60 questions, 60 minutes

1 question/min

↑ questions



1 question
1 min

expected value

time (min)
60

↑ questions



1 question
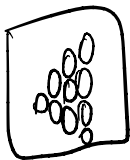70 sec

1 question
35 s

time (min)
60
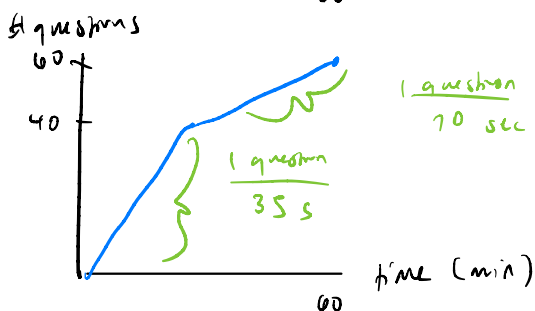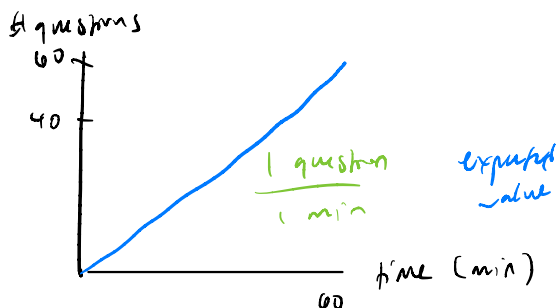
Hider being questions that take too long to class

22) Don't check the middle numbers check outliers

23)



$\pi \left( \frac{2.25}{2} \right)^2$

One pin 1.27 $\pi$

Ten pins = 12.7 $\pi$ ≈ 40
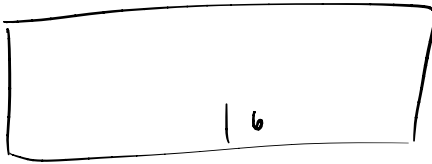
A) 40

Want !! Pin !! Read carefully

40) Ana: 2/5
Amy: 1/3

Ruben: $1 - \frac{2}{5} - \frac{1}{3} = \frac{4}{15}$ ⇒ If $\frac{4}{15}$ takes 2 hours
$\frac{1}{1}$ takes $2 \cdot \frac{15}{4} = \boxed{7.5 \text{ hours}}$

43)   $\frac{2}{3} - \frac{1}{4}$        $\frac{8}{12} - \frac{3}{12} = \frac{5}{12}$

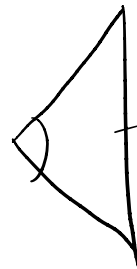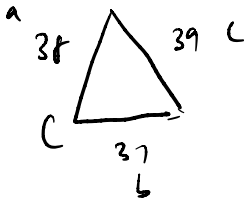$$\frac{12\left(\frac{x}{3} + \frac{1}{2}\right)}{5} = \frac{4x + 6}{5}$$

✶ 28)



| 6

26

4a)   $c^2 = a^2 + b^2 - 2ab\cos C$

Figure out whether you want
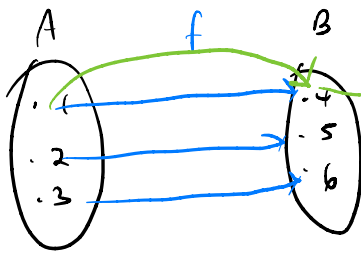C    or    C



a
38   39 C
C
37
b

$c^2 - a^2 - b^2 = -2ab\cos C$

$-\frac{c^2 - a^2 - b^2}{2ab} = \cos C$

$\cos^{-1}\left(-\frac{c^2 - a^2 - b^2}{2ab}\right) = \cos^{-1}(\cos(C)) = C$

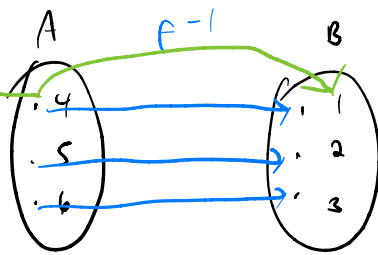$C = \cos^{-1}\left(-\frac{c^2 - a^2 - b^2}{2ab}\right)$

B

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

A — f → B    A — f⁻¹ → B

.1  →  .4        .4 → .1
.2  →  .5        .5 → .2
.3  →  .6        .6 → .3

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

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

**33)** Airplane   horizontal
$x = \cdots$   vertical

C                    $A: (0, 0)$

be careful, A might not start at 0

**52)** 
$n = 1$    $s_1 = 3$
$n = 2$    $s_2 = 9 = 2(3) + 2 + 1$
$n = 3$    $s_3 = 22$
$n = 4$    $s_4 = 49$

$s_0$        start at $s_0$ or
$s_1$            $s_1$?

**55)** Geometry: Always draw diagram



$(x, 11)$

$3 \}$

$3 \{ $ $(7, 8)$

$(x, 5)$
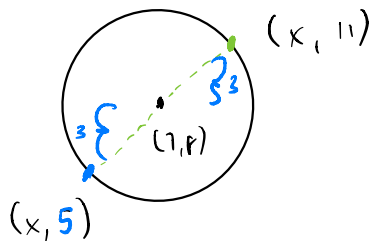
Even for hard questions,
you're always 1-2
small steps from
answer,
attempt each question fully.

60) K    Graphing imaginary solutions

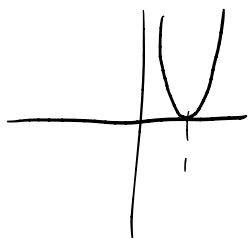To get actual roots,     $x+1 \overline{\smash{)}\,4x^3-2x^2+x+7}$

# solutions to polynomial = degree (highest power) of
    (hidden) (*)                          polynomial
    (imaginary)

$(x-1)^2$   How many solutions?   2



$(x-1)(x-1)$
$x=1$   $x=1$

(*)

54)   expected value   average (mean)

$\{1, 2, 2, 3, 3, 3, 4, 4, 4, 4\}$

$\dfrac{1+2+2+3(3)+4(4)}{10} = \boxed{3}$

Flip a coin    H = 3 pts   T = 0 pts

Expected value of a toss?   1.5 pts per toss
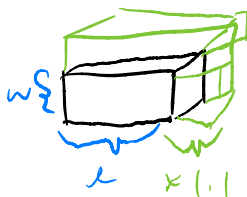
59)   Be aware of when something might be wrong    Do sanity
                                                      checks

$V = \ell w h$
$= 1.1\ell \cdot 1.1 w \cdot h$
$1.1 \cdot 1.1 = 1.21$

$\boxed{21\%}$



$w\{$
$\ell$   $\times 1.1$

How much does volume increase when
just $\ell \to 1.1\ell$    $1.1\times$