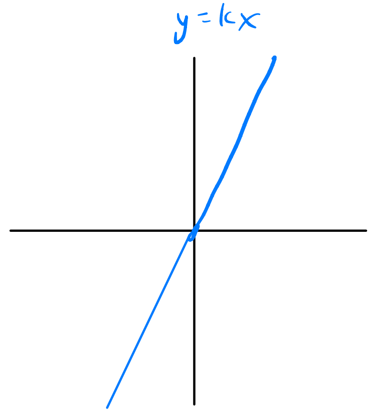
[redacted]

2-26-22 Math 73C

44) $0.14 = k(2.75)$

$k = \frac{0.14}{2.75} = 0.05$ B



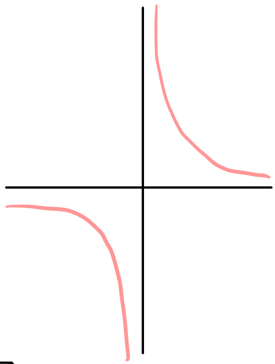
$x\uparrow, y\uparrow \Rightarrow$ direct variation

$3 \cdot 1 = 3$

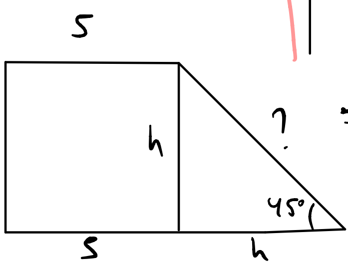
$6 \cdot \frac{1}{2} = 3$

$xy = k$

$y = \frac{k}{x}$



50)



$= 2\sqrt{2}$

$\frac{1}{2}h(b_1 + b_2)$

$b_1 = 5 + h$

$h = h$

$b_2 = 5$

12 cm^2

$5h + \frac{h^2}{2} = 12$

$10h + h^2 = 24$

$h^2 + 10h - 24 = 0$

$(h+12)(h-2) = 0$

$h = -12 \quad h = 2$

13

12

3

5

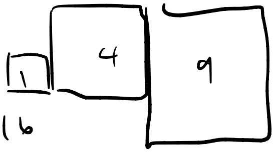
Whenever you see

3-4-5, 6, 8, 10

5-12-13, 10, 24, 26

$1 : 1 : \sqrt{2}$ 45°-45°-90°

$1 : \sqrt{3} : 2$ 30°-60°-90°

51) 

16 25 Integers 1-18, $36 = 6^2$ not possible

$15 + 1 = 16$
$8 + 1 = 9$
$3 + 1 = 4$

$18 + 7$
$17 + 8$
$16 + 9$

Must have these, start with these 3

$15 + \{10, 1\}$
$14 + \{11, 2\}$
$13 + \{12, 3\}$
$12 + \{13, 4\}$
$11 + \{14, 5\}$
$10 + \{15, 6\}$

$\{a, b\}$ denotes that it could be either a or b

Note that if 15 goes with 1, then all of 1-18 are used

57) 1 2 3 4

1 2 3 4 . . .

arithmetic sequence
common difference d added each term

A → Any

Let $d = 0$

Come up with one sequence, and the condition must be true for all sequences, or do it by reasoning

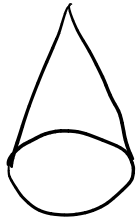
3/4 3/4 3/4 3/4 3/4 3/4 3/4

$3/4 + 0d$ $3/4 + 1d$ $3/4 + 2d$ $3/4 + 3d$ $3/4 + 4d$ $3/4 + 5d$ $3/4 + 6d$

$3/4 + 0d$ $3/4 + 1d$ $3/4 + 2d$ $3/4 + 3d$ $3/4 + 4d$ $3/4 + 5d$ $3/4 + 6d$ $3/4 + 7d$

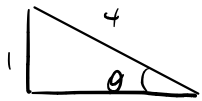
$3/4 + 3.5d$

60) conic section any cross section of a cone



circle
hyperbola
parabola
ellipse

58)



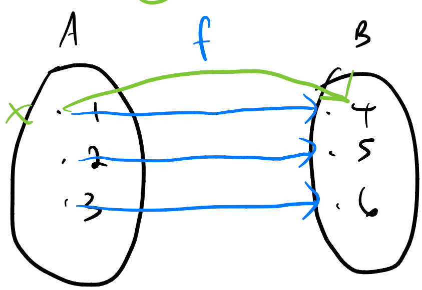
$$\theta = \sin^{-1}(1/4)$$

$$\sin\theta = 1/4$$

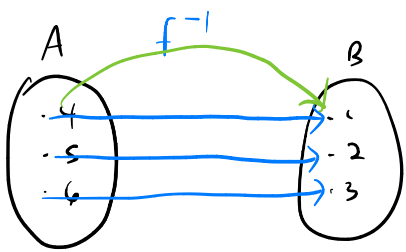
$$\sin^{-1}(\sin(\theta)) = \sin^{-1}(1/4)$$

$$\theta = \sin^{-1}(1/4)$$

$$f^{-1}(f(x)) = x$$



$f: A \to B$



$f^{-1}: A \to B$

Domain Range

56) $a^b = (a^j)^c$ The powers can be different

But the bases are formed from the same base

$\sqrt{3}^{\,j} = 27^k$ powers of 3

$\sqrt{3} = 3^{1/2}$ $\quad 4 = 2^2$

$27 = 3^3$ $\quad 8 = 2^3$

$(3^{1/2})^j = (3^3)^k$

$3^{\frac{1}{2}j} = 3^{3k}$

$\Rightarrow \frac{1}{2}j = 3k$ Find values by guess & check

$\frac{1}{2}\frac{j}{k} = 3$

$\frac{j}{k} = 6$

53) "factored form" means $(x+a)(x+b) \Rightarrow$ gives 0's

$\Rightarrow$ "reaches ground at x seconds"

48) A B

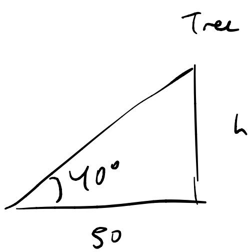
Matrix multiplication

columns = # rows

$\begin{array}{cc} \text{rows} & \text{cols} \\ (m & \times\, n) \end{array} \quad \begin{array}{cc} \text{rows} & \text{cols} \\ (n & \times\, p) \end{array}$

cols = # rows

42)



39)

Math 73G April

58)

60)

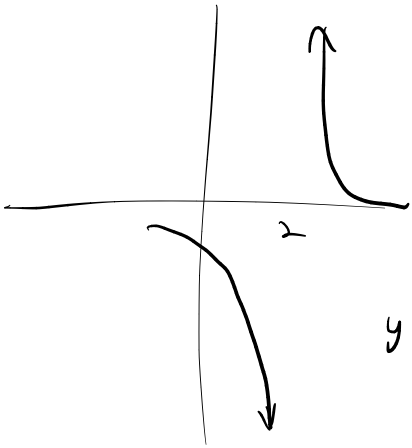
59) $y = 2$ $\qquad \frac{2x^2}{x^2} \qquad \frac{2}{1} = 2$

horizontal asymptote: you're dealing with infinity

asymptotic complexity

"what happens when input size → infinity"

$y = 0$



$y = \frac{1}{(x-2)} \qquad \frac{1}{x-2}$

$x \to \infty \qquad \frac{1}{\infty - 2}$

$\frac{1}{\infty} = 0$ (*)

$x = 2$ is a V.A.

(*) You can't do this in formal math in precalc, but it's a good way to reason about it

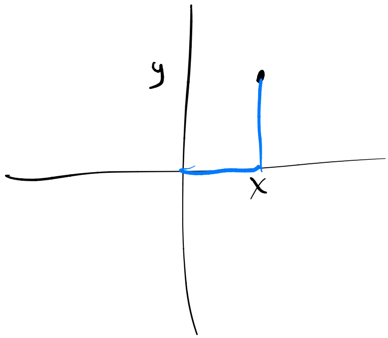
$$\lim_{x\to\infty} \frac{2x^2 - 18}{x^2 - 50000x} = \lim_{x\to\infty} \frac{2x^2}{x^2} = 2$$

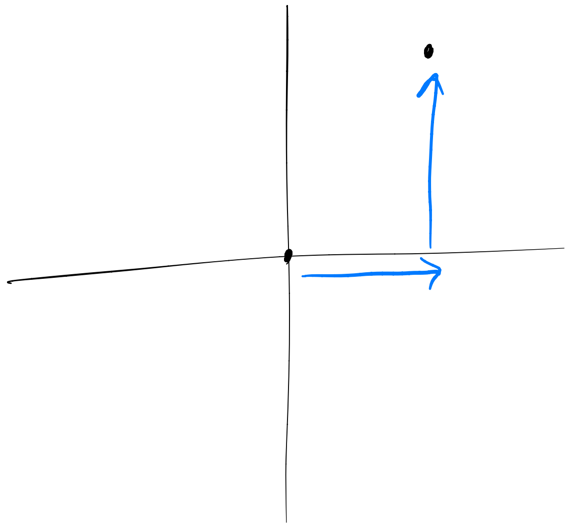
H.A. $y = 2$

x	x^2
1	1
10	100
100	10000
1000	1000000
⋮	⋮

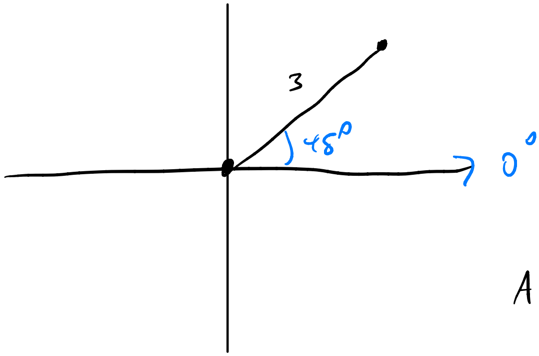
When there's x squared ignore x

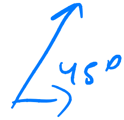
59)





59)





walk forward
5 steps

A. $(3, -315°)$

Any point can be represented as (r, θ)

θ = face θ angle (starting at 0°, East)
r = walk forward r steps

57) $3^{x+1} = 9^{x-2} = 3^{2(x-2)}$

$3^{x+1} = 3^{2x-4}$

$x+1 = 2x-4$

B. 1

$2x-4 = 2x-4 \Rightarrow$ infinite solution

$2x+1 = 2x+2$
$1 = 2$ $\Rightarrow$ no solutions