

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

a) I get paid every other Friday. I was paid last Friday. I will not be paid this Friday.

↳ rule

deductive - conclusion based on rule

b) The last two Fridays I was paid. Therefore, I will be paid this Friday.

↳ observation

inductive - conclusion based on observation

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

a) -10, -6, -2, 2, 6, 10, _____

$\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$
 $+4$ $+4$ $+4$ $+4$ $+4$

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b) 8, 4, 2, 1, _____

$\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$
 $\cdot \frac{1}{2}$ $\cdot \frac{1}{2}$ $\cdot \frac{1}{2}$ $\cdot \frac{1}{2}$

$\frac{1}{2}$

c) 2, 7, 15, 26, 40, _____

$\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$
 5 8 11 14 17
 $\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$ $\underbrace{\quad}$
 3 3 3 3

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d) $1^2 + 2 = 2^2 - 1$

$$2^2 + 3 = 3^2 - 2$$

$$3^2 + 4 = 4^2 - 3$$

$$4^2 + 5 = 5^2 - 4$$

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

a) $1+3+5+7+\dots+997$

$$2n-1 = 997 \Rightarrow n = 499$$

$$1+3+5+7+\dots+997 = 499^2 = 249,001$$

b) $1+2+3+4+\dots+5,000$

$$= \frac{5000(5000+1)}{2}$$

$$= 12,502,500$$

c) $500+501+502+\dots+5,000$

$$1+2+3+4+\dots+499 = \frac{499(499+1)}{2} = 124,750$$

$$12,502,500 - 124,750 = 12,377,750$$

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

$$\begin{array}{r}
 8^4 \quad 11^c \quad 8^7 \quad 13 \\
 - \quad d \quad 5 \quad 2 \quad a \\
 \hline
 2 \quad 6 \quad b \quad 6
 \end{array}$$

$$a = 7$$

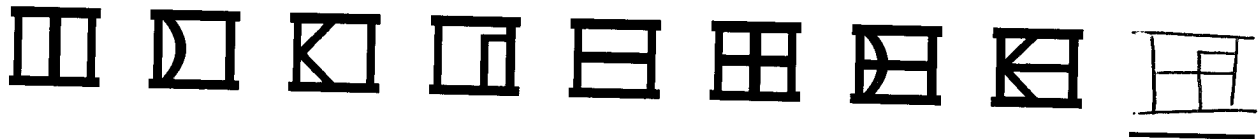
$$b = 5$$

$$c = 1$$

$$d = 2$$

$$\hline 15$$

5) (4 points) Draw the next symbol in the sequence:



6) (3 points) Write in set-builder notation: {France, Germany, Italy, Spain,...}:

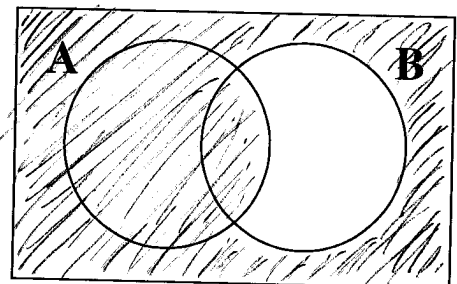
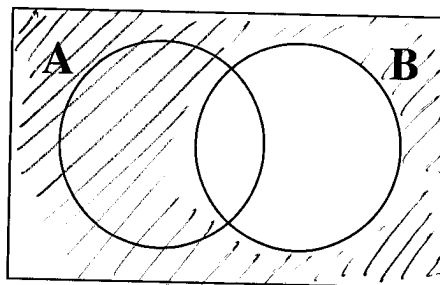
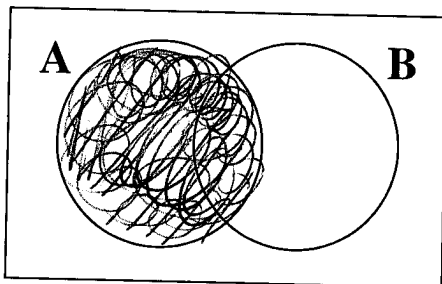
$$\{x \mid x \text{ is an European country}\}$$

7) (3 points) Write in roster notation: {x | x is an animal}

$$\{\text{dog, cat, hamster, cows, ...}\}$$

? need!

8) (4 points) Shade in the Venn Diagram representation for $A \cup B'$. Be sure to mark which one is the final answer:



$$A \cup B' = A \cup B'$$

For numbers 9 – 11, use the following:

$$U = \{a, b, c, d, e, f, g, h, i, j\}, A = \{a, b, c\} B = \{x \mid x \text{ is a vowel}\}$$

9) (3 points each) Use the symbol \in or \notin below:

a) $a \in A$

b) $d \in A'$

c) $u \notin B$

10) (3 points each) Use the symbol \subseteq or $\not\subseteq$ below:

a) $\{a, e\} \subseteq B$

b) $\{d, e\} \not\subseteq B'$

c) $\emptyset \subseteq A$

11) (4 points each) List the elements of the following sets:

a) $A \cap B:$
 $\{a, e, i\}$

b) $A' \cup B':$
 $\{d, e, f, g, h, i\} \cup \{b, c, d, f, g, h\}$

$\{a\}$

$\{b, c, d, e, f, g, h, i\}$

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

$\{a\}' =$

$\{b, c, d, e, f, g, h, i\}$

d) The subsets of set A:

$\{a, b, c\}$

$\{a, b\}$

$\{a, c\}$

$\{b, c\}$

$\{a\}$

$\{b\}$

$\{c\}$

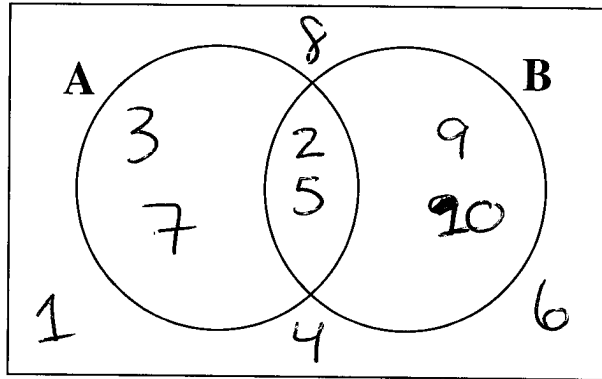
\emptyset

12) (4 points) Fill in the Venn Diagram with the appropriate numbers:

$$U = \{1, 2, 3, \dots, 10\}$$

$$A = \{x \mid x \text{ is prime}\}$$

$$B = \{2, 5, 9, 10\}$$

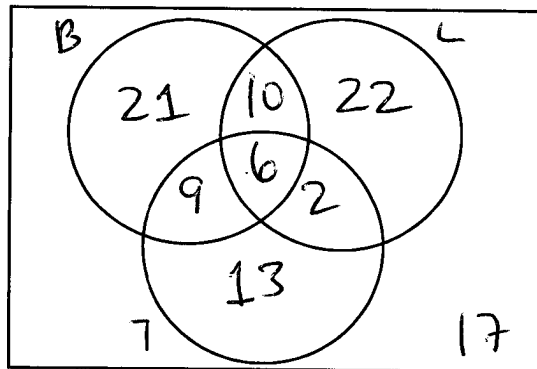


13) 100 people were surveyed on what addition(s) they like on their burgers. The results are below:

- 46 people like Bacon
- 40 like Lettuce
- 30 like Tomato
- 16 like Bacon and Lettuce
- 15 like Bacon and Tomato
- 8 like Lettuce and Tomato
- 6 like all three

Given this information, find...

a) (5 points) The corresponding Venn Diagram. Be sure to label **EVERYTHING AND SHOW THE NUMBERS YOU ARE ADDING TO GET YOUR ANSWER:**



b) (3 points) How many people like either Lettuce or Tomato but not Bacon?

$$22 + 2 + 13 = 37$$

c) (3 points) How many people only like Bacon?

$$21$$

d) (3 points) How many people do not like Lettuce nor Tomato?

$$21 + 17 = 38$$

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