MA171 FINAL EXAM REVIEW PACKET

- 1. Angelique began an exercise program in which she walked four blocks the first day and then two blocks more than the previous day for each of the two-week period. How many blocks had she walked during the two week period all together?
- 2. I am thinking of a number. If I subtract 7, multiply the result by 5, and then add 25, I get 80. What is the number?
- 3. Josh and Jared earned the same amount of money, although one worked 2 more days than the other. Josh earns \$15 a day and Jared earns \$18 a day. How many days did each work?
- 4. Answer the following questions:
 - a. Is the sequence 3, 1, 5, 9, 13, 17, 21, 25, ... arithmetic or geometric? Explain your reasoning.
 - b. Determine a formula to find the nth term of the sequence.
 - c. Use your formula to find the 25th term of the sequence.
- 5. Find the next two terms of each sequence below:
 - a. 3, 5, 9, 15, 23, _____, ____

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- 6. Write the contrapositive of the following statement: *If today is my birthday, then I will have* cake.
- 7. If p is true and q is false, determine the truth value of the following statement. Please show work demonstrating how you arrive at your answer.

$$(\sim p \leftrightarrow q) \land (p \lor q)$$

- 8. Determine the truth value of each statement. Please show work demonstrating how you arrive at your answer.
 - a. 0 * 12 = 0 and 2 + 3 = 6
 - b. If 13 is an even number, then 12 2 = 0.
- 9. Determine if the following arguments are valid or not. Support your decisions using either an Euler diagram or symbolic logic (or the rule used).
 - a. Hypothesis: If I go to the gym then I can't go to the movies. Conclusion: If I go to the movies, then I didn't go to the gym.
 - b. Hypothesis: Some dogs have fur. No lizards are dogs. Conclusion: Therefore, no lizards have fur.

☆ ☆ ☆ ☆ 10. Determine the number that immediately follows each of the following numbers. ☆ a. 112_{three} ☆ ☆ ☆ ☆ b. 2031_{four} ☆ ☆ ☆ ☆ ☆ c. 10011_{two} ☆ ☆ ☆ ☆ ☆ 11. Write each of the following in the indicated base. ☆ a. 2031_{*four*} to base 10. ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ b. Convert 371 to base 6. ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ 12. List all the subsets of the set {4, 5}. ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ 13. Let $A = \{a, b\}$ and $B = \{1, 2, 3\}$. Find $A \times B$. ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ Revised May 2017 by Kathryn Field ****

- 14. A survey of 185 students produced the following results: 90 liked *Shrek*, 96 like *Toy Story*, 70 liked Monster Inc., 33 liked Shrek and Toy Story, 30 liked Shrek and Monsters Inc., 43 liked Toy Story and Monsters Inc., and 15 liked all three.
 - a. Complete the following Venn diagram to illustrate this information.



Find the number of students who:

b. Like none of the movies listed

c. Like *Monsters, Inc.*, but not like *Shrek* or *Toy Story_____*

d. Like exactly one of the movies listed _____

e. Do not like *Toy Story*_____

15. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$ $A = \{2, 4, 6, 8, 10, 12, 14\}$ $B = \{1, 4, 7, 12, 14\}$ C = {1, 2, 3, 4, 5, 6, 7, 8}. Determine the following: a. *A* ∩ *B* ______

- b. *A C* _____
- c. Ā_____
- d. $(\overline{A} \cap C) \cup B$ _____
- e. *n*(*B*)_____

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-	16. Classify the following as true or false, where A and B are any two sets.	ע ר
-	a \emptyset is equal to $\{\emptyset\}$	۲ ح
	b If A and B are two sets then either $A \subseteq B$ or $B \subseteq A$ a; lksdf	2 2
	c {!, @, #, \$} is equivalent to $\{\%, \&, *\}$	
	d $A \subseteq B$ means that $A \subseteq B$	☆
	e I ne set { $\alpha, \beta, \gamma, 0,, \psi, \omega$ } (the Greek alphabet) is inite f	☆
	$f_{\alpha} = \{x \mid x \text{ is a terrer in the alphabet}\} = \{u, b, c, \dots, x, y, z\}$	ਮ ਨੂ
	h. If $5 \in A \cap B$ then $5 \in A$ and $5 \in B$	☆
	i If $n(A) = 3$ and $n(B) = 2$ then $n(A \times B) = 5$	\$
	j $A \cap U = \overline{A}$	☆ ~
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	17. Illustrate mental calculating the following by using breaking up and bridging.	$\stackrel{\sim}{\star}$
	82 + 59 =	☆
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		$\stackrel{\sim}{\star}$
	19 Derform the following operations using the indicated method	☆
	$3 - 938 \pm 324$ left to right method	☆
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	b. 5023 – 869 equal additions method	द्र •
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	$a = (0.4 \times 50 \text{ lattice method})$	\ \ \}
	c. 604 × 59 factice method (Be sure to write your final answer clearly:)	$\stackrel{\sim}{\Delta}$
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		ਕ ਨ
	d. $2813 \div 9$ repeated subtraction	$\stackrel{\sim}{\Delta}$
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	19. Illustrate estimating the following quotient using compatible numbers.	\bigstar
	3592 ÷ 58	\$
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 $\frac{1}{2} \stackrel{1}{2} \stackrel{1}$

☆ ☆ ☆ 20. Determine each of the following:

a.	3201 _{four} –	- 312 _{four}	=
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b. $2031_{four} \times 32_{four} =$ _____

c. $2013_{four} + 1302_{four} =$ _____

21. Divide: $101001_{two} \div 11_{two} =$

22. Determine whether the following relation is reflexive, symmetric, or transitive. Justify your answer for each case.

 $\{(a, a), (a, b), (a, c), (b, b), (b, c), (c, a), (c, b), (c, c)\}$ a. Reflexive: Yes / No Explanation:

b. Symmetric: Yes / No Explanation

c. Transitive: Yes / No Explanation

23. Determine if the following relation represents a function. Justify your answer. $\{(l, 12), (m, 10), (k, 12), (l, 1), (d, 4)\}$

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24. Is the set {1, 2, 3, 5, 8, 13, 21,	} closed under addition? Justify your response.
25. Given the following function and range. $\{(b, 2), (e, 5), (z, 26), (a, 1), (a, 1), (a, 1), (b, 2), (c, 5), (c, 26), (a, 1), (c, 2), (c, 2$	a, find a rule to describe the function, then determine the dom [x, 24)] [x, 24] [x, 2
then. How old are Xander an	nd Ynez now?
27. Given that $f(x) = 5x - 12$ a a. $(f \circ g)(-2)$ b. $(g \circ g)(5)$	nd $g(x) = -8x$ determine the following:
28. The variables a, b, c, and d eause the properties of additio	ach represent a different whole number. Given that a is not ze
below to determine the value $d + d = h$	es of a, b, c, and d.
u + u = b	a=
$a \times a = a$	b=
$a \times c = c$	c=
d + b = a	d=
29. A student answers the quest the nearest hundred" as 323	tion, "Estimate the product 323×850 by rounding the factors $8 \times 850 = 274,550 \rightarrow 274,600$. How do you respond?
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- en the following function, find a rule to describe the function, then determine the domain range.
 - 2), (e, 5), (z, 26), (a, 1), (x, 24)}
 - a. Rule: _____
 - b. Domain = _____
 - c. Range = _____
- ider is four years older than Ynez. Ten years ago, Xander was 3 times as old as Ynez was n. How old are Xander and Ynez now?

b.
$$(g \circ g)(5)$$

$a \times d = a$	b=
$a \times c = c$	c=
d + b = a	d=

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30. A student claims that (-2) + (-3) = 5 because two negatives make a positive. Demonstrate how you could show this student that the sum is actually -5 by using either the chips method, or a number line.

31. Indicate whether the following statements are true or false.

- a. _____ a + (b + c) = (b + c) + a illustrates the associative property of addition
- b. _____ -|x| + x = 0 if x < 0
- c. _____ 4|84,406
- d. _____ If 2(x-3) = 10, then x = 8
- e. _____ $0 \div 18 = 0$
- f. _____ ($f \circ g$)(x) is always the same as $(g \circ f)(x)$
- g. _____ $0 \div 0 = 0$
- h. _____ Every function is a relation
- _____ Whole numbers are closed under division i.
- j. _____ Zero is the multiplicative inverse
- 32. Rewrite each of the following terms with a single exponent:
 - a. $5^6 \cdot 15^6$
 - b. $3^4 \cdot 3^7$
 - c. $(4^8)^3$
 - d. $11^{22} \div 11^2$
- 33. Express the following using a single, positive exponent:
 - a. $(6^{-2})^7$ b. c. d. $\frac{2^{-9}}{2^{-15}}$

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$\stackrel{\wedge}{\leftarrow}$	24 Determine each of the following:
☆	a. The prime factorization of 504.
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$\stackrel{\sim}{\bigstar}$	\sim
☆	b. The prime factorization of 1900 \wedge
$\stackrel{\times}{\Delta}$	b. The prime factorization of 1090. \bigstar
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☆	c. $GCD(504, 1890)$
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$\stackrel{\sim}{\bigstar}$	$\hat{\mathbf{A}}$
☆	
	d. LCM(504, 1890)
☆	
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$\frac{1}{2}$	
\$	35. Calculate the following:
☆	a. Find GCD (1584, 385) using the Euclidean Algorithm.
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*	b. Find LCM(1584, 385)
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$\stackrel{\sim}{\bigstar}$	$\hat{\mathbf{A}}$
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☆	36. Find all digits which make the following true. Justify your answer with divisibility tests.
☆ ∻	3 257 but 9 ∤ 257
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☆	37. Find two fractions between $\frac{5}{11}$ and $\frac{9}{17}$. Simplify your answers. Justify your answer without
≍ ☆	using decimals. \searrow
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38. Show how to use unit fractions such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, or 1 to estimate the following. Also, indicate the estimated answer written in simplest form.

$$\frac{7}{25} + \frac{9}{37} + \frac{100}{97} + \frac{40}{75}$$

39. Perform the following operations, simplifying all your answers. Show all steps. No credit will be given without work.

a. $12 - 5\frac{4}{9} =$ _____

b.
$$7\frac{3}{5} + 4\frac{2}{3} =$$

c.
$$4\frac{2}{3} \times 5\frac{4}{7} =$$

d.
$$16\frac{4}{15} \div 4 =$$

- 40. A box of candy holds 40 pieces when first opened. The box is now $\frac{2}{5}$ full. How many pieces of candy have been eaten?
- 41. Convert 9.08 to a fraction in simplest form.

42. Perform the following operations. Show all steps. No credit will be given without work.

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$\overrightarrow{\mathbf{x}}$		\$ \$
$\overrightarrow{\mathbf{x}}$		×
	a. $-45 \div (-8 + 3) =$	
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× 		X
\sim	h. $(-5+9) \times (-7-(-4)) =$	
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$\frac{1}{2}$		~ ~
$\frac{1}{2}$		Å
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$\stackrel{\sim}{\mathbf{x}}$	c. $(-9)(2)(11) \div (-6) =$	\$
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☆	d $(9 + (-9)) \div (-7) =$	\bigstar
☆	u: $(0 + (-0)) \div (-7) = _$	\bigstar
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\$		\$
\$	43. Simplify the following. Express your answer in scientific notation.	\$
\$	6×10^{9}	\$
*	$(4 \times 10^2)(3 \times 10^5)$	\$
*	(4×10)(5×10)	\$
$\overrightarrow{\mathbf{x}}$		X
$\overrightarrow{\mathbf{x}}$		X7
		X
× ~	44. Simplify if possible. If not, indicate that radical is not a real number.	X
⊼ ,	a. $\sqrt[3]{432}$	ж ~
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 <u>↓</u>	$h \sqrt{2F}$	Å
$\stackrel{\sim}{\Delta}$	$\mathbf{D}, \mathbf{\gamma} = 23$	$\stackrel{\sim}{\leftarrow}$
☆		$\overleftarrow{\mathbf{x}}$
*		\$
☆	45. The ratio of girls to boys in Miss Melon's kindergarten class is 4 to 6. If there are 12 girls in	\bigstar
☆	the class, determine how many total students are in the kindergarten class.	☆
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*	46. Indicate whether the following statements are true or false:	\$
*	a1 is a prime number.	\$
*		\$
*		\$
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b	Every rational number has an additive inverse.
C	The rational numbers are closed under division.
۵	A number and its multiplicative inverse have opposite signs.
e f	$\frac{2}{2} = 0.67$
1	$\frac{1}{3} = 0.07$
g	1 = 0.9
h	$(-2)^{\overline{4}}$ is real number.
i	$\underline{\qquad }_{5}$ is a rational number.
j	The final is scheduled for Wednesday, May 10 th at 11:30am in AB244.
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\bigstar		a. 20 🖈
*		b. 12
*		c. 89
*		
*	15	u. 85
*	15.	
∑ 		b. {10, 12, 13, 14}
₩ ♣		c. $\{1, 3, 5, 7, 9, 11, 15\}$
\sim		d. $\{1, 3, 4, 5, 7, 12, 14\}$
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*	1/.	
*		a. $80 + 50 = 130, 2 + 9 = 11, 130 + 11 = 141$
*		b. $1200 + 50 + 12 = 1250 + 12 = 1262$
*		c. Add 1; add 30; add 100; Final answer: 154
*		d. 35,636
		e. $312 r 5$ (Processes may vary.)
X 	18 35	$0.0 \div 50 - 70$ (Estimations may vary)
	10. 55	
<u>↓</u>	19.	
\sim		a. 132312 _{four}
\sim		b. 3321 _{four}
		c. $1101_{two} r 10_{two}$
☆ ☆	20. Exp	planations may vary.
$\stackrel{\sim}{\star}$		a. Yes
\bigstar		h No (not all arrows are double-ended)
☆		S. No (no chartcut of $h \rightarrow a$ for $h \rightarrow a \rightarrow a$)
\bigstar	24	c. No (no shortcut of $D \rightarrow u$ for $D \rightarrow c \rightarrow u$)
☆	21. NO	. Explanations may vary.
☆	22. No	. Explanations may vary.
☆	23.	*
☆		a. Wording of rule may vary: The range is the domain's numeric place in the alphabet.
\$		b. $\{b, e, z, a, x\}$
☆		c. $\{2, 5, 26, 1, 24\}$
\$	24. 7ar	nder 16. Ynez 12
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25. a. 60 b. 320 26. $a = 3, b = 2, c = 0, d = 1$ 27. 28. Wording/explanations may vary. 29. a. F b. T c. F d. T e. T f. F 8. F h. T i. F 30. a. $2^3 \cdot 3^2 \cdot 7$ b. 3^{11} c. 4^{24} d. 1^{20} 31. a. $2^3 \cdot 3^2 \cdot 7$ b. $2^3 \cdot 5 \cdot 7$ c. 126 31. a. 11 b. $5, 5,400$ 33. 1and 7 34. $\frac{1}{6} \sqrt{5}, \frac{1}{10}, \frac{3}{10}$ 33. 1and 7 34. $\frac{1}{6} \sqrt{5}, \frac{1}{10}, \frac{3}{10}$ 35. $\frac{1}{10}$ and $\frac{1}{2}$	$\begin{array}{c} \begin{array}{c} \begin{array}{c} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} $	$\bigstar \bigstar \bigstar \bigstar$	*********************************	☆☆
25. a. 68 b. 320 26. $a - 2, c = 0, d = 1$ 27. Explanations may vary. 28. Wording/explanations may vary. 9. a. f b. T c. F d. T c. F d. T c. F d. T c. F d. T e. T f. F g. F h. T i. F j. F	*			$\stackrel{\land}{\sim}$
25. a. 68 b. 30 26. $a = 3, b = 2, c = 0, d = 1$ 27. 28. Wording-explanations may vary. 29. a. F b. T c. F d. T c. 2, 3 ¹ c. 4 ²⁴ d. 11 ²⁰ 31. a. 2 ³ - 3 ² - 7 c. 126 d. 7560 32. a. 11 b. 55, 540 33. 1anT 34. $\frac{1}{6}, \frac{4}{9}, \frac{1}{12}, \frac{2}{3}, \frac{3}{12}, \frac{2}{3}, $				☆ ^
25. a. 68 b. 320 26. $a = 3, b = 2, c = 0, d = 1$ 27. Explanations may vary. 28. Wording/explanations may vary. 29. a. F b. T c. F d. T c. F d. T c. F d. T i. F j. F 30. a. 75 ⁶ b. 3 ¹¹ c. 4 ²⁴ d. 1 ¹²⁰ 31. a. 2 ⁵ , 3 ² , 5 ⁷ , 5 ¹ b. 2 ³ , 5 ² , 7 c. 126 d. 1 ²⁰³ 31. a. 2 ⁴ , 3 ² , 7 b. 2, 2 ³ , 5 ² , 7 c. 126 d. 1 ²⁰³ 31. a. 2 ⁴ , 3 ³ , 7 b. 55,440 33. 1 and 7 34. $\frac{1}{6}, \frac{4}{9}, \frac{1}{12}, \frac{2}{3}, \frac{3}{3}, \frac{5}{15}, \frac{3}{15}, \frac{5}{15}, \frac{3}{15}, \frac{5}{15}, \frac{1}{35}, \frac{5}{15}, \frac{1}{35}, \frac{5}{15}, \frac{1}{35}, \frac{1}{3$	$\overrightarrow{\mathbf{x}}$	25		☆ ^
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