

1)) (3 points each) Label the following as either inductive or deductive reasoning and explain why:

a) My aunt always only calls me on Sunday.
Today is Friday. My aunt will not call me today.

*deductive
- based on rule*

b) The last four times I went grocery shopping, it was busy. The next time I go, it will also be busy.

*inductive
- based on observation*

2) (3 points each) In the following number patterns, write the most likely next number/equation:

a) -2, 8, -32, 128, _____

-512

b) -7, -2, 3, 8 _____

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c) 12, 20, 30, 42, _____

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$$\begin{array}{cccc} & & & 14 \\ & & \swarrow & \searrow \\ & 8 & & 12 \\ & \swarrow & & \searrow \\ & 2 & & 2 \end{array}$$

d)

$1 = 1^2$
 $1 + 3 = 2^2$
 $1 + 3 + 5 = 3^2$
 $1 + 3 + 5 + 7 = 4^2$

3) (4 points each) Find the following sums:

a) $1 + 3 + 5 + \dots + 501 = 251^2 = 63001$
 $2n - 1 = 501$
 $2n = 502$
 $n = 251$

b) $1 + 2 + 3 + 4 + \dots + 630$
 $n = 630$
 $= \frac{630(630+1)}{2} = 198,765$

c) $400 + 401 + 402 + \dots + 630$

Take out $1 + 2 + 3 + \dots + 399$

$$\frac{399(399+1)}{2} = 79,800$$

$$\begin{array}{r} 198,765 \\ - 79,800 \\ \hline 118,965 \end{array}$$

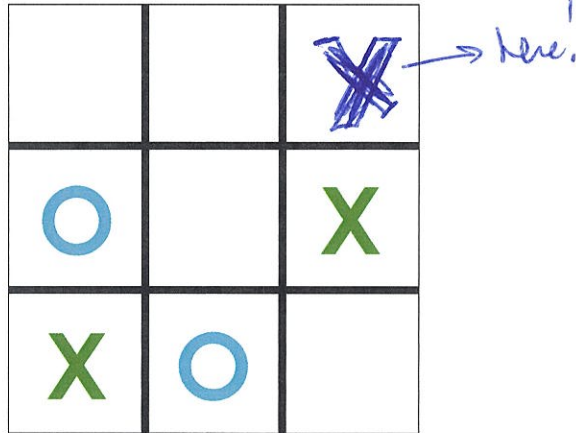
4) (5 points) Find the sum $a + b + c + d$ where:

$$\begin{array}{r} 8 \quad c \quad \cancel{6} \quad 1 \quad 2 \\ - \quad d \quad 2 \quad 1 \quad a \\ \hline 5 \quad 6 \quad b \quad 7 \end{array}$$

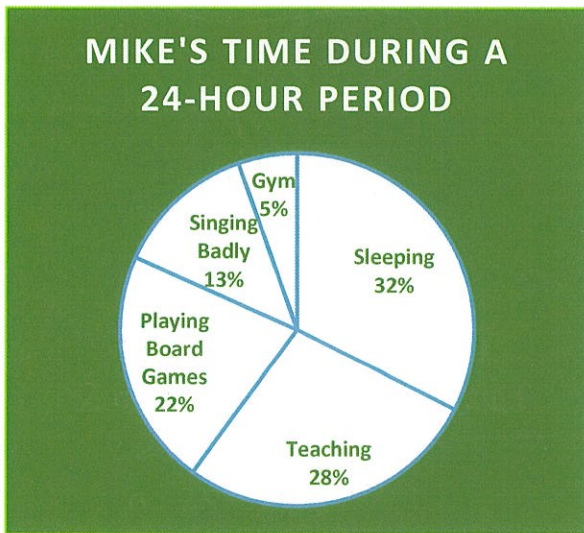
$a = \underline{5}$
 $b = \underline{4}$
 $c = \underline{8}$
 $d = \underline{3}$
 SUM: 20

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5) (3 points) Where should the X's move next to guarantee victory?



6) (3 points each) Using the chart below, answer the following questions. Round answers to one decimal place:



a) How many hours does Mike sleep during the 24-hour period?

$$32\% \text{ of } 24$$

$$0.32 \cdot 24 = \boxed{7.68 \text{ hours}}$$

b) How many more hours does Mike play board games than he does going to the gym?

$$(22 - 5\%) \text{ of } 24 = \boxed{4.08 \text{ hrs}}$$

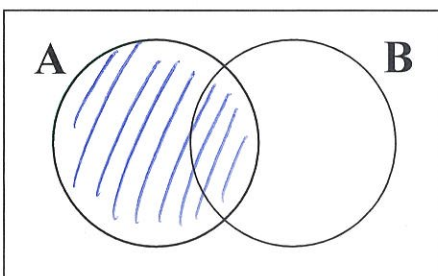
7) (3 points) Write in set-builder notation: {tulip, rose, lily, gerbera, ...}

$$\{x \mid x \text{ is a flower}\}$$

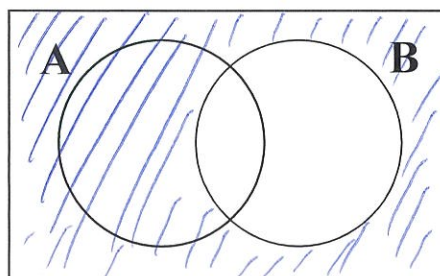
8) (3 points) Write in roster notation: {x | x is a pizza topping}

$$\{\text{prosciutto, mushrooms, cheese...}\}$$

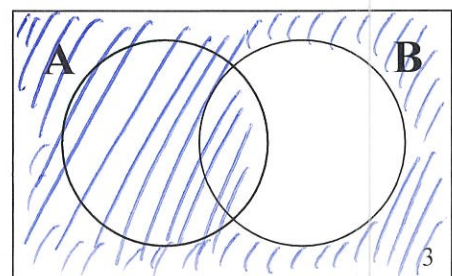
9) (4 points) Shade in the Venn Diagram representation for $A \cup B'$. Be sure to mark which one is the final answer:



A



B'



$A \cup B'$

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For numbers 10 – 12, use the following:

$$U = \{1, 2, 3, 4, \dots, 10\} \quad A = \{2, 4, 6\} \quad B = \{x \mid x \text{ is a multiple of } 3\}$$

$\{3, 6, 9\}$

10) (3 points each) Use the symbol \in or \notin below:

a) $5 \notin A$

b) $9 \in A'$

c) $27 \notin B$

11) (3 points each) Use the symbol \subseteq or $\not\subseteq$ below:

a) $\{3, 6\} \subseteq B$

b) $\emptyset \subseteq B$

c) $\{2, 6\} \not\subseteq A \cap B$

12) (4 points each) List the elements of the following sets:

a) $A \cup B$:

$\{2, 3, 4, 6, 9\}$

b) $A' \cap B'$:

$A' = \{1, 3, 5, 7, 8, 9, 10\}$

$B' = \{1, 2, 4, 5, 7, 8, 10\}$

$A' \cap B' = \{1, 5, 7, 8, 10\}$

c) $(A \cup B)'$:

$\{1, 5, 7, 8, 10\}$

d) The subsets of set A :

$\{2, 4, 6\}$

$\{2, 4\}$

$\{2\}$

\emptyset

$\{4, 6\}$

$\{4\}$

$\{2, 6\}$

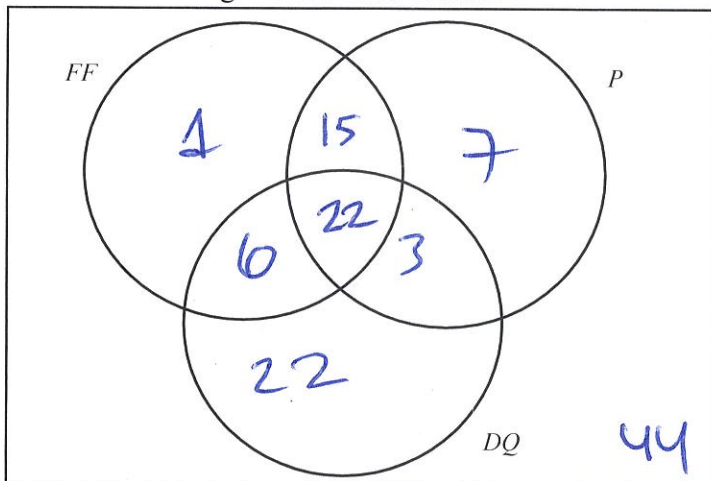
$\{6\}$

13) 120 customers at a video game store were surveyed on which role-playing series they've played before. The results are below:

44 played *Final Fantasy* 47 played *Persona* 53 played *Dragon Quest*
 37 played *Final Fantasy* and *Persona* 28 played *Final Fantasy* and *Dragon Quest*
 25 played *Persona* and *Dragon Quest* 22 played all three

Given this information, find the following. **BE SURE SHOW THE NUMBERS YOU ARE ADDING TO GET YOUR ANSWER:**

a) (6 points) The corresponding Venn Diagram and label circles.



b) (2 points) How many people played exactly two series?

$15 + 6 + 3 = 24$

c) (2 points) How many played *Final Fantasy* and *Persona* but not *Dragon Quest*?

$1 + 15 + 7 = 23$

d) (2 points) How many played at most one of these series?

$1 + 7 + 22 + 44 = 74$

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