

Review for Final

Wednesday, April 10, 2024 10:34 AM

① convert 24362 to hexadecimal

	Q	R	
$24362 \div 16$	1522	10 = A	
$1522 \div 16$	95	2	
$95 \div 16$	5	15 = F	↑
$5 \div 16$	0	5	

$5F2A_{16}$

② convert 57.024_8 to hexadecimal

$$57.024_8 = 10111.000010100_2 = 2F.0A_{16}$$

③ convert 0.9 to octal. Give an exact answer (do not round.)

	int	non-int
$0.9 \times 8 =$	7	+ 0.2
$0.2 \times 8 =$	1	+ 0.6
$0.6 \times 8 =$	4	+ 0.8
$0.8 \times 8 =$	6	+ 0.4
$0.4 \times 8 =$	3	+ 0.2

repeat

$$0.7\overline{1463}_8$$

④ Answer with Yes, No, or Maybe.

a) Priya plays soccer. Does she play soccer or hockey?

Yes

b) Jan plays soccer and hockey. Does he play soccer?

Yes

c) Rafael does not play soccer. Does he play soccer or hockey?

Maybe

⑤ For the pairs of sentences below, is the second sentence the negation of the first sentence?

0, 1, 2, 3, ...

a) There are no keys on my keyring. I have a positive number of keys on my keyring.

≥ 3

Yes

b) There are at least 3 dogs in the park.
There are at most 3 dogs in the park.

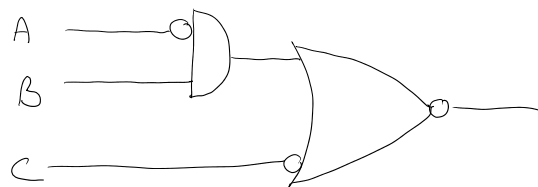
≤ 3

No

c) All textbooks are overpriced. No textbooks are overpriced.

No

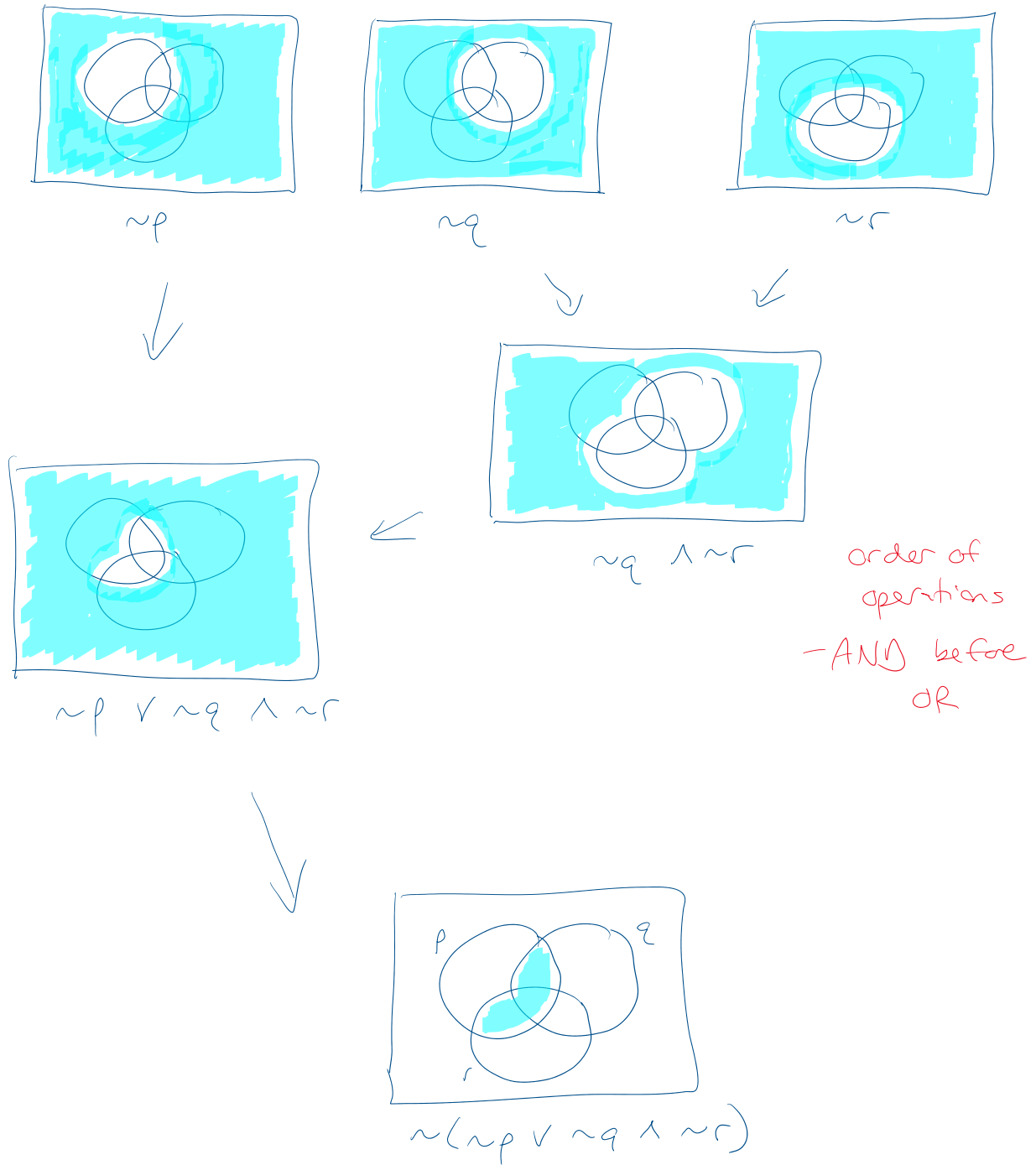
⑥ Write the Boolean expression that corresponds to the following gate diagram



$\overline{AB + C}$

⑦ Represent $\sim(\sim p \vee \sim q \wedge \sim r)$ on a Venn diagram by shading in the appropriate regions. Show your work.

answer:



⑧ Is $\overline{A\overline{B}} (\overline{A+B})$ logically equivalent to zero?
 Justify your answer using a truth table.

answer:

A	B	\overline{A}	\overline{B}	$\overline{A\overline{B}}$	$\overline{\overline{A\overline{B}}}$	$\overline{A+B}$	$\overline{A\overline{B}} (\overline{A+B})$
0	0	1	1	1	0	1	0

0	0	1	1	1	0	1	0
0	1	1	0	0	1	1	1
1	0	0	1	0	1	1	1
1	1	0	0	0	1	0	0

NO

9) Use the laws of logic to simplify.

a) $(p \wedge \sim p) \vee (\sim q \vee q) \vee (\sim r \wedge \sim r)$

$0 \vee 1 \vee (\sim r \wedge \sim r)$ complement

$1 \vee (\sim r \wedge \sim r)$ { identity
def of "or"

$1 \vee \sim r$ idempotent

1 identity

b) $\sim(p \wedge q) \wedge (\sim p \vee \sim p)$

$(\sim p \vee \sim q) \wedge (\sim p \vee \sim p)$ DeMorgan's

$(\sim p \vee \sim q) \wedge \sim p$ idempotent

$\sim p$ absorption

10) The following statement is true:

"If Han did not shoot first, then fans are unhappy."

- a) Hen shot first. Are fans happy? *Maybe*
- b) Hen did not shoot first. Are fans happy? *No*
- c) Fans are unhappy. Did Hen shoot first? *Maybe*
- d) Fans are happy. Did Hen shoot first? *Yes*

11) Consider the following:

$$\frac{1}{9}, -\frac{1}{3}, 1, -3, \dots$$

- a) Is it a sequence or a series? *sequence*
- b) Is it arithmetic, geometric, or neither? *geometric*
(mult by -3)
- c) write a general formula for a_n .

$$a_n = a_1 r^{n-1}$$

$$a_n = \frac{1}{9} (-3)^{n-1} \quad \text{for } n \geq 1$$

- d) write a recursive formula for a_n

$$\begin{cases} a_0 = \frac{1}{9} \\ a_n = -3a_{n-1} \quad \text{for } n \geq 1 \end{cases}$$