

T101 CHAPTER 2 REVIEW**Last edit SP10**

This worksheet is a review only. It is not meant a sample test. Other questions are possible.

REVIEW ALL HOMEWORK, CLASS NOTES, TEXTBOOK SECTIONS, QUIZZES, ETC.

- 1) Rewrite the statement using mathematical symbols:
The set consisting of the elements k and x is a proper subset of {k, b, d, x, u}.
- 2) Write TRUE or FALSE
 - a. $A \cup \bar{A} = U$
 - b. $27 \notin \{x \mid x = 3^n \text{ and } n \in N\}$
 - c. If $A \sim B$, then $A = B$.
 - d. If $A \subseteq B$, then $A \subset B$.
 - e. $A \subseteq A$
 - f. $A \cap \emptyset \neq A$
 - g. $1 \in \{1, 2, 3, 4, 5\}$
 - h. If $n(A) < n(B)$, then $A \subset B$?
 - i. For all sets A and B, if $A \sim B$ then $A = B$.
 - j. If $A \cup B = B$, then $A \subseteq B$.
 - k. If $A \subseteq B$ and $B \subseteq C$, then $A \subseteq C$.
 - l. $A \cup \emptyset = A \cap \emptyset$
- 3) Write {2, 4, 6, 8} using set-builder notation.
- 4) $A = \{x \mid x \in N \text{ and } 13 \leq x \leq 24\}$, Find $n(A)$
- 5) Given: $A = \{x \mid x \in N \text{ and } 8 \leq x < 25\}$.
Find $n(A)$.
- 6) Indicate which symbol, \in or \notin , makes the statement true.
 - a. $\emptyset _ \emptyset$
 - b. $\{4\} _ \{1, 2, 3, \dots, 10\}$
 - c. $81 _ \{x \mid x = 3^n \text{ and } n \in N\}$
- 7) A is the set of all the letters of the alphabet and B is the set of vowels. What kind of relationship exists between the two sets? Also, if C is the set of consonants what is the relationship between B and C?
(Use $\cup, \cap, \emptyset, \subseteq, \subset, \sim$, or other set notation where necessary)
- 8) If $U = \{a, b, c, d\}$, $A = \{a, b, c\}$, $B = \{b, c\}$ and $C = \{d\}$, find each of the following:
 - a. $A \cup B$
 - b. $A \cap B$
 - c. $(C \cup B) \cap A$
- 9) Given $U = \{l, u, k, e, w, a, r, m\}$ $A = \{r, e, a, l\}$
 $B = \{r, a, k, e\}$ $C = \{l, e, a, r\}$
 $D = \{w, e, a, k\}$ $E = \{a, r, e\}$
 - a. Is $C \subseteq E$?
 - b. Is $A \subset C$?
 - c. Is $C \sim B$?
 - d. Find $n(D \cup B)$.
 - e. Find $B \cap C$.
 - f. Find $D \cup A$.
- 10) Is the set of multiples of 5 between 1 and 100 well-defined?
- 11) Is the set of good software packages in the market well-defined?
- 12) Find the first 5 terms of a sequence whose nth term is: $a_n = 2n^2 - 1$
- 13) $P = \left\{ \begin{matrix} a, b, c, \\ d, e, f \end{matrix} \right\}$.
How many subsets of the set P can be made?
- 14) How many proper subsets does the set $K = \{k, i, t, c, h, e, n, s\}$ have?
Express your answer as a natural number.
- 15) List all subsets of the set $B = \{b, a, m\}$
- 16) Given that $n(P) = 10$ and $P \subset Q$, what is the least number of elements that set Q can have?
- 17) Given: $P \subseteq Q$
 - a. If $n(Q) = 7$, what is the maximum possible number of elements in P?
 - b. If $n(Q) = 7$, what is the minimum possible number of elements in P?
- 18) $n(A) = 27$ $n(B) = 6$
Find $n(A \times B)$.
- 19) $A = \{3, 2, 7, 6\}$
 $B = \{0, 1\}$
Find $B \times A$.
- 20) Given: $A = \{\infty, \bullet\}$ and $B = \{A, B, C\}$
Find $B \times A$

Convert the numeral to Hindu-Arabic form.

21) 

22) 

23) Convert the numeral to Egyptian form: 620

24) Convert the numeral to Egyptian form.: 1,100

25) Convert the numeral to Hindu-Arabic form.

- a. $\overline{\text{VMMDX}}$
- b. XLV

26) Write the numeral as a Roman numeral.

- a. 842
- b. 13,303

27) Convert the numeral to a numeral in base 10.

- a. $6T^9$ twelve
- b. 672 eight
- c. 26 seven

28) Convert the decimal form numeral to a numeral in the base indicated.

- a. 503 to base 8
- b. 503 to base 5
- c. 2874 to base 9

29) Convert each of the following to number as indicated.

- a. 1, 021, 235 (to Egyptian)
- b. 24, 069 (to Roman)
- c. 59 (to Base 3)
- d. 4, 873 (to Base 12)

30) Write each of the following as a Hindu Arabic (Base 10) number.

- a. MMCDXLIII
- b. 1 524 *six*
- c. 101 111 *two*

31) What is the value of the digit 3 in the number 301,475?

32) What is the value of the digit 4 in the number 475 eight?

33) Write the **value** of the underlined digit.

Simplify to a natural number.

- a. $\underline{1}4,857$
- b. $\underline{5}174$ *eight*

34) What base would make the equation true?

- a. $32 = 44$ _____
- b. $31_{\text{four}} = 11$ _____

35) Write the first 10 counting numbers in base 3.

36) Write the first 10 counting numbers in base four.

37) Write the number in expanded notation using powers of the base indicated:

- a. $787,517$
- b. $4,513$ six

38) Write each of the following in expanded form using powers of the base indicated:

- a. 215,604
- b. 8703 *nine*

39) Simplify the following to a natural number.

$$(7 \times 10^6) + (8 \times 10^4) + (6 \times 10^3) + (3 \times 10^1)$$

40) List the numbers that precede and succeed the given number in the given base.

- a. $3,246$ seven
- b. 68 nine
- c. 34 five

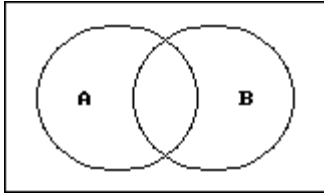
41) Write the smallest 4-digit number in base five

42) Jake is doing some chores for his father. He takes 50 minutes to clean the garage, 30 minutes to mow the lawn, and 130 minutes to trim the hedges. How much time, expressed in hours and minutes, did he spend working?

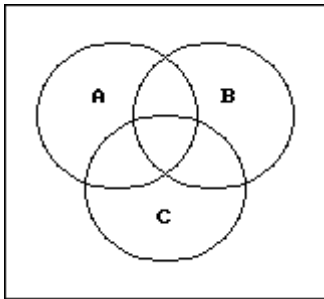
43) If B is the set of students who play basketball and H is the set of students who play hockey, how would you describe $B \cap H$?

- 44) If $U = \{x \mid x \text{ is all women}\}$ and
 $D = \{x \mid x \text{ is women with dyed hair}\}$ and
 $S = \{x \mid x \text{ is women who smoke}\}$
 then describe, in simplest terms and IN WORDS ONLY, what each of the following would be:
- $S \cap \overline{D}$
 - $D - S$

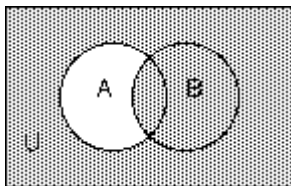
- 45) Shade the portion of the diagram that represents the given set.
- $\overline{B} \cap \overline{A}$



- $(A - \overline{B}) \cup \overline{C}$



- 46) Use set notation to identify the shaded region



- 47) Let $n(U) = 45$, $n(A) = 20$, $n(A \cap B) = 8$, and $n(\overline{A \cup B}) = 10$
- Construct a Venn Diagram.
 - What is $n(B)$?

- 48) Monticello residents were surveyed concerning their preferences for candidates Moore and Allen in an upcoming election. Of the 800 respondents, 300 support neither Moore nor Allen, 100 support both Moore and Allen, and 250 support only Moore. How many residents support Moore or Allen?

- 49) A survey of 160 families showed that:
- 59 had a dog;
 - 26 had a cat and a parakeet;
 - 46 had a cat;
 - 20 had only a dog
 - 19 had a dog and a cat;
 - 3 had a cat and dog and a parakeet
 - 57 had neither a cat nor a dog nor a parakeet;
- Draw a complete Venn Diagram
 - How many had a parakeet only?
 - How had exactly two of these types of pets?

- 50) A survey of 220 families showed that:
- 83 had a dog;
 - 64 had a cat;
 - 28 had a dog and a cat;
 - 84 had neither a cat nor a dog nor a parakeet;
 - 6 had a cat and dog and a parakeet.
- How many had a parakeet only?

Answer Key

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- 1) $\{k, x\} \subset \{k, b, d, x, u\}$
- 2) a. True b. False
 c. False d. False
 e. True f. True
 g. True h. False
 i. False j. True
 k. True l. False
- 3) $\{x|x \text{ is an even natural number less than } 10\}$
- 4) 12
- 5) 17
- 6) a. \notin b. \notin c. \in
- 7) $B \subset A$ or $B \subset A$
 $B \cap C = \emptyset$ or $B \cup C = A$
- 8) a. $\{a, b, c\}$ or A
 b. $\{b, c\}$
 c. $\{b, c\}$
- 9) a. no b. no
 c. yes d. 5
 e. $\{r, a, e\}$
 f. $\{w, e, a, k, r, l\}$
- 10) Yes, you can list the elements.
- 11) No, since "good" is a subjective term.
- 12) 1, 7, 17, 31, 49
- 13) 64
- 14) 255
- 15) \emptyset , $\{b\}$, $\{a\}$, $\{m\}$, $\{b,a\}$, $\{b,m\}$, $\{a,m\}$, $\{b,a,m\}$
- 16) 11
- 17) a. 7 b. 0
- 18) 162
- 19) $\{(0, 3), (0, 2), (0, 7), (0, 6), \}$
 $\{(1, 3), (1, 2), (1, 7), (1, 6) \}$
 $\{(A, \infty), (A, \bullet), \}$
 $\{(B, \infty), (B, \bullet), \}$
- 20) $\{(C, \infty), (C, \bullet) \}$
- 21) 3067
- 22) 62,000
- 23) 9999999000
- 24) 19
- 25) a. 7510 b. 45
- 26) a. DCCCXLII
 b. \overline{X} MMMCCCIII
- 27) a. 993 b. 442 c. 20
- 28) a. 767_{eight}
 b. 4003_{five}
 c. 3843_{nine}
- 29) a. Image not available
 b. \overline{XXIV} LXIX
 c. 2012_{three}
 d. 29T1_{twelve}
- 30) a. 2443 b. 412 c. 47
- 31) 300,000
- 32) 256
- 33) a. 4000 b. 2560
- 34) a. seven b. twelve
- 35) [1, 2, 10, 11, 12, 20, 21, 22, 100, 101]_{three}
- 36) [1, 2, 3, 10, 11, 12, 13, 20, 21, 22] _{four}
- 37) a. $(7 \times 10^5) + (8 \times 10^4) + (7 \times 10^3) + (5 \times 10^2) + (1 \times 10^1) + (7 \times 10^0)$
 b. $(4 \times 6^3) + (5 \times 6^2) + (1 \times 6^1) + (3 \times 6^0)$
- 38) a. $(2 \cdot 10^5) + (1 \cdot 10^4) + (5 \cdot 10^3) + (6 \cdot 10^2) + (0 \cdot 10^1) + (4 \cdot 10^0)$
 b. $(8 \cdot 9^3) + (7 \cdot 9^2) + (0 \cdot 9^1) + (3 \cdot 9^0)$
- 39) 7,086,030
- 40) a. 3,245_{seven}; 3,250_{seven}
 b. 67_{nine}; 70_{nine}
 c. 33_{five}; 40_{five}
- 41) 1000_{five}
- 42) 3 hr and 30 min
- 43) $B \cap H$ is the set of students who play both basketball and hockey.
- 44) a. Women who smoke and don't dye their hair.
 b. Women who dye their have, but don't smoke.
- 45) a. Only region 1
 b. Regions 1,2,3,4,6
- 46) $\overline{A} \cup B$ or $\overline{A} \cup (A \cap B)$
- 47) b. 23
- 48) 500
- 49) a. Image not available
 b. 17
 c. 59
- 50) 17