1) (3 points each) Label the following as either inductive or deductive reasoning and explain why:
a) I go grocery shopping on Saturdays. Today is Thursday. Thus, I will not go grocery shopping.

$$Deductive \quad general \rightarrow specific$$

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

$$Inductive \quad specific \rightarrow general$$

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

a) $-12, -6, 0, 6, 12,$ (18)

$+6$

b) $8, 4, 2, 1,$ ($1/2$)

$\times \frac{1}{2}$

c) $2, 7, 15, 26, 40,$ (57)

$5 \quad 8 \quad 11 \quad 14 \quad 17$

$3 \quad 3 \quad 3 \quad 3$

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

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

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

$\boxed{4^2 + 5 = 5^2 - 4}$

3) (4 points each) Find the following sums:
a) $1 + 3 + 5 + 7 + ... + 123$

odds only

$2n - 1 = 123$

$2n = 124$

$n = 62$

sum:
$62^2 = 3844$

b) $1 + 2 + 3 + 4 + ... + 156$

$n = 156$

Sum:
$\frac{156(156+1)}{2} = \boxed{12246}$

even
odd

c) $70 + 71 + 72 + ... + 156$

Remove $1 + 2 + 3 + ... + 69$

$= \frac{69(69+1)}{2} = 2415$

ANS: $12,246 - 2415 = \boxed{9831}$

$\frac{2}{30}$

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

$$\begin{array}{ccccc} 7^6 & c & 7^6 & {}^1 4 \\ - & d & 5 & 2 & a \\ \hline & 2 & 6 & b & 6 \end{array}$$

$a =$ ___8___
$b =$ ___4___
$c =$ ___1___
$d =$ ___4___
SUM: ___17___

5) (3 points) Draw the next symbol in the sequence:

6) Consider the chart below. If there were 2,100,000 phones sold in Quarter 4 of last year, how many more phones were sold by Talk to Me than by Connect2U?

| Manufacturer | Market Share in Q4 |
|---|---|
| Talk to Me | 36% |
| Tin Can and String | 27% |
| Connect2U | 21% |
| Pineapple | 16% |

$(0.36 - 0.21) \cdot 2,100,000$

$= 315,000$ more phones

7) (3 points) Write in set-builder notation: {France, Germany, Italy, Spain,...} :

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

8) (3 points) Write in roster notation: $\{x \mid x \text{ is an animal}\}$
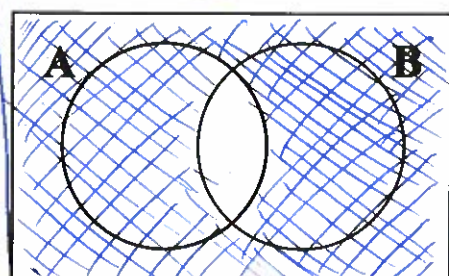
$\{dog, rooster, red panda, ...\}$

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'∪B'

3

24
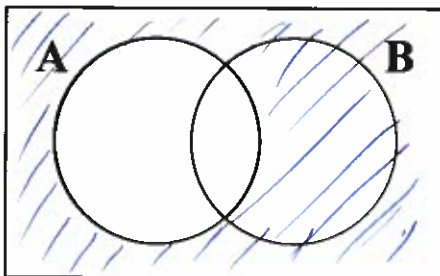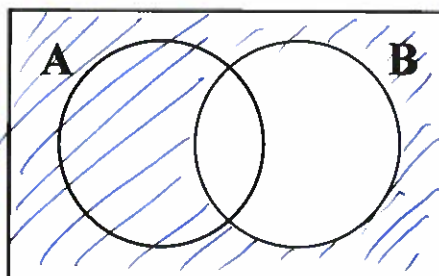
For numbers 10 – 12, use the following:

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

{a, e, i}

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

a) $a \underline{\notin} A$        b) $e \underline{\notin} A'$        c) $u \underline{\notin} B$

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

a) $\{a, e\} \underline{\subseteq} B$        b) $\{h, i\} \underline{\subseteq} A'$        c) $\varnothing \underline{\subseteq} A$

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

a) $A \cap B$:

$$= \{e\}$$

b) $A' \cup B'$:

$A' = \{a, b, c, g, h, i, j\}$

$B' = \{b, c, d, f, g, h, j\}$

$A' \cup B' = \{a, b, c, d, f, g, h, i, j\}$

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

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

d) The subsets of set $A$:

$\{d, e, f\}$   $\{d, e\}$   $\{d\}$   $\varnothing$

$\{d, f\}$   $\{e\}$

$\{e, f\}$   $\{f\}$

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

3 like 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.
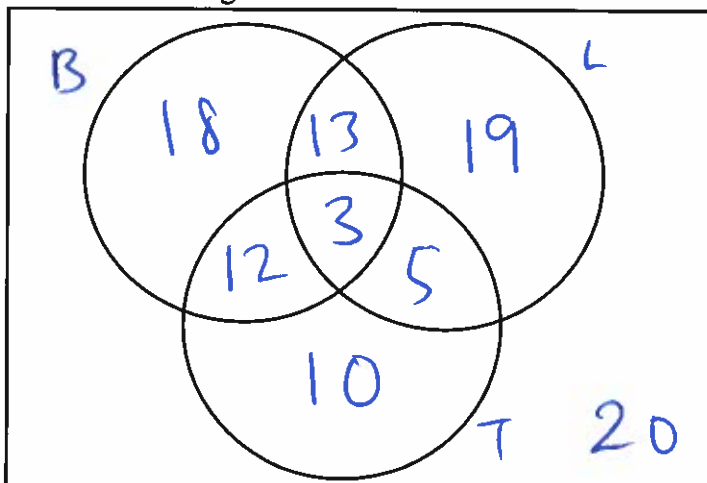


b) (2 points) How many people like either Lettuce or Tomato but not Bacon?

$$19 + 5 + 10 = \boxed{34}$$

c) (2 points) How many people only like Bacon?

$$\boxed{18}$$

d) (2 points) How many people do not like Lettuce nor Tomato?

$$18 + 20 = \boxed{38}$$

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