Solutions to Jan Exam Review

Monday, January 20, 2020 6:26 PM

#1 - C

#2

define variable
x = # Colomb hat
y = # Cartier hats

(2) determine the constraints

① $x + y \leq 60$ ② $2y \geq x$ → $y \geq \frac{1}{2}x$ → rise/run : $\frac{1}{2}$

② $x \geq 10$

③ $y \geq 10$

(3) Graph your polygon

rise/run

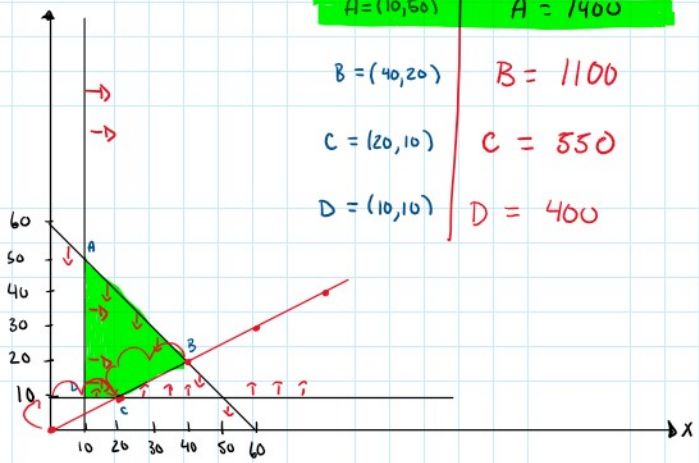
table of values

$x = \#$	$y = \#$	$x + y = \#$

(4) determine vertices

(5) determine the max profit by using the optimal function.

	$P = 15x + 25y$
A = (10,50)	A = 1400
B = (40,20)	B = 1100
C = (20,10)	C = 550
D = (10,10)	D = 400



the owner must sell a total of 10 colomb hats
50 Cartier hats

#3

① x = # t-shirts

y = # fleece

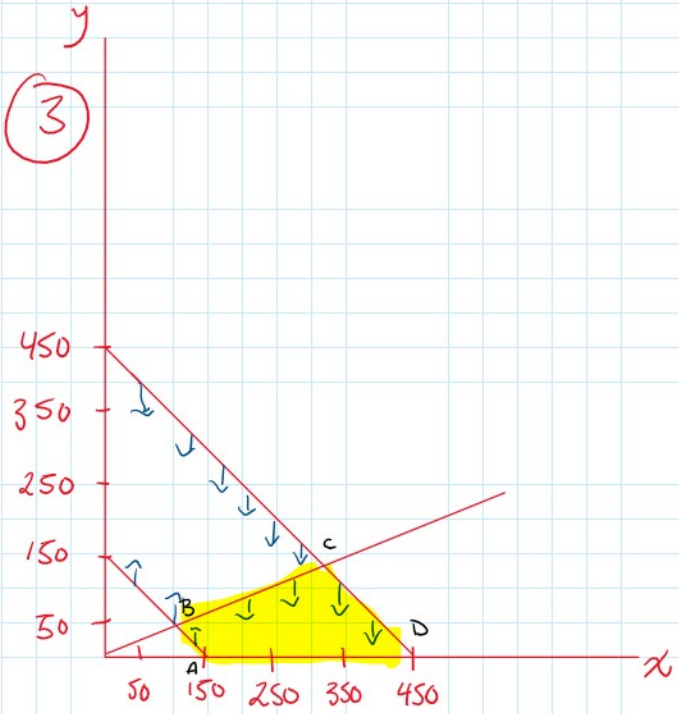
② $x + y \geq 150$

$x + y \leq 450$

$x \geq 2y \rightarrow y \leq \frac{x}{2}$

$R = 5x + 10y$

③



A(150, 0) C = ? (test points you are unsure of)

B(100, 50) D = (450, 0)

④ C

$x \geq 2y$

$x + y \geq 450$

$2y + y = 450$

$3y = 450$

$y = 150$

$x = 2y$

$x = 2(150)$

$x = 300$

C = (300, 150)

⑤

	$R = 5x + 10y$	R
A	$5(150) + 10(300)$	1050
B	$5(100) + 10(50)$	1000
C	$5(300) + 10(150)$	3000
D	$5(450) + 10(0)$	2250

300 t-shirts
150 fleece

#4

① $8x + 20y = R$

②

	$8x$	$+20y$	R
$(30, 10)$	$8(30)$	$+20(10)$	440
$(45, 15)$	$8(45)$	$+20(15)$	660
$(60, 0)$	$60(8)$	$+20(6)$	480

③ B

#5 - B

#6 - D

#7

① x = # vanilla
y = # chocolate

② $x \geq 4$
$y \geq 3$
$x + y \leq 11$

③ graph the polygon and determine vertices

A = (4, 7)
B = (8, 3)
C = (4, 3)

$y \geq 3$

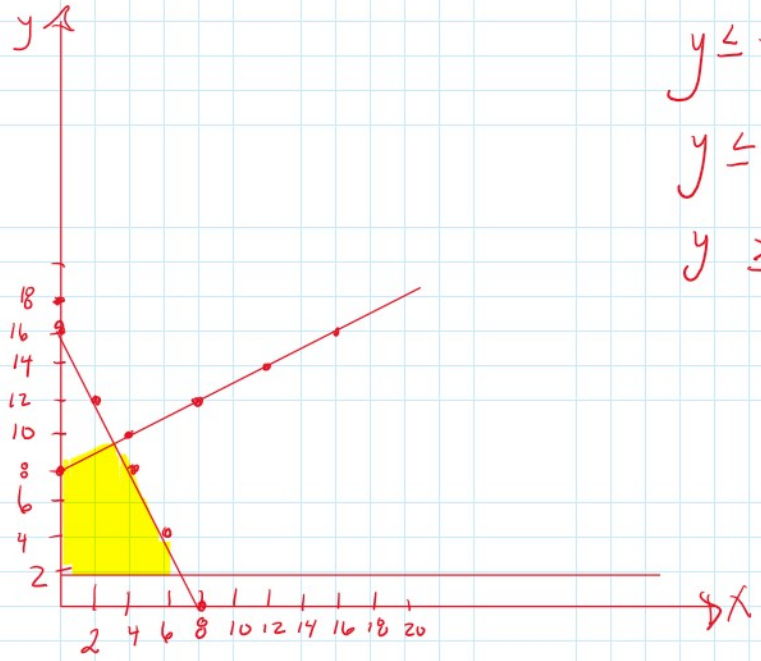
$x + y \leq 11$

$R = 5x + 6y$

$C = (4, 3)$

Answer : (A)

#8



$y \leq -2x + 16$ → 1. start @ 16 (y-axis)
2. $\frac{\text{rise}}{\text{run}} = \frac{-2}{1}$ ↓ →

$y \leq \frac{x}{2} + 8$ → 1. start @ 8 (y-axis)
2. $\frac{\text{rise}}{\text{run}} = \frac{1}{2}$ ↑ →

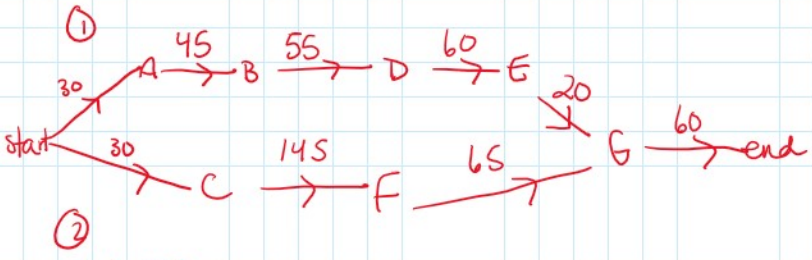
$y \geq 2$

↓

$y =$ horizontal line @ $y = 2$

#9. Assume : Once Natalie & Martin start their day, they can both run tasks at the same time.

∴ start → Natalie
start → Martin



start A B D E G end = 270 min

start C F E end = 300 min

min. time is 300 min.

#10 – C

#11 – A

#12

2 answers possible :

BADCB = 235

BACDB = 235

#13 – B

#14 SABDCS is the best path.

#15 – (A)

#16 – (A)

#17 – ① & ②

$x = 2y$

$x + 2y = 160$ – (B)

$2y + 2y = 160$

$\frac{4y}{4} = \frac{160}{4}$

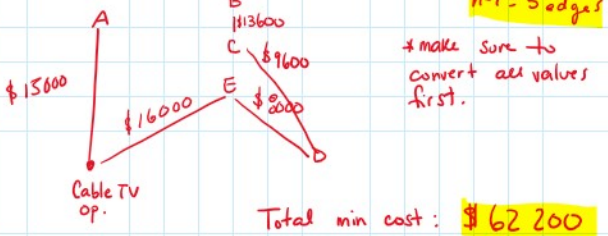
$y = 40$

$x = 2(40) = 80$

$(40, 80)$

#18 – make a tree of min value. $n = 6$ vertices

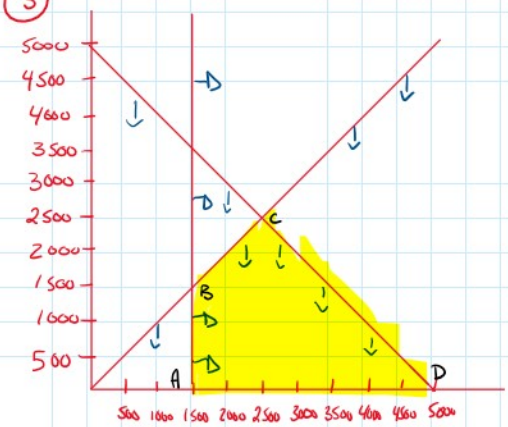
$n - 1 = 5$ edges



* make sure to convert all values first.

Total min cost: $62 200

#21 – Skip. Not needed for exam. (3)



#22

① x = # shampoo bottles

y = # conditioner bottles

② $\begin{cases} x \geq y \rightarrow y \leq x \\ x + y \leq 5000 \\ x \geq 1500 \end{cases}$

$K_1 = 3x + 3y$

$K_2 = 2.80x + 3.10$

④

		$R_1 = 3x + 3y$	$R_2 = 2.80x + 3.10y$
A	(1500, 0)	$3(1500) + 3(0) = 4500$	$2.8(1500) + 3.10(0) = 4200$
B	(1500, 1500)	$3(1500) + 3(1500) = 9000$	$2.8(1500) + 3.10(1500) = 8850$
C	(2500, 2500)	$3(2500) + 3(2500) = 15000$	$2.8(2500) + 3.10(2500) = 14750$
D	(5000, 0)	$3(5000) + 3(0) = 15000$	$2.8(5000) + 3.10(0) = 14000$

⑤ To maximize revenue, they should choose to sell 3$ per shampoo bottle
3$ per conditioner bottle.

#23 - Skip. not needed for exam.

#24 - There is a mistake. change the word "circuit" to "path".

(D)

25 - skip. not needed for exam.

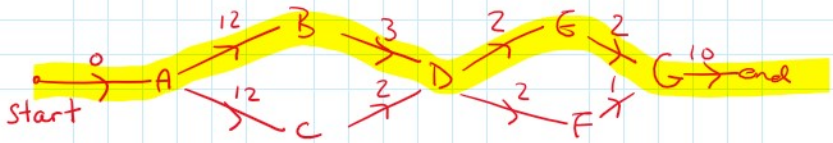
#26 - (C)

#27 - Skip, not needed for exam.

#28 D

#29 - A

#30 - Find min. time (CP)



C

SABDEGend
min time = 29 days

#31 $R = 6x + 8y$

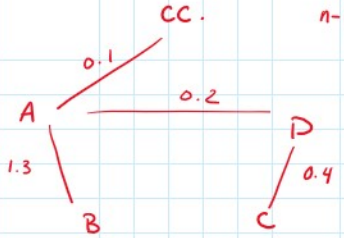
① determine vertices of polygon

x y	② $R = 6x + 8y$
A = (5,0)	6(5) + 8(0) = 30 pts
B = (0,5)	6(0) + 8(5) = 40 pts
C = (15,0)	6(15) + 8(0) = 90 pts
D = (15,3)	6(15) + 8(3) = 114 pts
E = (12,10)	6(12) + 8(10) = 152 pts
F = (0,10)	6(0) + 8(10) = 80 pts

③ max number of points is 152.

#56 make a min. tree.

n = 5 vertices
n-1 = 4 edges



Total min cost = 0.1 + 0.2 + 0.4 + 1.3
= 2 million dollars.

#57

① original min time = 20 days.

#57

① original min time = 20 days.
CP = FADFGend
cost = 20 × 5000 = $100 000

② change step D to →3 ∴
D takes 8 days now.

③ new min-time = 23 days

cost = $115 000 (23 × 5000)

④ new cost increases by $15 000