

CENTRAL WISCONSIN MATHEMATICS LEAGUE

Meet II

January 30, 2001

Category II (Algebra)

1. [2 points each](P) *True/False: Indicate whether each of the following statements is true or false by marking the appropriate box on your answer sheet.*

- (a) Every polynomial equation has at least two solutions.
- (b) $(x^6)^3 x^2 = x^{20}$.
- (c) Every complex number is irrational.
- (d) $x^2 + x + 2 = 0$ has no real number solutions.
- (e) $6\sqrt{-3}$ is an example of an imaginary number.

2–5: *Multiple Choice (4 points each). On your answer sheet, mark "X" in the box for the one best choice.*

2. Factor $3x^2 - 19x - 14$.

- (a) $(3x - 7)(x + 2)$
- (b) $(3x - 2)(x + 7)$
- (c) $(3x - 7)(x - 2)$
- (d) $(3x + 2)(x - 7)$
- (e) $3x(x - 19 - 14)$

3. The domain of $\sqrt{x + 2}$ is:

- (a) $(-2, \infty)$
- (b) $[0, \infty)$
- (c) $(-\infty, -2) \cup (2, \infty)$
- (d) $[-2, \infty)$
- (e) $(-2, -\infty)$

4. If $h(x) = 10x + 2x^2$, then $h(-2) =$

- (a) 6
- (b) -6
- (c) -12
- (d) -22
- (e) -28

5. Find the midpoint of the line segment joining $(-3, 1)$ and $(5, -7)$.

- (a) $(-4, 4)$
- (b) $(1, -3)$
- (c) $(-4, -3)$
- (d) $(1, 4)$
- (e) $(2, -6)$

6–9: Multiple Choice (6 points each). On your answer sheet, mark “X” in the box for the one best choice.

6. In the metric system, 5 cm³ is equivalent to:

- (a) 5 cm²
- (b) 50 mL
- (c) 500 mL
- (d) 0.5 dm³
- (e) 0.005 dm³

7. Find the maximum point on the graph of $y = -3x^2 + 12x + 1$.

- (a) (6, -5)
- (b) (-2, -19)
- (c) (2, 13)
- (d) (1, 14)
- (e) (2, 14)

8. Simplify $\frac{\sqrt{x} + \frac{6}{\sqrt{x}}}{\sqrt{x}}$.

- (a) $\frac{6}{\sqrt{x}}$
- (b) $1 + 6\sqrt{x}$
- (c) $\frac{x + 6\sqrt{x}}{x}$
- (d) $\frac{x + 6}{x}$
- (e) $1 - 6\sqrt{x}$

9. Find the distance between the points (-6, 10) and (12, 2).

- (a) $2\sqrt{7}$
- (b) $2\sqrt{97}$
- (c) 10
- (d) $2\sqrt{65}$
- (e) None of these

10–14: Miscellaneous Problems (10 points each). On your answer sheet, write your answer in the blank(s) provided. (P) means that partial credit may be given.

10. Brian has 160 feet of fencing. He will use the fencing to enclose a play area for his puppy. What is the maximum number of square feet he can enclose? *Express your answer to the nearest whole number.*
11. Jennifer puts 14.5% of the monthly rent from a rental property into an account for repairs and maintenance. She wants the annual rent to be at least \$9250 more than repairs and maintenance. What is the minimum number of dollars she needs to charge for monthly rent to accomplish these goals? *Express your answer to the nearest dollar.*
12. Jamie has three investments totaling \$2500 and receives \$212 per year simple interest. Part of the money is invested at 7%, part at 8%, and part at 9%. There is \$1100 less invested at 8% than at 9%. How much is invested at 8%? *Give the exact amount.*
13. Thirty students took an exam on which the passing score was 60. The mean score of those who passed was 75, the mean score of those who failed was 45, and the mean score of all students was 68. How many students passed the exam?
14. Natasha has more than \$1 but less than \$10 worth of dimes. When she puts her dimes in stacks of 3, she has 2 left over. When she put them in stacks of 4, she has 3 left over. When she puts them in stacks of 5, she has 4 left over. How many dimes does Natasha have?

Student's Answer Sheet

Name: _____
PRINT: First Last

School: _____ Code

I participated in Meet I: Yes No

1. *True/False (2 points each). Mark X in the box for the correct answer.*

	True	False
(a)	<input type="checkbox"/>	<input type="checkbox"/>
(b)	<input type="checkbox"/>	<input type="checkbox"/>
(c)	<input type="checkbox"/>	<input type="checkbox"/>
(d)	<input type="checkbox"/>	<input type="checkbox"/>
(e)	<input type="checkbox"/>	<input type="checkbox"/>

2–5: *Multiple Choice (4 points each). Mark X in the box for the one best choice.*

	a	b	c	d	e
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6–9: *Multiple Choice (6 points each). Mark X in the box for the one best choice.*

	a	b	c	d	e
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10–14: *Miscellaneous Problems (10 points each). Write your answer in the blank(s) provided; the boxes at the right are for grading use only. (P) means that partial credit may be given.*

10. _____ square feet	10	
11. _____ dollars	10	
12. \$ _____	10	
13. _____ students passed	10	
14. _____ dimes	10	

FOR GRADING USE ONLY

#1: _____ correct × 2 = _____
 #2–5: _____ correct × 4 = _____
 #6–9: _____ correct × 6 = _____
 #10–14: _____ total = _____

TOTAL SCORE