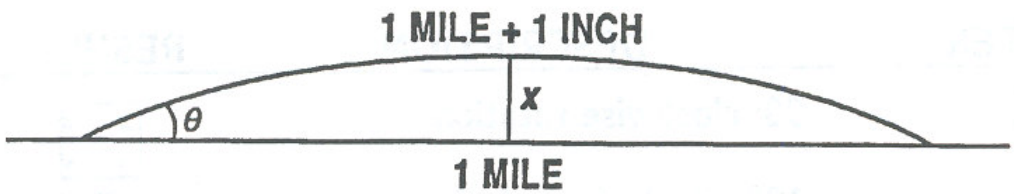


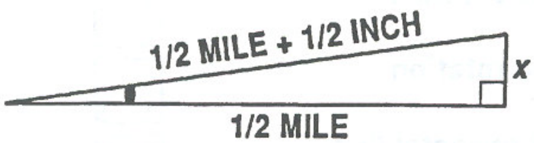
A single railroad track is laid one mile over level ground. It is firmly secured at the ends so that they cannot move. If in the heat of the day, the track expands one inch over its length and arcs up above the ground, then how high is the arc at its center?

High enough to:

A. Slip a sheet of paper under?
B. Slip your hand under?
C. Crawl under?
D. Walk under?
E. Drive a locomotive under?

RAILROAD
PROBLEM SOLUTION





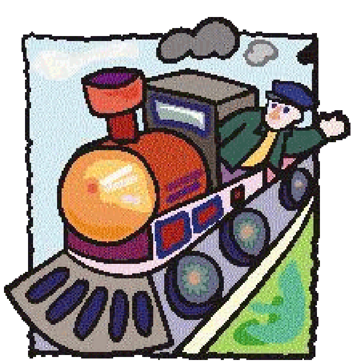
A triangle may be used to approximate x, since θ is so small (approx. 0.03°).

$$\left(\frac{1}{2}\text{mile} + \frac{1}{2}\text{inch}\right)^2 = x^2 + \left(\frac{1}{2}\text{ mile}\right)^2$$

$$(31{,}680.5)^2 = x^2 + (31{,}680)^2 \text{ in inches}$$

$$x = 177.989466 \text{ inches}$$

$$\approx 14.8 \text{ feet}$$



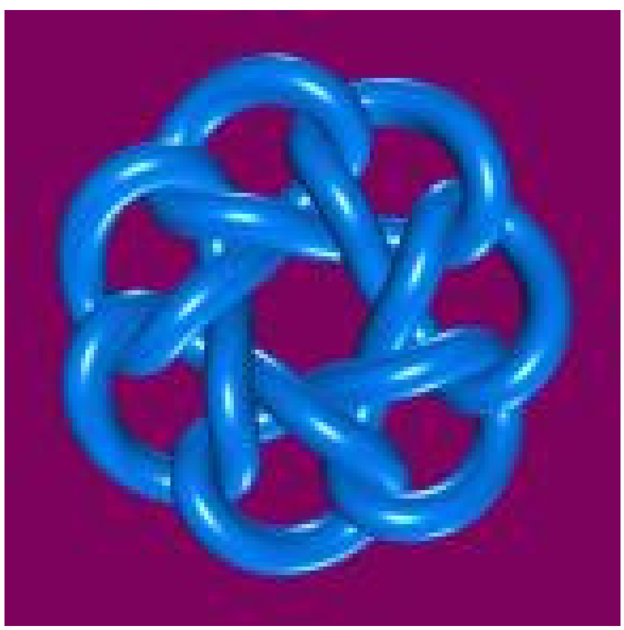
CASEY JONES CAN GO RIGHT UNDER!

SYMMETRIES OF A SQUARE

Element	*Description*	*Result*
A	**90°** clockwise rotation	3 4 2 1
B	**180°** clockwise rotation	2 3 1 4
C	**270°** clockwise rotation	1 2 4 3
D	**360°** clockwise rotation	4 1 3 2
E	Flip about a **horizontal** line through the middle of the square	3' 2' 4' 1'
F	Flip about a **vertical** line through the middle of the square	1' 4' 2' 3'
G	Flip along a line drawn from **upper** left to lower right	4' 3' 1' 2'
H	Flip along a line drawn from **lower** left to upper right	2' 1' 3' 4'

It's all up to YOU!

	A	B	C	D	E	F	G	H
A	B	C	D	A	H	G	E	F
B	C	D	A	B	F	E	H	G
C	D	A	B	C	G	H	F	E
D	A	B	C	D	E	F	G	H
E	G	F	H	E	D	B	A	C
F	H	E	G	F	B	D	C	A
G	F	H	E	G	C	A	D	B
H	E	G	F	H	A	C	B	D



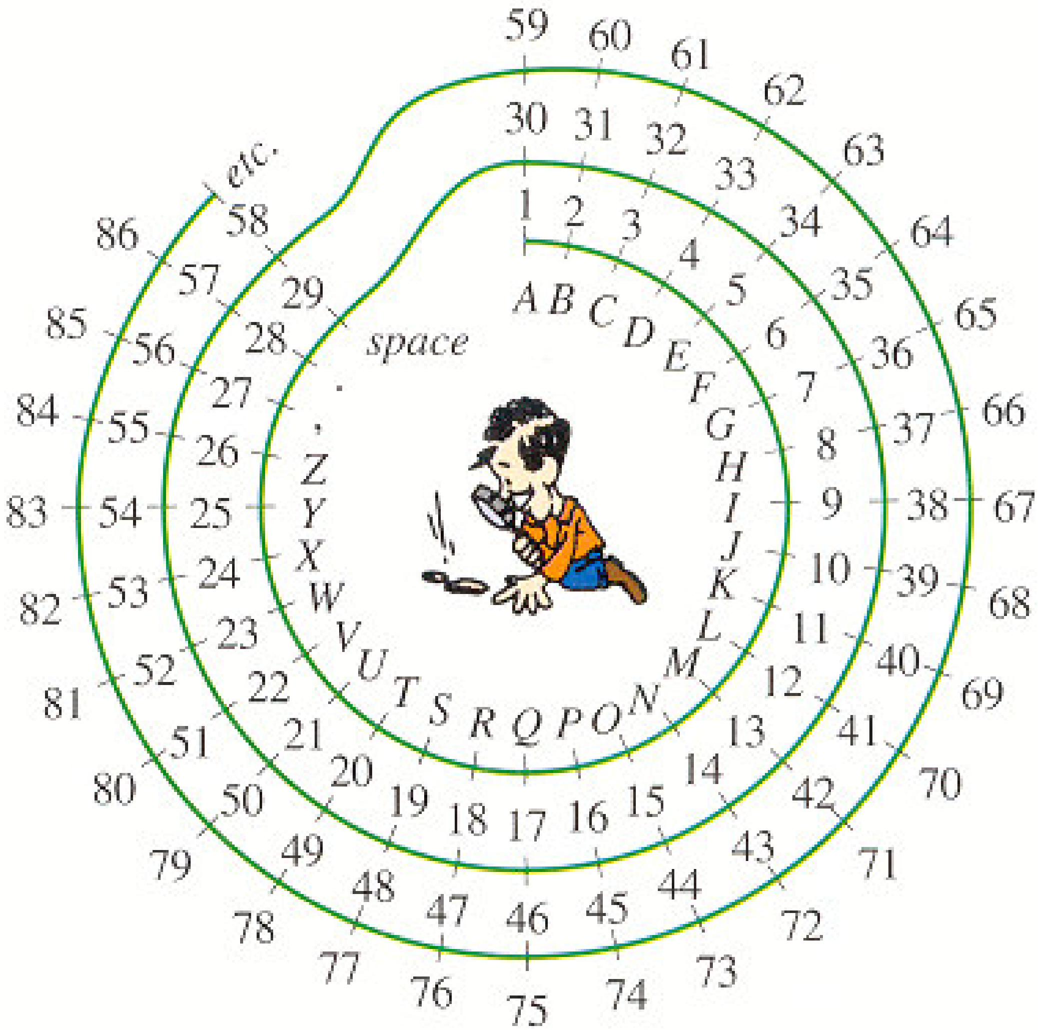
FIELD OF DREAMS

A **field** is a set $\mathbb{R}$, with two operations + and $\times$ satisfying the following properties for any elements a, b, $c \in \mathbb{R}$.

Addition	*Multiplication*
Closure	**Closure**
1. $(a+b) \in \mathbb{R}$	2. $ab \in \mathbb{R}$
Associative	**Associative**
3. $(a+b)+c = a+(b+c)$	4. $(a \times b) \times c = a \times (b \times c)$
Identity	**Identity**
5. There exists $0 \in \mathbb{R}$ so that $0 + a = a + 0 = a$ for every element a in $\mathbb{R}$.	6. There exists $1 \in \mathbb{R}$ so that $1 \times a = a \times 1 = a$ for every element a in $\mathbb{R}$.
Inverse	**Inverse**
7. For each $a \in \mathbb{R}$, there is a unique number $(-a) \in \mathbb{R}$ so that $a + (-a) = (-a) + a = 0$	8. For each $a \in \mathbb{R}$, $a \neq 0$, there is a unique number $\frac{1}{a} \in \mathbb{R}$ so that. $a \times \frac{1}{a} = \frac{1}{a} \times a = 1$
Commutative	**Commutative**
9. $a + b = b + a$	10. $ab = ba$
Distributive	

11. $a \times (b + c) = a \times b + a \times c$

THE FBI HAS BED BUGS



Transparency 22

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