

Math 200 - Test 2
March 16, 2011

Name _____

Score _____

Show all work to receive full credit. Supply explanations where necessary.

1. (1 point) Which one of these is the greatest 3-digit base-seven number?
 - (a) 100_{seven}
 - (b) 666_{seven}
 - (c) 999_{seven}
 - (d) 777_{seven}

2. (1 point) Given that $n(A \cap B) = 5$ and $n(A \cup B) = 9$, only one of these could possibly be true. Which is it?
 - (a) $n(A) = 4$
 - (b) $n(B) = 9$
 - (c) $n(B) = 3$
 - (d) $n(A) = 14$

3. (1 point) Which one of these illustrates the associative property of addition?
 - (a) $(x + 7) + 3 = 3 + (x + 7)$
 - (b) $5(x + 2) = 5x + 10$
 - (c) $(3x + 8) + (2 + y) = (y + 2) + (3x + 8)$
 - (d) $5 + (b + 3) = (5 + b) + 3$

4. (1 point) Choose the subtraction model that best fits the following problem situation:
The first row of the parking lot contains 9 cars, and the second row contains 5 cars. How many more cars are in the first row?
 - (a) comparison model
 - (b) take-away model
 - (c) set partition model
 - (d) missing addend model

5. (1 point) What is the **value** of the digit 5 in the numeral 4534_{six} ?
 - (a) 36
 - (b) 5
 - (c) 180
 - (d) 500

6. (2 points) Is the following set closed under addition? Explain.

$$\{1, 2, 3, \dots, 20\}$$

7. (2 points) List the three base-eight numbers that follow immediately after 76_{eight} .

8. (3 points) Convert 11011_{two} to base ten.

9. (2 points) Shade the region of a three-set Venn diagram corresponding to $(\overline{A} \cap B) \cup C$.

10. (1 point) Choose the addition model that best fits the following problem situation:
Marie has two pieces of yarn. The first is 6 in long and the second is 7 in long. If she connects them, how long is the new piece of yarn?
- (a) set partition model
 - (b) combination model
 - (c) set model
 - (d) number line model
11. (2 points) Use any algorithm to compute the following sum: $2463_{\text{eight}} + 1546_{\text{eight}}$
- (a) 4231_{eight}
 - (b) 4009_{eight}
 - (c) 4301_{eight}
 - (d) 2057_{eight}
12. (1 point) Let U be the set of all PSC students. Let T be the set of students who drink tea and C be the set of all students who drink coffee. Which one of the following is a description of an element of $\overline{C} - T$?
- (a) a student who drinks coffee but not tea
 - (b) a student who neither drinks coffee nor tea
 - (c) a student who drinks tea but not coffee
 - (d) a student who drinks both coffee and tea
13. (1 point) Choose the multiplication model that best fits the following problem situation:
The desks in the room are arranged in 6 rows with 5 desks in each row. How many desks are there in all?
- (a) Cartesian product model
 - (b) set partition model
 - (c) area/array model
 - (d) repeated addition model
14. (1 point) Let $A = \{x, y, z, \pi, \phi\}$ and $B = \{3, 8, y, \phi\}$. Which one of the following represents $n(B - A)$?
- (a) 2
 - (b) 4
 - (c) 11
 - (d) -2

15. (5 points) 100 people were asked how they obtain their daily news. Here are their responses:

- 49 get their news from printed sources
- 46 get their news from the radio
- 25 get their news from the radio and printed sources
- 28 get their news from the radio and TV
- 35 get their news from TV and printed sources
- 20 get their news from all three sources
- 9 get their news from none of these sources

(a) Use a three-set Venn diagram to organize this information.

(b) How many people get their news from TV?

(c) How many people get their news from exactly one of these sources?

(d) How many people get their news from exactly two of these sources?

16. (3 points) Convert 210 to base three.

17. (4 points) Think about the strategies that we studied for mastering basic addition facts. Of those strategies, use a different one to compute each sum below. Show work or explain your reasoning.

(a) $5 + 4$

(b) $9 + 8$

18. (3 points) Use any of the algorithms we discussed in class, except the standard algorithm, to compute $416 - 168$.

19. (3 points) Use any of the algorithms we discussed in class, except the standard algorithm, to compute $5419 + 1397$.

20. (3 points) Let $A = \{x, y\}$ and $B = \{2, 4\}$.

(a) Determine $A \times B$.

(b) Is it true that $A \times B = B \times A$? Explain.

(c) Determine $B \times \emptyset$.

21. (2 points) Rewrite each expression using the indicated property, and only that property, exactly one time.

(a) *Commutative property of addition:* $x + 8(3 + 1)$

(b) *Associative property of addition:* $(2y + 4) + 6 + (3 + 8x)$

22. (1 point) State the closure property of whole number addition.

23. (3 points) Write a word problem involving multiplication in which the multiplication fact is best described by the Cartesian product model.

24. (2 points) Use the missing addend model to describe how to compute $8 - 3$.

25. (1 point) Explain why 20112_{two} cannot be a correctly written base-two numeral.