

Practice Problems for Exam 1

Exam One covered Topics 1-3

Problem 1 You are hired to carve pumpkins for a festival. When preparing for the task you generate the following list of things you need to get or do beforehand;

- (a) You need a new knife; your previous one has been resharpened too many times now and must be replaced.
- (b) You want to invite your little brother to join you, so you can teach him how to carve pumpkins (and get some free labor!)
- (c) You need to buy candles and LED lights to fulfill customer requests for lighting the interior of pumpkins.
- (d) You want to get a new set of shaving tools to help carve specific thickness levels in pumpkins.
- (e) You need to let your friends know that you can't go to the beach with them next weekend as you'll be busy working.

Of the above pieces of information, which are relevant to **up front cost** (costs before you start) to you of the project?

Select All Correct Answers:

- (a) You need a new knife; your previous one has been resharpened too many times now and must be replaced. ✓
- (b) You want to invite your little brother to join you, so you can teach him how to carve pumpkins (and get some free labor!)
- (c) You need to buy candles and LED lights to fulfill customer requests for lighting the interior of pumpkins. ✓
- (d) You want to get a new set of shaving tools to help carve specific thickness levels in pumpkins. ✓
- (e) You need to let your friends know that you can't go to the beach with them next weekend as you'll be busy working.

Problem 1.1 Which of the following is a good (valid) argument about the relevance of the statement: "You had plans with your friends to sell shell-based jewelry at the beach on the same weekend that you are considering carving pumpkins." to your desire to make money this weekend.

Multiple Choice:

- (a) The statement is relevant because you need to determine which activity would yield the most money. ✓
- (b) The statement is extraneous because you don't like selling sea-shell jewelry.
- (c) The statement is relevant because you don't want to disappoint your friends

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- (d) *The statement is relevant because your friends were going to pay for the gas for the trip.*
- (e) *The statement is extraneous because you didn't make very much money the last time you went to the beach to sell sea-shell jewelry.*

Problem 1.1.1 Which of the following are pieces of data (Select all that apply)?

Select All Correct Answers:

- (a) *Your summer income is pretty pathetic because you do weird odd-jobs like these all summer long.*
- (b) *The temperature outside is 20 degrees Fahrenheit. ✓*
- (c) *The projected income for selling sea-shell jewelry is \$70 per person involved. ✓*
- (d) *The projected income for carving pumpkins after expenses is \$80. ✓*
- (e) *Your brother is 11 years old. ✓*
- (f) *The last time you went to the beach you met some cool new friends.*

Problem 1.1.1.1 Which of the previous list are relevant pieces of data to your overall goal of maximizing your income for that weekend? (Select all that apply)

Select All Correct Answers:

- (a) *Your summer income is pretty pathetic because you do weird odd-jobs like these all summer long.*
- (b) *The temperature outside is 20 degrees Fahrenheit.*
- (c) *The projected income for selling sea-shell jewelry is \$70 per person involved. ✓*
- (d) *The projected income for carving pumpkins after expenses is \$80. ✓*
- (e) *Your brother is 11 years old.*
- (f) *The last time you went to the beach you met some cool new friends.*

Problem 1.1.1.1.1 Finally, using all the previous information; which of the following is a good argument for which activity to do?

Multiple Choice:

- (a) *You should do the beach activity because there's a better chance of making new friends there.*
- (b) *The (projected) income from the pumpkin carving is higher, so you should do that. ✓*
- (c) *You should go to the beach, since you already had told your friends you would.*
- (d) *You should go to the pumpkin carving event because it's closer to home.*
- (e) *You should go to the beach since you'd get yelled at for not splitting the income with your brother, but if you did split the money, you'd make less at the pumpkin carving.*

Problem 2 You got into an argument with a friend about which holiday is better, Halloween or Christmas. During the discussion, the following pieces of information are put forth;

- You get free candy on Halloween
- You get free presents, often from your own list of desired things, on Christmas
- Halloween decorations are much more interesting and varied than Christmas decorations.
- Christmas is a religious holiday.
- Halloween is a religious holiday.
- Christmas generates more sales revenue than Halloween.
- There are many other holidays that occur during or close to the same period of time as Christmas.
- Halloween traces it's origins back further in history than Christmas.

Which of those statements are examples of quantifiable information?

Select All Correct Answers:

- (a) You get free candy on Halloween
- (b) You get free presents; often from your own list of desired things, on Christmas
- (c) Halloween decorations are much more interesting and varied than Christmas Decorations.
- (d) Christmas is a religious holiday.
- (e) Halloween is a religious holiday.
- (f) Christmas generates more sales revenue than Halloween. ✓
- (g) There are many other holidays that occur during or close to the same period of time as Christmas. ✓
- (h) Halloween traces it's origins back further in history than Christmas. ✓
- (i) None of these are quantifiable pieces of information.

Problem 2.1 Which of these are examples of data?

Select All Correct Answers:

- (a) You get free candy on Halloween
- (b) You get free presents; often from your own list of desired things, on Christmas
- (c) Halloween decorations are much more interesting and varied than Christmas Decorations.
- (d) Christmas is a religious holiday.
- (e) Halloween is a religious holiday.

- (f) Christmas generates more sales revenue than Halloween.
- (g) There are many other holidays that occur during or close to the same period of time as Christmas.
- (h) Halloween traces its origins back further in history than Christmas.
- (i) None of these are data. ✓

Problem 2.1.1 Which of the following is a good (valid) argument using the information listed as to which is better? (Select all that apply, remember that you are evaluating the arguments, not the claim!)

Select All Correct Answers:

- (a) Halloween is clearly superior.
- (b) Christmas is clearly superior.
- (c) Christmas generates more revenue, which (according to capitalism) means it has a higher value to society, so Christmas is better. ✓
- (d) Many families give nearly as much candy in Christmas stockings as you typically get in your small neighborhood for Halloween, thus Christmas (since it also has other presents) is better for getting gifts. ✓
- (e) Halloween is an 'older' holiday which means it has been preserved for a longer period of history. Since your friend is a history major and fanatic, they should consider it better. ✓
- (f) Halloween lets you scare little kids, what's not great about that?
- (g) Christmas means setting elaborate traps to catch Santa with your little brother which is great!
- (h) Halloween and Christmas are both inferior to Arbor day. Everyone knows that.

Problem 3 Which of the following is a reasonable definition for "Mathematical Reasoning"?

Multiple Choice:

- (a) A technique of problem solving that relies on deductive reasoning and symbolic manipulation. ✓
- (b) A technique of problem solving that relies purely on reasoning.
- (c) A technique of modeling that uses deductive reasoning to manipulate symbols.
- (d) A form of inference that uses a set of given information, and extracts new information that must be true as a result.
- (e) A collection of knowledge or observations used to problem solve.

Problem 4 Which of the following is a reasonable definition for "Model"?

Multiple Choice:

- (a) A technique of problem solving that relies on deductive reasoning and symbolic manipulation.
- (b) A (collection of) mathematical expressions used to represent a specific situation. ✓
- (c) A collection of knowledge or observations used to problem solve.
- (d) A form of inference that uses a set of given information, and extracts new information that must be true as a result.
- (e) A collection of symbolic manipulations and deductive inferences applied to a general situation.

Problem 5 A friend of yours plans to get her ears pierced and is trying to decide what kind of piercing to get and where. She is debating between getting the ear cartilage in the upper ear pierced vs the earlobe pierced. She gives you the following comparison lists.

In favor of cartilage piercing

- Cartilage is stronger and doesn't heal as quickly, so the hole from the piercing would last longer.
- This style of piercing would hold heavier and more interesting earrings.
- This style is easier to hide with hair if needed.
- This style piercing is easier to prevent infections.

In favor of earlobe piercings:

- The earlobe is easier to heal if she wants to get rid of the piercing.
- This style is considered more "professional" and thus easier to deal with in formal settings like jobs.
- This style is cheaper to get done.
- More earrings are designed with the idea of going into the earlobe rather than cartilage.

How many of the above pieces of information are data? 0.

Problem 5.1 Which of the following statements are quantifiable information? (Select all that apply)

Select All Correct Answers:

- (a) Cartilage is stronger and doesn't heal as quickly, so the hole from the piercing would last longer. ✓
- (b) Cartilage piercings would hold heavier and more interesting earrings.
- (c) Cartilage piercings are easier to hide with hair if needed.
- (d) Cartilage piercings are easier to prevent infections.
- (e) The earlobe is easier to heal if she wants to get rid of the piercing.
- (f) Earlobe piercings are considered more "professional" and thus easier to deal with in formal settings like jobs.
- (g) Earlobe piercings are cheaper to get done. ✓

- (h) More earrings are designed with the idea of going into the earlobe rather than cartilage.
- (i) None of these pieces of information are quantifiable.

Problem 5.1.1 Which of the following are good arguments with regards to which piercing (if any) your friend should get, based on the previous information.(Select all that apply)

Select All Correct Answers:

- (a) She shouldn't get any piercings because she wants to get a job as a sales clerk at a local store.
- (b) She wants to get a very heavy and elaborate earring, so it would be a good idea to get a cartilage piercing. ✓
- (c) Your friend has really long hair, so either piercing is fine.
- (d) You friend seems to change her mind on a whim, so the earlobe piercing (since it is less permanent) is probably the better choice. ✓
- (e) Your friend is pretty broke, so she shouldn't be considering getting a piercing.
