



READ THIS NOW!

- Print your name in the space provided below.
- There are 6 short-answer questions, priced as marked. The maximum score is **94**.
- The grading of each question will take into account whether you obtained a correct solution and how well you presented your analysis and justified your logic. In most cases, more weight will be given to the presentation and logic than to whether the solution is fully correct.
- When you have finished, sign the pledge at the bottom of this page and turn in the test.
- This is a closed-book, closed-notes examination.
- No laptops, calculators, cell phones or other electronic devices may be used during this examination.
- Until solutions are posted, you may not discuss this examination with any student who has not taken it.
- Failure to adhere to any of these restrictions is an Honor Code violation.

KEY

Name (Last, First) _____ printed

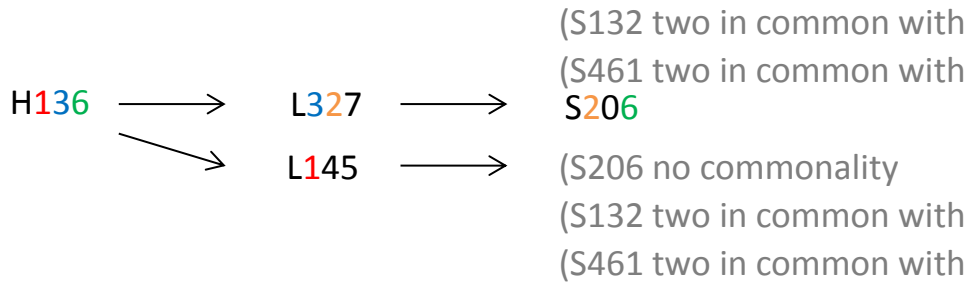
Pledge: On my honor, I have neither given nor received unauthorized aid on this examination.

signed

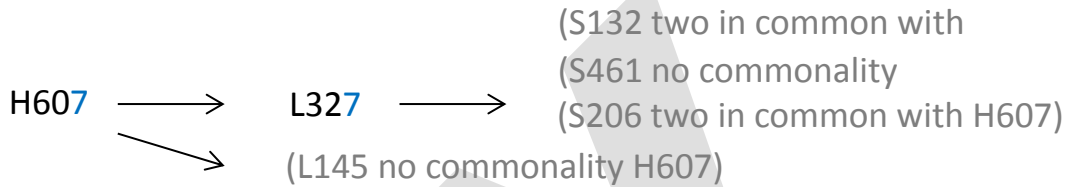
1. [12 points] Charlene, Fiona, and Quinn Parr are currently enrolled in Perez Park College, but because the siblings have landed some exciting internships, their course loads for the fall semester are rather light. Each Parr is taking three of nine courses (two of which—American History 136 and Imperial Japan 607—are history courses, two of which—French 327 and Spanish 145—are language courses, two of which—Calculus 540 and Trigonometry 356—are math courses, and three of which—Biology 206, Chemistry 132, and Physics 461—are science courses). No two Parr siblings are enrolled in the same course. Registration at Perez Park College this semester was a real three-for-all! From the information provided, can you determine the three courses being taken by each student?
- A. One student is taking a history course, a language course, and a science course. One student is enrolled in a history course, a math course, and a science course. One student is taking a language course, a math course, and a science course.
 - B. Each of each student's three courses has exactly one digit in common with each of the other two courses that he or she is taking.
 - C. Quinn isn't enrolled in either Physics 461 or French 327.
 - D. Fiona isn't taking Imperial Japan 607.

Write a clear, complete, well-organized description of the inferences you made in solving the problem, and write your final solution in the table provided below. The page after this one is left blank so you have sufficient room to organize your thoughts and provide a full answer.

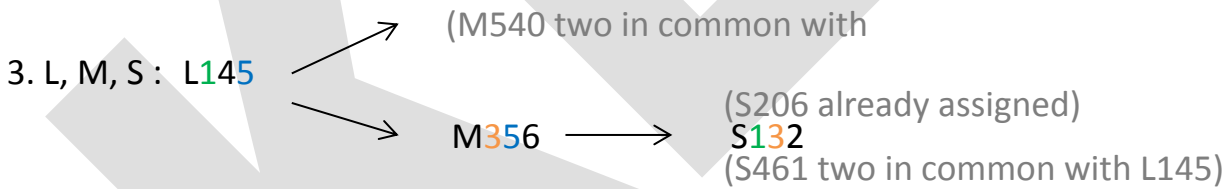
Student	Courses
Charlene	Japan 607, Calculus 540, Physics 461
Fiona	American History 136, French 327, Biology 206
Quinn	Spanish 145, Trigonometry 356, Chemistry 132



1. H, L, S :



∴ 1. H, L, S : (H136, L327, S206)



∴ 3. L, M, S : (L145, M356, S206) → ∴ 2. H, M, S : (H607, M540, S461)

2. [16 points] For each analogy problem below, give the answer, and also give an appropriate relationship sentence that demonstrates a valid analogy relationship while ruling out the other answers.

1. Dress is to wool as _____ is to _____.

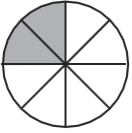
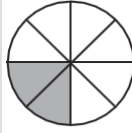
- a) animal : dog
- b) suit : jacket
- c) **door : glass**
- d) concrete : building

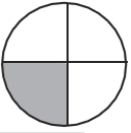
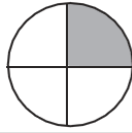
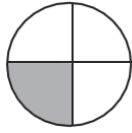
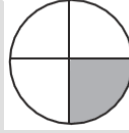
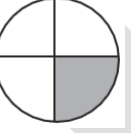
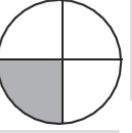
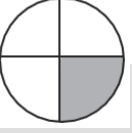
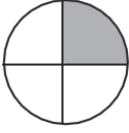
A _____ can be made out of _____.

2. _____ is to ocean as lake is to _____.

- a) ship : boat
- b) **island : land**
- c) Atlantic : Erie
- d) rough : calm

_____ is surrounded by _____.

3.  is to _____ : as  is to _____

- a)  : 
- b)  : 
- c)  : 
- d)  : 

Starting with _____, remove the diagonal X lines and rotate 90 degrees counter clockwise to yield figure _____.

Starting with _____, remove the diagonal X lines and rotate 180 degrees to yield figure _____.

4. 1 is to _____ as 3 is to _____

- a) 8 : 25
- b) 1 : 5
- c) 1001 : 2999
- d) **1 : 81**

_____ raised to the fourth power is _____.

b) is also acceptable with the relationship:

"In the Fibonacci number sequence _____ is followed by _____.

3. [10 points] 1. The World Cup Soccer Championship brings teams to vie for the title from around the globe. At a previous Cup Championship, thirty percent of the teams were from European countries. One twentieth of the teams were from Australia. Africa sent one fifth of all the teams in the completion. North America sent one eighth of all the competing teams. South America countries accounted for three times as many teams as Australia. What percentage of teams came from continents/countries NOT given in this problem? Externalize and justify your conclusion.

% of teams NOT in problem

$$= 100\% - (30\% + 1/20\% + 1/5\% + 1/8\% + 3(1/20\%))$$

$$= 100\% - (30\% + 5\% + 20\% + 12.5\% + 15\%)$$

$$= 100\% - 82.5\% = 17.5\%$$

4. [16 points] In each part, state what (other) facts, if any, you can validly infer from the given facts:

a) Some fish are carnivores. All sharks are fish.

Some or all sharks may be carnivores.

b) All piranha are fish. All piranha eat meat.

Some fish eat meat.

c) If Jane is a programmer then she writes code in assembly. Jane writes code in assembly.

Jane may be a programmer.

d) If Governor Romney insults 47% of the population, then he will lose the election. Governor Romney does not insult 47% of the population.

Governor Romney may lose the election.

5. [20 points] Design and write pseudo-code (see the test supplement) for an algorithm that displays true if in a list of N numbers there is a place to split the list so that the sum of the numbers on one side is equal to the sum of the numbers on the other side. For example, {1, 1, 1, 2, 1}, is true since the sum of the first three numbers is the same as the sum of the last two numbers. Here are some other examples of lists and the correct display output:

```
List is { 2, 1, 1, 2, 1}      → display "false"
List is { 1, 2, 3, 1, 0, 2, 3} → display "true"
List is { 1, 2, 3, 1, 0, 1, 3} → display "false"
List is { 10, 0, 1, -1, 10}   → display "true"
```

```
Algorithm splitSumList takes list number nums, number size
#size is the dimension of the list

if (size < 2) #optional check
  display "false"
  halt
endif

number leftSum    #left list split sum
number rightSum   #right list split sum
logical evenSplit #split sum comparison
number i          #split indexing

leftSum := 0      #first split is at far left
rightSum := nums[1]
i := 2
while (i <= size) #initial rightSum is entire list
  rightSum := rightSum + nums[i]
  i := i + 1
endwhile

i := 0            #initial split before first element
evenSplit := (leftSum = rightSum)
while( (NOT evenSplit) AND (i < size-1) ) #(i < size) is ok but redundant
  i := i + 1
  leftSum := leftSum + nums[i]
  rightSum := rightSum - nums[i]
  evenSplit := (leftSum = rightSum)
endwhile

if (evenSplit)
  display "true"
else
  display "false"
endif

halt
```

6. [20 points] My niece and two nephews (including Randy), whom I was in charge of baby-sitting for the night, were bored with their video games and couldn't agree on what to watch on television. I was at my wit's end, until inspiration struck and I pulled out the battered board-game version of Monopoly that has been in my family since I was a kid. The children happily settled down to play and at the end of thirty minutes, each owned a different one of the game's avenues (Atlantic, Mediterranean or Ventor) and a different one of the game's railroads (B&O, Pennsylvania, or Reading). The kids were having so much fun that I couldn't wait to challenge my three sisters to a game of Monopoly when they came to pick up their offspring! From the information provided, match each child (identified by first and last names — two surnames are Anderson and Vandelay) with the avenue and railroad he or she purchased during the game.
- A. The owner of Reading Railroad didn't purchase Ventnor Avenue.
 - B. Vanessa Margolis didn't buy Atlantic Avenue.
 - C. Benedict (who purchased Pennsylvania Railroad) didn't buy Mediterranean Avenue.
 - D. The initial of each child's surname isn't the same letter as the initial of the avenue he or she bought.

Write a clear, complete, well-organized description of the inferences you made in solving the problem, and write your final solution in the table provided below. The page after this one is left blank so you have sufficient room to organize your thoughts and provide a full answer.

First Name	Last Name	Avenue	Railroad
Benedict	Vandelay	Atlantic	Pennsylvania
Randy	Anderson	Mediterranean	Reading
Vanessa	Margolis	Ventor	B&O

		Last Name			Avenue			Railroad		
		Anderson	Margolis	Vandelay	Atlantic	Mediterranean	Ventor	B&O	Pennsylvania	Reading
First	Benedict	X-D3	X-B	v-D3	v-2	X-C	X-2	X-C	v-C	X-C
	Randy	v-4	X-B	X-3	X-1	v-1	X-1	X-6	X-C	v-6
	Vanessa	X-B	v-B	X-B	X-B	X-D	v-5	v-7	X-C	X-A5

1. By process of elimination using C & D.
2. By process of elimination following 1. eliminating Randy as buyer of Atlantic.
3. By 2. once it is determined that Benedict must buy Atlantic, then by D that eliminates Anderson as his last name leaving on Vandelay.
4. By 3. once Benedict's surname is determined to be Vandelay, this leaves only Anderson as Randy's surname by elimination.
5. By elimination using 1. and 2.
6. Using 5. and A to eliminate Vanessa as buyer of Reading, this leaves only Randy as the Reading owner.
7. By elimination using 6.