



Doing & Thinking Through Mathematics

APPROACH Ask Questions

When you first tried the task, did you...?

- ☐ Annotate the written representation of the task and recall connected facts (*know*)
- ☐ Identify the given relevant information and facts that might connect (*given*)
- ☐ Write out questions that come to mind about what properties the object, phenomena, or relationship has (*questions*)
- ☐ Create alternative representations (sketches, graphs, verbal descriptions) (*know*)
- ☐ State the goal (*want*)

When you were first thinking about the math, did you...? *Monitor Thinking*

- ☐ Ask if any of the given information is irrelevant/ missing/ contradictory
- ☐ Ask how I know if my representations and given information are relevant
- ☐ Identify reasoning/procedural questions that need to be answered to clear up points of confusion
- ☐ Ask if there are different ways to understand the task
- ☐ Contrast the current problem/task to previous ones
- ☐ Consider alternative ways of interpreting the task and/ or goal
- ☐ Ask if there is an error in my facts and approach
- ☐ Ask if I need to take a step back and work more on exercises before tackling this problem

CREATE A PLAN Imagine a Pathway

Looking at your plan, did you...?

- ☐ Use the givens, identify models, relationships, and/or concepts that might apply
- ☐ Symbolically relate the givens with the model
- ☐ Using the model/concepts/relationships, establish connections and intermediate steps between givens and goal

Thinking through your plan, did you...? *Monitor Thinking*

- ☐ Decide if any approximations or assumptions, which weren't stated in the task, need to be made
- ☐ Decide if the model(s) are compatible with each other
- ☐ Compare the plan to others used in previous tasks to determine if reasonable
- ☐ Ask if all objects that look like this have the same property
- ☐ Evaluate the plan for completeness.
- ☐ Consider alternative plans
- ☐ Ask if I can describe the relationships
- ☐ Ask if there is an error in concept knowledge

EXECUTION Create and Improve

When executing your plan, did you...?

- ☐ Follow the plan (solution pathway) until your goal is attained

When thinking through your execution, did you...? *Monitor Thinking*

- ☐ Continuously examine the plan to ensure it is working
- ☐ Ask if there is an error in the procedure
- ☐ Examine the outcome of the plan for coherence
- ☐ Compare the result of the plan against previous experiences to test if reasonable
- ☐ Check to see if the task has been completed
- ☐ Consider if the solution pathway will always work in all cases