30/ (\*) n, n+1, …, n+7

n+4, n+5, …, n+11

n-4, n-3, …, n+3

51/ 20% less than standard rate of … = 20% discount

64/ (\*\*) ***positive NOT includes 0***

69/ (\*) Variable cost per unit = 0.4 \* $2 = $0.8 🡪 left with $1.2

To break even with $5,040 of the fixed cost: $5,040 / $1.2 = 4,200 units

72/ (\*) ((A – D) / D) \* 100%

76/ (\*\*) Method 1: $8,000\*(1.06) + $10,000\*(1.04)^2

Method 2: $8,000\*6% = $ 480; $10,000\*8% = $800 (semi so must be higher)

* Total = 480 + 800 - $ 1,280 🡪 slightly higher than $1,280 🡪 $1,296

80/ (\*\*) Day E: $2\*30 = $60 🡪 Day D: $180-$60 = $120

🡪 Day D 1st 40 units: $2\*40 = $80 🡪 paid $120 - $80 - $40 assembling for exceeded units

* Day D assembled 40/2.5 = 16 units 🡪 Day D assembled a total of 40+16 = 56 units

82/ (\*) Set t as the number of hours after 8am that Ben drove

* Ben: 20t; Al: 40(t-3) 🡪 60t – 120 = 240

89/ (\*) kx + 3y = 6 ***for every possible value of k***? 🡪 0 + 3(2) = 6

92/ (\*) 0.42 x – 0.33x = 0.9x = 9% of x

93/ (k+2)(K^3 – k) = (k + 2)(k)(K^2 – 1) = (k-1)(k)(k+1)(k+2) (ascending)

* ~ 4! = 24 divisible by 6

98/ (\*\*) ***15% more in*** Dec ***than it had in*** Jan 🡪 460 ***is 115% of the number of … in Jan***

* Jan: 460/1.15 = 400

101/ ***for given sum of two numbers, their product is maximized when they are equal.***

Thus mp will be maximzed if given that m^2+p^2<100 <-> m^2+p^2<100 when m=p

2m^2<100 <-> 2m^2<100 <-> m^2<50 <-> m^2<50

* m is a positive integer then m = 7 🡪 mp = 7\*7 = 49.

107/ ***twice as many units of Q as P 🡪 Q = 2P***

110/ 4\*6 = 25 machine days for x products 🡪 for 3x products: 3\* 24 = 72 machine days

* 72/4 = 18 machines for 4 days

114/ (\*) 65% + 22% + 18% + 15% = 90% ~ 0.9 T

0.22T + 0.18T = 0.4T 🡪 0.4T / 0.9T = 4/9

115/ Thế 2 cái p vào.

118/ (\*) r + s + t = ¼; s + t = 1/5 🡪 r = ¼ - 1/5 = 1/20 🡪 tR = 20h

119/ (\*\*) 4/3pi(1^3 + 2^3 + 3^3) = 4/3pi(36) = 44/3pi(R^3) 🡪 R^# = 36 🡪 ***2R = 2 căn 3 (36)***

124/ (\*) Total = Stockholders + Employees – Both <-> 100 = 62 + 47 – Both 🡪 Both = 9

% of stockholders, who were employees: 62 – 9 = 53

126/ (\*\*) Phải thế vào:

(12-20)/20 \* 100% = -40% …

127/***n = 20! + 17 divisible by only 17.***

130/ (\*\*) No runs at rate 8 min / mile. 🡪 in 50’ he cover: 50/8 – 6.25 miles

* Total round trip = 3.25 + 6.25 = 9.5 miles

½ distance (1 way south): 9.5/2 = 4.75 miles south

He runs: 4.75 – 3.25 = 1.5 miles further south

132/ (\*) Reciprocals of consecutive int from 201-300 🡪 100(1/300) < M or 1/3 < M

100(1/200) > M or ½ > M 🡪 1/3 < M < ½

136/ (\*) The median of 161 ages is the 81st age when the ages are listed in order

138/ Possible values of 100x + 200y (\*)? x + y = 1 🡪 y =1 – x

(\*) 🡪 200 – 100x. Thế vào xét âm thì loại

140/ (\*\*) Randomly choose 4 books form teh 10 books. Possible cases = 10\*9\*8\*7 = 5,040

141/ n pos int & product of all ints from 1 to n divisible by 990. Least possible n:

***990 = 2 \* 362 \* 5 \* 11*** 🡪 **11**

143/ (\*) Q odd, median of Q conse ints is 120. Largest of int?

Say ! = 3: set = {119; 120; 121}

Plug Q = 3 into ans to see which yields 121. Only ***(Q-1)/2 + 120*** works

145/ (\*) 146/ (\*\*) Triangle 30-60-90 🡪 1: căn 3: 2

147/ (\*\*) 10^12, if t is single digit 🡪 11 zeros 🡪 12 – num of digits of t

But 0s <8 🡪 t should have digits > 12-8 or >4 (and <8)

148/ (\*) 2 cases of 2nd digit: a/ 8\*1\*10 = 80 + b/ 8\*1\*9 = 72 🡪 152

149/ (\*) Tỉ lệ chéo

151/ STD of y = 0.8x + 20? Thế ví dụ vào 🡪 20\*0.8 = 16

152/ (\*\*) ***n(E or F or I) = n(E) + n(F) + n(I) – n(E&F) – n(F&I) – n(I&E) + n(E&F&I)***

154/ (\*) x/y = 96.12 = 96 12/100 = 96 3/25 🡪 y = 25

156/ (\*) ***the sides of the square are the hypotenuses of the triangles and the sides of the rectangle are the legs of the triangles.***

157/ (\*\*) Review 3x + (37-x) = 64 🡪 x = 13.5 🡪 0 and 13

162/ 0.45\*60 = 27 woman lawyers 🡪 27/100 = 0.27 prob woman lawyers selected

167/ (\*\*) ***3(1/m) + 1/(m-4)*** = (4m-12)/m(m-4)

168/ r & s are roots 🡪 x^2 – (r+s)x +rs = 0 🡪 r = 1 + căn 2 & s = 1 – căn 2

* r + s = 2 & rs = -1 🡪 x^2 – 2x – 1 = 0

70/ (\*\*) Neither pen defective: Prob of 1st pen good: 9/12, Prob of 2nd pen good: 8/11

* Total prob: 9/12 \* 8/11 = 6/11

Or 9C2 / 12C2 = 6/11

171/ (\*\*) 40\*2 + 60\*(8-c) = 52(10-c) 🡪 c=5

172/ (\*\*) % = Change/Original \* 100

(1/12 – 3/20)/(3/20) \* 100

173/ (\*) Để ý to **10h: 10:00 – 9:31** = 28’ 🡪 off for 29-15 = 14’

175/ Find the num of powers of a prime num l, in the n!

n/k + n/k2 + n/k3 … till n > kx  🡪 30/3 + 30/32 + 30/33 = 10 + 3 + 1 = 14

* The highest power of 3 in 30! Is 14

176/ (\*\*) n = 38 – 28, which not factor of n?

* (34 – 24)(34 + 24) = 65\*97 = 5\*13\*97 but 35=5\*7 🡪 35

178/ (\*\*) x = 4m + 3 = 5n + 3 🡪 x is a multiple of both 4 & 5 or 20

As 10<x<40 🡪 remainder when 23/6 is 5 🡪 x = 23

179/ (\*) (75n + 790) / (n + 6) = 90 🡪 n=10

181/ (\*) If 3<x<100, how many values of x is x/3 the square of a prime? 🡪 Three

**3 \* 22 = 12; 3\* 32 = 27; 3 \* 52 = 75**; 3 \* 72 = 147; …

182/ (\*) ***Num of single letter code: n***

***Num of pair of distinct codes: nC2***

* ***nC2 +n >= 12 🡪 n min = 5***

188/ (\*\*) (r-2)(t+4) = 336 (rt = 336)

192/ (\*) 285 <= m < 295; 11.5 <= y < 12.5 🡪 285/12.5 and 295/11.5

195/ (\*) 3,150 = 2 \* 32 \* 52 \* 7 🡪 2\*7 = 14

197/ Sum of the first n pos int: n(n+1) / 2

* Sum of the first 52 pos int: 52\*53/2 = 1,378

199/ (\*\*) Trip time: x/40 + 9100-x)/60 = (x+200)/120

* Avg speed = Total distance / Total Time = 100/ ((x+200)/120) = 12,000/(x+200)

201/ (\*\*) tug of war/ Team of 3 Males and 3 Females 🡪 M,F,M,F,M,F so how many possible lineups?

* 3\*3\*2\*2\*1\*1 = 36 = 3! \* 3!

202/ (\*\*\*) Mỗi bên viền của 1 cạnh hcn là x

Area of large rec: (10 + 2x)(8 + 2x) = (80 + 36x + 4x2)

Area of small rec: 10\*8 = 80

* Area of remaining: (80 + 36x + 4x2)– 80 = 36x + 4x2 = 144 🡪 (x-3)(x+12) = 0 🡪 x=3

203/ How many nonzero digits?

***Multiply by 24/24*** : d = 24/(23\*57)24 = 24/(27\*57) = 24/107 = 16/107 = 0.00000***16***

🡪 2 nonzero digits

204/ (\*) Sum of ***even*** ints between 99 and 301? 🡪 L=300, S=100

Sum of the 1st n digits = n(n + 1)/2

***Avg of the set: (L + S)/2*** = (300+100)/2 = 200

***Num of terms: (L – S)/2 + 1*** = (300-100)/2 + 1 = 101

***Cấp số cộng: Avg \* Num of terms*** = 200 \* 101 = 20,200

207/ (\*\*\*) ***Set x, y: Original price = x; Original earnings = y 🡪 Original ratio price per earnings = x/y***

Increased price: x(1 + k/100) = x(100 + k)/100

Increased earningsL y(1 + m/100) = y(100 + m)/100

* New ratio price per earnings: x(100 + k)/y(100 + m) (#)

% change = Change/Original \* 100% = [(#) - x/y]/ (x/y) \* 100 = 100(k – m)/(100 + m)

208/ (\*\*\*) **Phụ: (*Total = A + B + C – Both + All + Nei*)**

**Total = A + B + C – Exact2 – 2All + Nei**

* 100 = 40 30 + 75 – 35 – 2All + 0 🡪 All = 5%

**Only1 = Total – Exact 2 – All** = 300 – (35% + 5%)\*300 = 180

210/ (\*\*\*) Total cost: 60\*($250/1.2) = 50\*250 (3)

Num of cams sold: 60 – 6 = 54 🡪 Total Rev: 54\*250 (1)

Num of cams return is 6 🡪 Total Refund: 6\*250/1.2\*0.5 (2)

* **Total Income = Total Rev + Total Refund = (1) + (2)**
* **Approx Profit = (Total Income – Total Cost) / Total Cost \* 100** = 13% profit

211/ (\*\*) 7 ropes: Avg = 68, Med = 84. Longest = 4\* Shortest. Max possible of Longest?

* Maximize y = 4a + 14 🡪 Minimize all other ropes
* Min b,c must = a (shortest); min e, f must = d (median)
* a, a, a, 84, 84, 84 & 4a+14 (#)

Avg = (#)/7 = 68 🡪 a = 30 🡪 Longest = 4\*30 + 14 = 134

214/ (\*\*) Letters D, G, I, I and T. How many formed 2 Is separated by at least 1 letter?

**Total cases (Total num of ways 5 letters w 1 letter I redundant): 5! / 2! = 60**

**Num of ways 2 I together: 4! = 24 (Treat both Is as 1)**

**Num of ways at least 1 letter betwwen 2 I: 60 – 24 = 36**

Method 2: Num of ways selecting locations of 2 occurences of I: 5C2 – 4 = 6

For each of these 6 ways to select locations of 2 occurences of letter I, there are 6 ways to select location of D, G T: 3! = 6

* Total ways to select locations of 5 letters to form 5 letter strings: 6\*6 = 36

215/ (\*\*\*) Apply a2 – b2 = (a + b)(a - b)

0.99999999/1.0001 – 0.99999991/1.0003 = (1 - 10-8)/(1 + 10-4) – (10 - 9\*10-8)/(1 + 3\*10-4)

= 2\*10-4

216/ (\*\*\*\*) r = a/(a + 1.25b) \* 100

p = a/(a + b) \* 100 🡪 b = a/p \* 100 – a = a(100 – p)/p

* r = 100p/(125 – 0.25p) 🡪 ***Multiply by 4/4*** 🡪 400p/(500 – p)

217/ (\*\*) The past n days plus today ~ 1 more day = n + 1 days

(x \* daily avg + 1 \* today abg) / (n + 1) = 55 🡪 55 = (50n + 90) / (n + 1) 🡪 n = 7

218/ (\*\*) y intercept (0, 2); x intercept (3, 0)

***Slope = change in y / change*** in x = (0 – 2) / (3 – 0) = -2/3

***b = y intercept = 2*** 🡪 y =-2/3 x + 2 🡪 2x + 3y = 6

219/ 2 nums having 2 digits reversed : (10s + t) – (10t + s) = 27 🡪 s – t = 3 (difference)

220/ (\*) Reciprocal of r = sum of reciprocals of x & y: 1/r = 1/x + 1/y 🡪 r = xy/(x + y)

221/ (\*) Prob of X, Y, but not Z will solve problem?

Prob of Z NOT solving prob: 1 – 5/8 = 3/8 🡪 Combined prob: ¼ \* ½ \* 3/8 = 3/64

224/ (\*\*\*) a = 180 – 2x 🡪 9\*(180 – 2x) as graph

Sum of interior angles of a polygon with n sides: (n – 2)\*180 = 7\*180 = 1,260

Also, that sum of interior angles of a polygon = 9\*(180 – 2x) = 1,280 🡪 x = 40

* a = 180 – 2x = 180 – 2\*40 = 100

225/ (\*\*\*\*) ***Choose 2.8 🡪 3 (+0.2) ; 2.2 🡪 3 (+0.8) (làm tròn lên)***

***2.1 🡪 2 (-0.1) ; 2.9 🡪 2 (-0.9) (làm tròn xuống)***

Max E = S + 0.8\*10 – 0.1\*20 = S + 8 – 2 = S + 6 🡪 **E – S = 6 (max)**

Min E = S + 0.2\*10 – 0.9\*20 = S – 16 🡪 **E – S = -16 (min)**

227/ (\*\*\*) ***0.4X + 0.25Y = 0.3(X + Y)*** 🡪 X = 0.5Y 🡪 ***X/(X + Y)*** = 0.333

228/ (\*\*) How many ints for (x+2)(x+3)/(x-2) >= 0 are less than 5?

Vẽ hình: (1) pos for values -3 < x < -2 🡪 x = -3; -2

(2) x > 2 (x != 2) 🡪 x = 3; 4

🡪 4 values above

229/ (\*\*) Total = A + S + P – Exact -2All + Nei 🡪 150 = 0.6\*150 + 0.5\*150 + 0.3\*150 – Exact2 – 2\*5 + 5 🡪 Exact2 = 55

230/ (2-14 + 2-15 + 2-16 + 2-17) / 5 = how many times 2-17 ?

Gán x 🡪 x \* 2-17 = (2-14 + 2-15 + 2-16 + 2-17) / 5 🡪 x = (2-14 + 2-15 + 2-16 + 2-17) / 5 \* 217

= 23 + 22 + 21 + 20 = 3