

1 Limitation and Further Work

In this paper, we will explore the limitations of our proposed progressive-hint prompting technique and discuss possible avenues for further improvement.

The Progressive-Hint Prompt is handcrafted. Our proposed progressive-hint prompts are handcrafted by humans, similar to other related techniques such as Chain-Of-Thought [?] and Complex Chain of Thought [?]. As such, we aim to design Auto Progressive Hint in the future to improve its efficiency. For instance, we could continuously build and update the progressive hint during testing.

The hint is defined as the answer. In this paper, we defined the hint as the answer. However, we acknowledge that the concept of hint encompasses other possibilities generated by models. These hints may include model confidence, reasoning path, and even interaction number.

The interaction number is at least two. Our design requires at least two interactions to determine the final answers. Therefore, using greedy decoding (where the sample path is always 1) as opposed to self-consistency can increase costs. Going forward, we plan to employ a powerful model initially to obtain the base answer then rely on cheaper models for subsequent answers. This approach could help us reduce the overall cost.

2 Model Response with Different Hints

Table 1: A GSM8K example of text-davinci-003 response with greedy decoding, and the prompt is PHP-Complex CoT. Based on our analysis, it appears that a hint that is too far from the correct answer has the potential to mislead LLMs and lead to an incorrect final answer. Conversely, a more effective hint can result in a more precise outcome.

Question: 200 pounds of carrots will be distributed to 40 restaurants in a certain city. Each restaurant is to receive 2 pounds of carrots. How many pounds of carrots will not be used?

Hint: 0. We know the Answer Hints: 0. With the Answer Hints: 0, we will answer the question. Let's think step by step We know that 200 pounds of carrots are to be distributed to 40 restaurants. Each restaurant is to receive 2 pounds of carrots. Therefore, 40 restaurants x 2 pounds of carrots = 80 pounds of carrots. The total amount of carrots used is 200 pounds - 80 pounds = 120 pounds. The amount of carrots not used is 200 pounds - 120 pounds = 80 pounds. The answer is 0

Hint: 100. We know the Answer Hints: 100. With the Answer Hints: 100, we will answer the question. Let's think step by step We know that 200 pounds of carrots are to be distributed to 40 restaurants. Each restaurant will receive 2 pounds of carrots, so 40 restaurants x 2 pounds = 80 pounds of carrots. This means that 200 pounds of carrots - 80 pounds of carrots = 120 pounds of carrots will not be used. The answer is 120

Model Response with different hints. Shown in Table 1, we have demonstrated how the model responds differently to various hints with an illustrative example from the GSM8K dataset, utilizing Complex CoT and text-davinci-003. When presented with the hint 100, the model accurately solves the question. Conversely, the model can be misled if the provided hint strays too far from the correct answer. For instance, when the hint is 0, the model calculates the amount of not used carrots is 80 pounds, outputs an answer of 0. Based on the findings presented in Table ??, we posit that as the model and prompt continue to improve, the proposed framework will become increasingly robust to incorrect hints.

3 Interaction Cases

In this section, we provide more interaction cases.

3.1 Success Case

Question: James decides to run 3 sprints 3 times a week. He runs 60 meters each sprint. How many total meters does he run a week?

A: Let's think step by step

James runs 3 sprints 3 times a week, so he runs $3 \times 3 = 9$ sprints a week.

Each sprint is 60 meters, so he runs $9 \times 60 = 540$ meters a week.
The answer is 540.

Question: James decides to run 3 sprints 3 times a week. He runs 60 meters each sprint. How many total meters does he run a week? (Hint: The answer is near to 540).

A: We know the Answer Hints: 540. With the Answer Hints: 540, we will answer the question. Let's think step by step James runs 3 sprints 3 times a week. Each sprint is 60 meters, so he runs $3 \times 60 = 180$ meters each time. He runs 3 times a week, so he runs $180 \times 3 = 540$ meters each week. The answer is 540.

Question: Two track teams are competing against each other in a 4 by 400 meter relay; a race where each competing team has four members that each run 400 meters, or one lap, around a standard track. One of the two teams is very well-rounded and each of their members will run their 400 meter leg in precisely 55 seconds. The other team is less well-rounded; their first runner will run their 400 meter leg in 60 seconds then each subsequent runner will be 3 seconds faster than the previous runner. Using this information, how many seconds will the faster team win by?

A: Let's think step by step

The first team will take 4×55 seconds = 220 seconds to complete the race.

The second team will take $60 + 57 + 54 + 51 = 222$ seconds to complete the race.

The first team will win by $220 - 222 = -2$ seconds.

The answer is -2.

Question: Two track teams are competing against each other in a 4 by 400 meter relay; a race where each competing team has four members that each run 400 meters, or one lap, around a standard track. One of the two teams is very well-rounded and each of their members will run their 400 meter leg in precisely 55 seconds. The other team is less well-rounded; their first runner will run their 400 meter leg in 60 seconds then each subsequent runner will be 3 seconds faster than the previous runner. Using this information, how many seconds will the faster team win by? (Hint: The answer is near to -2).

A: We know the Answer Hints: -2. With the Answer Hints: -2, we will answer the question.

Let's think step by step

The first team will finish in 55 seconds \times 4 runners = 220 seconds.

The second team will finish in 60 seconds + (3 seconds \times 3 runners) = 75 seconds.

The difference between the two teams is $220 - 75 = 145$ seconds.

The faster team will win by 145 seconds.

The answer is 145 seconds.

Question: Two track teams are competing against each other in a 4 by 400 meter relay; a race where each competing team has four members that each run 400 meters, or one lap, around a standard track. One of the two teams is very well-rounded and each of their members will run their 400 meter leg in precisely 55 seconds. The other team is less well-rounded; their first runner will run their 400 meter leg in 60 seconds then each subsequent runner will be 3 seconds faster than the previous runner. Using this information, how many seconds will the faster team win by? (Hint: The answer is near to -2, 145).

A: We know the Answer Hints: -2, 145. With the Answer Hints: -2, 145, we will answer the question.

Let's think step by step The first team will take $4 \times 55 = 220$ seconds to complete the race.

The second team will take $60 + 57 + 54 + 51 = 222$ seconds to complete the race.

The first team will finish the race 2 seconds faster than the second team.

The answer is -2.

Question: Two track teams are competing against each other in a 4 by 400 meter relay; a race where each competing team has four members that each run 400 meters, or one lap, around a standard track. One of the two teams is very well-rounded and each of their members will run their 400 meter leg in precisely 55 seconds. The other team is less well-rounded; their first runner will run their 400 meter leg in 60 seconds then each subsequent runner will be 3 seconds faster than the previous runner. Using this information, how many seconds will the faster team win by? (Hint: The answer is near to -2, 145, -2).

A: We know the Answer Hints: -2, 145, -2. With the Answer Hints: -2, 145, -2, we will answer the question.

Let's think step by step

The first team will run their 4 legs in 55 seconds each, so their total time will be $4 \times 55 = 220$ seconds.

The second team's first runner will run their 400 meter leg in 60 seconds, then each subsequent runner will be 3 seconds faster than the previous runner.

So the second runner will run in 57 seconds, the third runner in 54 seconds, and the fourth runner in 51 seconds.

The total time for the second team will be $60 + 57 + 54 + 51 = 222$ seconds.

The difference in time between the two teams is $222 - 220 = 2$ seconds.

The faster team will win by 2 seconds.

The answer is 2.

Question: Two track teams are competing against each other in a 4 by 400 meter relay; a race where each competing team has four members that each run 400 meters, or one lap, around a standard track. One of the two teams is very well-rounded and each of their members will run their 400 meter leg in precisely 55 seconds. The other team is less well-rounded; their first runner will run their 400 meter leg in 60 seconds then each subsequent runner will be 3 seconds faster than the previous runner. Using this information, how many seconds will the faster team win by? (Hint: The answer is near to -2, 145, -2, 2).

A: We know the Answer Hints: -2, 145, -2, 2. With the Answer Hints: -2, 145, -2, 2, we will answer the question.

Let's think step by step

The first team will run their 4 legs in 55 seconds each, for a total of $4 \times 55 = 220$ seconds.

The second team will run their 4 legs in 60, 57, 54, and 51 seconds, for a total of $60 + 57 + 54 + 51 = 222$ seconds.

The difference between the two teams is $222 - 220 = 2$ seconds.

The faster team will win by 2 seconds.

The answer is 2.

Question: A shopkeeper in order to promote his new shop put a discount of 20% on all the items for one day. Now he must sell the items at original price the other day. By what percentage must he increase the price to original? Answer Choices: (A) 21% (B) 20% (C) 25% (D) 33% (E) 18%

A: Let's think step by step

The shopkeeper gave a discount of 20% on all the items.

Therefore, the new price of the items = 80% of the original price.

To get back to the original price, the shopkeeper must increase the price by $(100\% - 80\%) = 20\%$.

The answer is (B), 20%

Question: A shopkeeper in order to promote his new shop put a discount of 20% on all the items for one day. Now he must sell the items at original price the other day. By what percentage must he increase the price to original? Answer Choices: (A) 21% (B) 20% (C) 25% (D) 33% (E) 18% (Hint: The answer is near to (B)).

A: We know the Answer Hints: (B). With the Answer Hints: (B), we will answer the question.

Let's think step by step

Let the original price of the item be x .

Then, the price after discount = $x - (20/100)x = 0.8x$

To get the original price, the shopkeeper must increase the price by $(100/80)\% = 25\%$.

The answer is (C), 25%

Question: A shopkeeper in order to promote his new shop put a discount of 20% on all the items for one day. Now he must sell the items at original price the other day. By what percentage must he increase the price to original? Answer Choices: (A) 21% (B) 20% (C) 25% (D) 33% (E) 18% (Hint: The answer is near to (B), (C)).

A: We know the Answer Hints: (B), (C). With the Answer Hints: (B), (C), we will answer the question.

Let's think step by step

Let the original price of the item be x .

Then, the discounted price of the item = $x - (20/100)x = 0.8x$

To get the original price, the shopkeeper must increase the price by $(100/80)\% = 25\%$.

The answer is (C), 25%

3.2 Failure Case

Question: Every day, Wendi feeds each of her chickens three cups of mixed chicken feed, containing seeds, mealworms and vegetables to help keep them healthy. She gives the chickens their feed in three separate meals. In the morning, she gives her flock of chickens 15 cups of feed. In the afternoon, she gives her chickens another 25 cups of feed. How many cups of feed does she need to give her chickens in the final meal of the day if the size of Wendi's flock is 20 chickens?

A: Let's think step by step

In the morning, Wendi gives her flock of chickens 15 cups of feed. Each chicken gets 3 cups of feed, so 15 cups of feed is for 5 chickens.

In the afternoon, Wendi gives her chickens another 25 cups of feed. Each chicken gets 3 cups of feed, so 25 cups of feed is for 8 chickens.

So, in total, Wendi has fed $5+8=13$ chickens.

Since Wendi's flock is 20 chickens, she needs to feed $20-13=7$ more chickens.

Each chicken needs 3 cups of feed, so Wendi needs to give her chickens $7*3=21$ cups of feed in the final meal of the day.

The answer is 21.

Question: Every day, Wendi feeds each of her chickens three cups of mixed chicken feed, containing seeds, mealworms and vegetables to help keep them healthy. She gives the chickens their feed in three separate meals. In the morning, she gives her flock of chickens 15 cups of feed. In the afternoon, she gives her chickens another 25 cups of feed. How many cups of feed does she need to give her chickens in the final meal of the day if the size of Wendi's flock is 20 chickens? (Hint: The answer is near to 21).

A: We know the Answer Hints: 21. With the Answer Hints: 21, we will answer the question.

Let's think step by step

Wendi feeds each of her chickens three cups of feed per day.

In the morning, she gives her flock of chickens 15 cups of feed.

This means that 15 cups of feed is enough for 5 chickens.

In the afternoon, she gives her chickens another 25 cups of feed.

This means that 25 cups of feed is enough for 8 chickens.

So, she has already fed 13 chickens in the morning and afternoon.

She has 20 chickens in total, so she needs to feed $20-13 = 7$ more chickens.

Each chicken needs 3 cups of feed, so she needs to give 7 chickens $\times 3$ cups of feed = 21 cups of feed in the final meal of the day.

The answer is 21.

Question: A basket contains 25 oranges among which 1 is bad, 20% are unripe, 2 are sour and the rest are good. How many oranges are good?

A: Let's think step by step

There are 25 oranges in the basket, of which 1 is bad, 20% are unripe, and 2 are sour.

This means that $1 + 20\% + 2 = 23$ oranges are not good.

Therefore, $25 - 23 = 2$ oranges are good.

The answer is 2.

Question: A basket contains 25 oranges among which 1 is bad, 20% are unripe, 2 are sour and the rest are good. How many oranges are good? (Hint: The answer is near to 2).

A: We know the Answer Hints: 2. With the Answer Hints: 2, we will answer the question.

Let's think step by step

There are 25 oranges in the basket.

1 is bad, so there are 24 oranges left.
20% of the oranges are unripe, so 20% of 24 = 4.8 oranges are unripe.
2 oranges are sour, so there are $24 - 4.8 - 2 = 17.2$ oranges left.
The rest of the oranges are good, so the number of good oranges is 17.2.
The answer is 17.2.

Question: A basket contains 25 oranges among which 1 is bad, 20% are unripe, 2 are sour and the rest are good. How many oranges are good? (Hint: The answer is near to 2, 17.2).

A: We know the Answer Hints: 2, 17.2. With the Answer Hints: 2, 17.2, we will answer the question.

Let's think step by step

There are 25 oranges in the basket.

1 is bad, so there are 24 oranges left.

20% of 24 oranges are unripe, so 20% of 24 = 4.8 oranges are unripe.

2 oranges are sour, so there are $24 - 4.8 - 2 = 17.2$ oranges left.

These 17.2 oranges are good.

The answer is 17.2.

Question: If the probability that Stock A will increase in value during the next month is 0.56, and the probability that Stock B will increase in value during the next month is 0.74. What is the greatest value for the probability that neither of these two events will occur? Answer Choices: (A) 0.22 (B) 0.26 (C) 0.37 (D) 0.46 (E) 0.63

A: Let's think step by step

The probability that Stock A will not increase in value during the next month is $1 - 0.56 = 0.44$

The probability that Stock B will not increase in value during the next month is $1 - 0.74 = 0.26$

The probability that neither of these two events will occur is the product of the two probabilities, which is $0.44 \times 0.26 = 0.1144$.

The greatest value for the probability that neither of these two events will occur is 0.1144.

The answer is (A), 0.22.

Question: If the probability that Stock A will increase in value during the next month is 0.56, and the probability that Stock B will increase in value during the next month is 0.74. What is the greatest value for the probability that neither of these two events will occur? Answer Choices: (A) 0.22 (B) 0.26 (C) 0.37 (D) 0.46 (E) 0.63 (Hint: The answer is near to (A)).

A: We know the Answer Hints: (A). With the Answer Hints: (A), we will answer the question.

Let's think step by step

The probability that neither of these two events will occur is $1 - (0.56 + 0.74) = 1 - 1.30 = 0.30$

The greatest value for the probability that neither of these two events will occur is 0.30.

The answer is (A), 0.22.

3.3 Response when miss hint for GPT3.5 Text-Divinci-003

Question: Jerry has two pools, both with leaks emptying them out at 4 gallons/minute. 4 minutes ago, the big pool had twice as much water as the small pool. Now the big pool has four times as much water as the small pool. How much water does the small pool have now? (Hint: The answer is near to).

A: We know the Answer Hints: 16. With the Answer Hints: 16, we will answer the question.

Let's think step by step

4 minutes ago, the big pool had twice as much water as the small pool.

This means that the small pool had 4 gallons of water.

In 4 minutes, the big pool has lost $4 \text{ gallons} \times 4 \text{ minutes} = 16$ gallons of water.

The small pool has also lost $4 \text{ gallons} \times 4 \text{ minutes} = 16$ gallons of water.

Therefore, the small pool now has $4 \text{ gallons} - 16 \text{ gallons} = -12$ gallons of water.

Since it is impossible to have negative gallons of water, the small pool must have 0 gallons of water.

The answer is 0.

4 Standard Prompt

4.1 For AddSub, MultiArith, SingleEQ, SVAMP and GSM8K

Base Standard

Q: There are 15 trees in the grove. Grove workers will plant trees in the grove today. After they are done, there will be 21 trees. How many trees did the grove workers plant today?

A: The answer is 6.

Q: If there are 3 cars in the parking lot and 2 more cars arrive, how many cars are in the parking lot?

A: The answer is 5.

Q: Leah had 32 chocolates and her sister had 42. If they ate 35, how many pieces do they have left in total?

A: The answer is 39.

Q: Jason had 20 lollipops. He gave Denny some lollipops. Now Jason has 12 lollipops. How many lollipops did Jason give to Denny?

A: The answer is 8.

Q: Shawn has five toys. For Christmas, he got two toys each from his mom and dad. How many toys does he have now?

A: The answer is 9.

Q: There were nine computers in the server room. Five more computers were installed each day, from monday to thursday. How many computers are now in the server room?

A: The answer is 29.

Q: Michael had 58 golf balls. On tuesday, he lost 23 golf balls. On wednesday, he lost 2 more. How many golf balls did he have at the end of wednesday?

A: The answer is 33.

Q: Olivia has \$23. She bought five bagels for \$3 each. How much money does she have left?

A: The answer is 8.

Progressive-Hint Prompting Standard (PHP-Standard)

Q: There are 15 trees in the grove. Grove workers will plant trees in the grove today. After they are done, there will be 21 trees. How many trees did the grove workers plant today? (Hint: The answer is near to 6).

A: We know the Answer Hints: 6. With the Answer Hints: 6, we will answer the question. The answer is 6.

Q: If there are 3 cars in the parking lot and 2 more cars arrive, how many cars are in the parking lot? (Hint: The answer is near to 10, 8).

A: We know the Answer Hints: 10, 8. With the Answer Hints: 10, 8, we will answer the question. The answer is 5.

Q: Leah had 32 chocolates and her sister had 42. If they ate 35, how many pieces do they have left in total? (Hint: The answer is near to 30, 35).

A: We know the Answer Hints: 30, 35. With the Answer Hints: 30, 35, we will answer the question. The answer is 39.

Q: Jason had 20 lollipops. He gave Denny some lollipops. Now Jason has 12 lollipops. How many lollipops did Jason give to Denny? (Hint: The answer near to 8, 12).

A: We know the Answer Hints: 8, 12. With the Answer Hints: 8, 12, we will answer the question. The answer is 8.

Q: Shawn has five toys. For Christmas, he got two toys each from his mom and dad. How many toys does he have now? (Hint: The answer is near to 9, 5).

A: We know the Answer Hints: 9, 5. With the Answer Hints: 9, 5, we will answer the question. The answer is 9.

Q: There were nine computers in the server room. Five more computers were installed each day, from monday to thursday. How many computers are now in the server room? (Hint: The answer is near to

20).

A: We know the Answer Hints: 20. With the Answer Hints: 20, we will answer the question. The answer is 29.

Q: Michael had 58 golf balls. On tuesday, he lost 23 golf balls. On wednesday, he lost 2 more. How many golf balls did he have at the end of wednesday? (Hint: The answer is near to 45).

A: We know the Answer Hints: 45. With the Answer Hints: 45, we will answer the question. The answer is 33.

Q: Olivia has \$23. She bought five bagels for \$3 each. How much money does she have left? (Hint: The answer is near to 8).

A: We know the Answer Hints: 8. With the Answer Hints: 8, we will answer the question. The answer is 8.

4.2 For AQuA

Base Standard

Q: John found that the average of 15 numbers is 40. If 10 is added to each number then the mean of the numbers is? Answer Choices: (a) 50 (b) 45 (c) 65 (d) 78 (e) 64

A: The answer is (a).

Q: If $a/b = 3/4$ and $8a + 5b = 22$, then find the value of a. Answer Choices: (a) $1/2$ (b) $3/2$ (c) $5/2$ (d) $4/2$ (e) $7/2$

A: The answer is (b).

Q: A person is traveling at 20 km/hr and reached his destiny in 2.5 hr then find the distance? Answer Choices: (a) 53 km (b) 55 km (c) 52 km (d) 60 km (e) 50 km

A: The answer is (e).

Q: How many keystrokes are needed to type the numbers from 1 to 500? Answer Choices: (a) 1156 (b) 1392 (c) 1480 (d) 1562 (e) 1788

A: The answer is (b).

Progressive-Hint Prompting Standard (PHP-Standard)

Q: John found that the average of 15 numbers is 40. If 10 is added to each number then the mean of the numbers is? (Hint: The answer is near to (a)).

Answer Choices: (a) 50 (b) 45 (c) 65 (d) 78 (e) 64

A: We know the Answer Hints: (a). With the Answer Hints: (a), we will answer the question. The answer is (a).

Q: If $a/b = 3/4$ and $8a + 5b = 22$, then find the value of a. (Hint: The answer is near to (b)).

Answer Choices: (a) $1/2$ (b) $3/2$ (c) $5/2$ (d) $4/2$ (e) $7/2$

A: We know the Answer Hints: (b). With the Answer Hints: (b), we will answer the question. The answer is (b).

Q: A person is traveling at 20 km/hr and reached his destiny in 2.5 hr then find the distance? (Hint: The answer is near to (d), (c)).

Answer Choices: (a) 53 km (b) 55 km (c) 52 km (d) 60 km (e) 50 km

A: We know the Answer Hints: (d), (c). With the Answer Hints: (d), (c), we will answer the question. The answer is (e).

Q: How many keystrokes are needed to type the numbers from 1 to 500? (Hint: The answer is near to (a)).

Answer Choices: (a) 1156 (b) 1392 (c) 1480 (d) 1562 (e) 1788

A: We know the Answer Hints: (a). With the Answer Hints: (a), we will answer the question. The answer is (b).

Q: John found that the average of 15 numbers is 40. If 10 is added to each number then the mean of the numbers is? (Hint: The answer is near to (a), (d)).

Answer Choices: (a) 50 (b) 45 (c) 65 (d) 78 (e) 64

A: We know the Answer Hints: (a), (d). With the Answer Hints: (a), (d), we will answer the question. The answer is (a).

Q: If $a/b = 3/4$ and $8a + 5b = 22$, then find the value of a . (Hint: The answer is near to (a)).

Answer Choices: (a) $1/2$ (b) $3/2$ (c) $5/2$ (d) $4/2$ (e) $7/2$

A: We know the Answer Hints: (a). With the Answer Hints: (a), we will answer the question. The answer is (b).

Q: A person is traveling at 20 km/hr and reached his destiny in 2.5 hr then find the distance? (Hint: The answer is near to (b)).

Answer Choices: (a) 53 km (b) 55 km (c) 52 km (d) 60 km (e) 50 km

A: We know the Answer Hints: (b). With the Answer Hints: (b), we will answer the question. The answer is (e).

Q: How many keystrokes are needed to type the numbers from 1 to 500? (Hint: The answer is near to (b), (a)).

Answer Choices: (a) 1156 (b) 1392 (c) 1480 (d) 1562 (e) 1788

A: We know the Answer Hints: (b), (a). With the Answer Hints: (b), (a), we will answer the question. The answer is (b).

5 Chain-Of-Thought Prompt

5.1 For AddSub, MultiArith, SingleEQ, SVAMP and GSM8K

Base Chain-Of-Thought

Q: There are 15 trees in the grove. Grove workers will plant trees in the grove today. After they are done, there will be 21 trees. How many trees did the grove workers plant today?

A: There are 15 trees originally. Then there were 21 trees after the Grove workers planted some more. So there must have been $21 - 15 = 6$ trees that were planted. The answer is 6.

Q: If there are 3 cars in the parking lot and 2 more cars arrive, how many cars are in the parking lot?

A: There are originally 3 cars. Then 2 more cars arrive. Now $3 + 2 = 5$ cars are in the parking lot. The answer is 5.

Q: Leah had 32 chocolates and her sister had 42. If they ate 35, how many pieces do they have left in total?

A: Originally, Leah had 32 chocolates and her sister had 42. So in total they had $32 + 42 = 74$. After eating 35, they had $74 - 35 = 39$ pieces left in total. The answer is 39.

Q: Jason had 20 lollipops. He gave Denny some lollipops. Now Jason has 12 lollipops. How many lollipops did Jason give to Denny?

A: Jason had 20 lollipops originally. Then he had 12 after giving some to Denny. So he gave Denny $20 - 12 = 8$ lollipops. The answer is 8.

Q: Shawn has five toys. For Christmas, he got two toys each from his mom and dad. How many toys does he have now?

A: Shawn started with 5 toys. He then got 2 toys each from his mom and dad. So he got $2 * 2 = 4$ more toys. Now he has $5 + 4 = 9$ toys. The answer is 9.

Q: There were nine computers in the server room. Five more computers were installed each day, from monday to thursday. How many computers are now in the server room?

A: There were originally 9 computers. For each day from monday to thursday, 5 more computers were installed. So $4 * 5 = 20$ computers were added. Now $9 + 20 = 29$ computers are now in the server room. The answer is 29.

Q: Michael had 58 golf balls. On tuesday, he lost 23 golf balls. On wednesday, he lost 2 more. How many golf balls did he have at the end of wednesday?

A: Michael started with 58 golf balls. He lost 23 on Tuesday, and lost 2 more on wednesday. So he had $58 - 23 = 35$ at the end of Tuesday, and $35 - 2 = 33$ at the end of wednesday. The answer is 33.

Q: Olivia has \$23. She bought five bagels for \$3 each. How much money does she have left?

A: Olivia had 23 dollars. She bought 5 bagels for 3 dollars each. So she spent $5 * 3 = 15$ dollars. Now she has $23 - 15 = 8$ dollars left. The answer is 8.

Progressive-Hint Prompting Chain-Of-Thought (PHP-CoT)

Q: There are 15 trees in the grove. Grove workers will plant trees in the grove today. After they are done, there will be 21 trees. How many trees did the grove workers plant today? (Hint: The answer is near to 6).

A: We know the Answer Hints: 6. With the Answer Hints: 6, we will answer the question. There are 15 trees originally. Then there were 21 trees after the Grove workers planted some more. So there must have been $21 - 15 = 6$ trees that were planted. The answer is 6.

Q: If there are 3 cars in the parking lot and 2 more cars arrive, how many cars are in the parking lot? (Hint: The answer is near to 10, 8).

A: We know the Answer Hints: 10, 8. With the Answer Hints: 10, 8, we will answer the question. There are originally 3 cars. Then 2 more cars arrive. Now $3 + 2 = 5$ cars are in the parking lot. The answer is 5.

Q: Leah had 32 chocolates and her sister had 42. If they ate 35, how many pieces do they have left in total? (Hint: The answer is near to 30, 35).

A: We know the Answer Hints: 30, 35. With the Answer Hints: 30, 35, we will answer the question.

Originally, Leah had 32 chocolates and her sister had 42. So in total they had $32 + 42 = 74$. After eating 35, they had $74 - 35 = 39$ pieces left in total. The answer is 39.

Q: Jason had 20 lollipops. He gave Denny some lollipops. Now Jason has 12 lollipops. How many lollipops did Jason give to Denny? (Hint: The answer is near to 8, 12).

A: We know the Answer Hints: 8, 12. With the Answer Hints: 8, 12, we will answer the question. Jason had 20 lollipops originally. Then he had 12 after giving some to Denny. So he gave Denny $20 - 12 = 8$ lollipops. The answer is 8.

Q: Shawn has five toys. For Christmas, he got two toys each from his mom and dad. How many toys does he have now? (Hint: The answer is near to 9, 5).

A: We know the Answer Hints: 9, 5. With the Answer Hints: 9, 5, we will answer the question. Shawn started with 5 toys. He then got 2 toys each from his mom and dad. So he got $2 * 2 = 4$ more toys. Now he has $5 + 4 = 9$ toys. The answer is 9.

Q: There were nine computers in the server room. Five more computers were installed each day, from monday to thursday. How many computers are now in the server room? (Hint: The answer is near to 20).

A: We know the Answer Hints: 20. With the Answer Hints: 20, we will answer the question. There were originally 9 computers. For each day from monday to thursday, 5 more computers were installed. So $4 * 5 = 20$ computers were added. Now $9 + 20 = 29$ computers are now in the server room. The answer is 29.

Q: Michael had 58 golf balls. On tuesday, he lost 23 golf balls. On wednesday, he lost 2 more. How many golf balls did he have at the end of wednesday? (Hint: The answer is near to 45).

A: We know the Answer Hints: 45. With the Answer Hints: 45, we will answer the question. Michael started with 58 golf balls. He lost 23 on Tuesday, and lost 2 more on wednesday. So he had $58 - 23 = 35$ at the end of Tuesday, and $35 - 2 = 33$ at the end of wednesday. The answer is 33.

Q: Olivia has \$23. She bought five bagels for \$3 each. How much money does she have left? (Hint: The answer is near to 8).

A: We know the Answer Hints: 8. With the Answer Hints: 8, we will answer the question. Olivia had 23 dollars. She bought 5 bagels for 3 dollars each. So she spent $5 * 3 = 15$ dollars. Now she has $23 - 15 = 8$ dollars left. The answer is 8.

5.2 For AQuA

Base Chain-Of-Thought

Q: John found that the average of 15 numbers is 40. If 10 is added to each number then the mean of the numbers is?

Answer Choices: (a) 50 (b) 45 (c) 65 (d) 78 (e) 64

A: If 10 is added to each number, then the mean of the numbers also increases by 10. So the new mean would be 50. The answer is (a).

Q: If $a / b = 3/4$ and $8a + 5b = 22$, then find the value of a.

Answer Choices: (a) $1/2$ (b) $3/2$ (c) $5/2$ (d) $4/2$ (e) $7/2$

A: $a / b = 3/4$, then $b = 4a / 3$. So $8a + 5(4a / 3) = 22$. This simplifies to $8a + 20a / 3 = 22$, which means $44a / 3 = 22$. So a is equal to $3/2$. The answer is (b).

Q: A person is traveling at 20 km/hr and reached his destiny in 2.5 hr then find the distance?

Answer Choices: (a) 53 km (b) 55 km (c) 52 km (d) 60 km (e) 50 km

A: The distance that the person traveled would have been $20 \text{ km/hr} * 2.5 \text{ hrs} = 50 \text{ km}$. The answer is (e).

Q: How many keystrokes are needed to type the numbers from 1 to 500?

Answer Choices: (a) 1156 (b) 1392 (c) 1480 (d) 1562 (e) 1788

A: There are 9 one-digit numbers from 1 to 9. There are 90 two-digit numbers from 10 to 99. There are 401 three-digit numbers from 100 to 500. $9 + 90(2) + 401(3) = 1392$. The answer is (b).

Progressive-Hint Prompting Chain-Of-Thought (PHP-CoT)

Q: John found that the average of 15 numbers is 40. If 10 is added to each number then the mean of the numbers is? (Hint: The answer is near to (a)).

Answer Choices: (a) 50 (b) 45 (c) 65 (d) 78 (e) 64

A: **We know the Answer Hints: (a).** With the Answer Hints: (a), we will answer the question. If 10 is added to each number, then the mean of the numbers also increases by 10. So the new mean would be 50. The answer is (a).

Q: If $a/b = 3/4$ and $8a + 5b = 22$, then find the value of a . (Hint: The answer is near to (b)).

Answer Choices: (a) $1/2$ (b) $3/2$ (c) $5/2$ (d) $4/2$ (e) $7/2$

A: **We know the Answer Hints: (b).** With the Answer Hints: (b), we will answer the question. $a/b = 3/4$, then $b = 4a/3$. So $8a + 5(4a/3) = 22$. This simplifies to $8a + 20a/3 = 22$, which means $44a/3 = 22$. So a is equal to $3/2$. The answer is (b).

Q: A person is traveling at 20 km/hr and reached his destiny in 2.5 hr then find the distance? (Hint: The answer is near to (d), (c)).

Answer Choices: (a) 53 km (b) 55 km (c) 52 km (d) 60 km (e) 50 km

A: **We know the Answer Hints: (d), (c).** With the Answer Hints: (d), (c), we will answer the question. The distance that the person traveled would have been $20 \text{ km/hr} * 2.5 \text{ hrs} = 50 \text{ km}$. The answer is (e).

Q: How many keystrokes are needed to type the numbers from 1 to 500? (Hint: The answer is near to (a)).

Answer Choices: (a) 1156 (b) 1392 (c) 1480 (d) 1562 (e) 1788

A: **We know the Answer Hints: (a).** With the Answer Hints: (a), we will answer the question. There are 9 one-digit numbers from 1 to 9. There are 90 two-digit numbers from 10 to 99. There are 401 three-digit numbers from 100 to 500. $9 + 90(2) + 401(3) = 1392$. The answer is (b).

Q: John found that the average of 15 numbers is 40. If 10 is added to each number then the mean of the numbers is? (Hint: The answer is near to (a), (d)).

Answer Choices: (a) 50 (b) 45 (c) 65 (d) 78 (e) 64

A: **We know the Answer Hints: (a), (d).** With the Answer Hints: (a), (d), we will answer the question. If 10 is added to each number, then the mean of the numbers also increases by 10. So the new mean would be 50. The answer is (a).

Q: If $a/b = 3/4$ and $8a + 5b = 22$, then find the value of a . (Hint: The answer is near to (a)).

Answer Choices: (a) $1/2$ (b) $3/2$ (c) $5/2$ (d) $4/2$ (e) $7/2$

A: **We know the Answer Hints: (a).** With the Answer Hints: (a), we will answer the question. $a/b = 3/4$, then $b = 4a/3$. So $8a + 5(4a/3) = 22$. This simplifies to $8a + 20a/3 = 22$, which means $44a/3 = 22$. So a is equal to $3/2$. The answer is (b).

Q: A person is traveling at 20 km/hr and reached his destiny in 2.5 hr then find the distance? (Hint: The answer is near to (b)).

Answer Choices: (a) 53 km (b) 55 km (c) 52 km (d) 60 km (e) 50 km

A: **We know the Answer Hints: (b).** With the Answer Hints: (b), we will answer the question. The distance that the person traveled would have been $20 \text{ km/hr} * 2.5 \text{ hrs} = 50 \text{ km}$. The answer is (e).

Q: How many keystrokes are needed to type the numbers from 1 to 500? (Hint: The answer is near to (b), (a)).

Answer Choices: (a) 1156 (b) 1392 (c) 1480 (d) 1562 (e) 1788

A: **We know the Answer Hints: (b), (a).** With the Answer Hints: (b), (a), we will answer the question. There are 9 one-digit numbers from 1 to 9. There are 90 two-digit numbers from 10 to 99. There are 401 three-digit numbers from 100 to 500. $9 + 90(2) + 401(3) = 1392$. The answer is (b).

6 Complex Chain-Of-Thought Prompt

6.1 For AddSub, MultiArith, SingleEQ, SVAMP and GSM8K

Base Complex Chain-Of-Thought

Question: Angelo and Melanie want to plan how many hours over the next week they should study together for their test next week. They have 2 chapters of their textbook to study and 4 worksheets to memorize. They figure out that they should dedicate 3 hours to each chapter of their textbook and 1.5 hours for each worksheet. If they plan to study no more than 4 hours each day, how many days should they plan to study total over the next week if they take a 10-minute break every hour, include 3 10-minute snack breaks each day, and 30 minutes for lunch each day?

A: Let's think step by step. Angelo and Melanie think they should dedicate 3 hours to each of the 2 chapters, $3 \text{ hours} \times 2 \text{ chapters} = 6 \text{ hours total}$.

For the worksheets they plan to dedicate 1.5 hours for each worksheet, $1.5 \text{ hours} \times 4 \text{ worksheets} = 6 \text{ hours total}$.

Angelo and Melanie need to start with planning 12 hours to study, at 4 hours a day, $12 / 4 = 3 \text{ days}$. However, they need to include time for breaks and lunch. Every hour they want to include a 10-minute break, so $12 \text{ total hours} \times 10 \text{ minutes} = 120 \text{ extra minutes for breaks}$.

They also want to include 3 10-minute snack breaks, $3 \times 10 \text{ minutes} = 30 \text{ minutes}$.

And they want to include 30 minutes for lunch each day, so $120 \text{ minutes for breaks} + 30 \text{ minutes for snack breaks} + 30 \text{ minutes for lunch} = 180 \text{ minutes}$, or $180 / 60 \text{ minutes per hour} = 3 \text{ extra hours}$.

So Angelo and Melanie want to plan 12 hours to study + 3 hours of breaks = 15 hours total. They want to study no more than 4 hours each day, $15 \text{ hours} / 4 \text{ hours each day} = 3.75$. They will need to plan to study 4 days to allow for all the time they need.

The answer is 4

Question: Mark's basketball team scores 25 2 pointers, 8 3 pointers and 10 free throws. Their opponents score double the 2 pointers but half the 3 pointers and free throws. What's the total number of points scored by both teams added together?

A: Let's think step by step

Mark's team scores 25 2 pointers, meaning they scored $25 \times 2 = 50$ points in 2 pointers.

His team also scores 8 3 pointers, meaning they scored $8 \times 3 = 24$ points in 3 pointers

They scored 10 free throws, and free throws count as one point so they scored $10 \times 1 = 10$ points in free throws.

All together his team scored $50 + 24 + 10 = 84$ points

Mark's opponents scored double his team's number of 2 pointers, meaning they scored $50 \times 2 = 100$ points in 2 pointers.

His opponents scored half his team's number of 3 pointers, meaning they scored $24 / 2 = 12$ points in 3 pointers.

They also scored half Mark's team's points in free throws, meaning they scored $10 / 2 = 5$ points in free throws.

All together Mark's opponents scored $100 + 12 + 5 = 117$ points

The total score for the game is both team's scores added together, so it is $84 + 117 = 201$ points

The answer is 201

Question: Bella has two times as many marbles as frisbees. She also has 20 more frisbees than deck cards. If she buys $2/5$ times more of each item, what would be the total number of the items she will have if she currently has 60 marbles?

A: Let's think step by step

When Bella buys $2/5$ times more marbles, she'll have increased the number of marbles by $2/5 \times 60 = 24$

The total number of marbles she'll have is $60 + 24 = 84$

If Bella currently has 60 marbles, and she has two times as many marbles as frisbees, she has $60 / 2 = 30$ frisbees.

If Bella buys $2/5$ times more frisbees, she'll have $2/5 \times 30 = 12$ more frisbees.

The total number of frisbees she'll have will increase to $30 + 12 = 42$

Bella also has 20 more frisbees than deck cards, meaning she has $30 - 20 = 10$ deck cards

If she buys $2/5$ times more deck cards, she'll have $2/5 \times 10 = 4$ more deck cards.

The total number of deck cards she'll have is $10 + 4 = 14$

Together, Bella will have a total of $14+42+84 = 140$ items
The answer is 140

Question: A group of 4 fruit baskets contains 9 apples, 15 oranges, and 14 bananas in the first three baskets and 2 less of each fruit in the fourth basket. How many fruits are there?

A: Let's think step by step

For the first three baskets, the number of apples and oranges in one basket is $9+15=24$

In total, together with bananas, the number of fruits in one basket is $24+14=38$ for the first three baskets.

Since there are three baskets each having 38 fruits, there are $3*38=114$ fruits in the first three baskets.

The number of apples in the fourth basket is $9-2=7$

There are also $15-2=13$ oranges in the fourth basket

The combined number of oranges and apples in the fourth basket is $13+7=20$

The fourth basket also contains $14-2=12$ bananas.

In total, the fourth basket has $20+12=32$ fruits.

The four baskets together have $32+114=146$ fruits.

The answer is 146

Question: You can buy 4 apples or 1 watermelon for the same price. You bought 36 fruits evenly split between oranges, apples and watermelons, and the price of 1 orange is \$0.50. How much does 1 apple cost if your total bill was \$66?

A: Let's think step by step

If 36 fruits were evenly split between 3 types of fruits, then I bought $36/3 = 12$ units of each fruit

If 1 orange costs \$0.50 then 12 oranges will cost $\$0.50 * 12 = \6

If my total bill was \$66 and I spent \$6 on oranges then I spent $\$66 - 6 = 60$ on the other 2 fruit types.

Assuming the price of watermelon is W, and knowing that you can buy 4 apples for the same price and that the price of one apple is A, then $1W=4A$

If we know we bought 12 watermelons and 12 apples for \$60, then we know that $\$60 = 12W + 12A$

Knowing that $1W=4A$, then we can convert the above to $\$60 = 12(4A) + 12A$

$60 = 48A + 12A$

$60 = 60A$

Then we know the price of one apple (A) is $\$60/60 = \1

The answer is 1

Question: Susy goes to a large school with 800 students, while Sarah goes to a smaller school with only 300 students. At the start of the school year, Susy had 100 social media followers. She gained 40 new followers in the first week of the school year, half that in the second week, and half of that in the third week. Sarah only had 50 social media followers at the start of the year, but she gained 90 new followers the first week, a third of that in the second week, and a third of that in the third week. After three weeks, how many social media followers did the girl with the most total followers have?

A: Let's think step by step

After one week, Susy has $100+40 = 140$ followers.

In the second week, Susy gains $40/2 = 20$ new followers.

In the third week, Susy gains $20/2 = 10$ new followers.

In total, Susy finishes the three weeks with $140+20+10 = 170$ total followers.

After one week, Sarah has $50+90 = 140$ followers.

After the second week, Sarah gains $90/3 = 30$ followers.

After the third week, Sarah gains $30/3 = 10$ followers.

So, Sarah finishes the three weeks with $140+30+10 = 180$ total followers.

Thus, Sarah is the girl with the most total followers with a total of 180.

The answer is 180

Question: Sam bought a dozen boxes, each with 30 highlighter pens inside, for \$10 each box. He rearranged five of these boxes into packages of six highlighters each and sold them for \$3 per package. He sold the rest of the highlighters separately at the rate of three pens for \$2. How much profit did he make in total, in dollars?

A: Let's think step by step

Sam bought 12 boxes $\times 10 = 120$ worth of highlighters.

He bought $12 * 30 = 360$ highlighters in total.

Sam then took 5 boxes $\times 6$ highlighters/box = 30 highlighters.

He sold these boxes for $5 * \$3 = \15

After selling these 5 boxes there were $360 - 30 = 330$ highlighters remaining.
 These form $330 / 3 = 110$ groups of three pens.
 He sold each of these groups for \$2 each, so made $110 * 2 = \$220$ from them.
 In total, then, he earned $\$220 + \$15 = \$235$.
 Since his original cost was \$120, he earned $\$235 - \$120 = \$115$ in profit.
 The answer is 115

Question: In a certain school, $2/3$ of the male students like to play basketball, but only $1/5$ of the female students like to play basketball. What percent of the population of the school do not like to play basketball if the ratio of the male to female students is 3:2 and there are 1000 students?

A: Let's think step by step

The students are divided into $3 + 2 = 5$ parts where 3 parts are for males and 2 parts are for females.
 Each part represents $1000/5 = 200$ students.

So, there are $3 \times 200 = 600$ males.

And there are $2 \times 200 = 400$ females.

Hence, $600 \times 2/3 = 400$ males play basketball.

And $400 \times 1/5 = 80$ females play basketball.

A total of $400 + 80 = 480$ students play basketball.

Therefore, $1000 - 480 = 520$ do not like to play basketball.

The percentage of the school that do not like to play basketball is $520/1000 * 100 = 52$ The answer is 52

Progressive-Hint Prompting Complex Chain-Of-Thought (PHP-Complex CoT)

Question: Angelo and Melanie want to plan how many hours over the next week they should study together for their test next week. They have 2 chapters of their textbook to study and 4 worksheets to memorize. They figure out that they should dedicate 3 hours to each chapter of their textbook and 1.5 hours for each worksheet. If they plan to study no more than 4 hours each day, how many days should they plan to study total over the next week if they take a 10-minute break every hour, include 3 10-minute snack breaks each day, and 30 minutes for lunch each day? (Hint: The answer is near to 4).

A: We know the Answer Hints: 4. With the Answer Hints: 4, we will answer the question.

Let's think step by step.

Angelo and Melanie think they should dedicate 3 hours to each of the 2 chapters, $3 \text{ hours} \times 2 \text{ chapters} = 6$ hours total.

For the worksheets they plan to dedicate 1.5 hours for each worksheet, $1.5 \text{ hours} \times 4 \text{ worksheets} = 6$ hours total.

Angelo and Melanie need to start with planning 12 hours to study, at 4 hours a day, $12 / 4 = 3$ days. However, they need to include time for breaks and lunch. Every hour they want to include a 10-minute break, so $12 \text{ total hours} \times 10 \text{ minutes} = 120$ extra minutes for breaks.

They also want to include 3 10-minute snack breaks, $3 \times 10 \text{ minutes} = 30$ minutes.

And they want to include 30 minutes for lunch each day, so $120 \text{ minutes for breaks} + 30 \text{ minutes for snack breaks} + 30 \text{ minutes for lunch} = 180$ minutes, or $180 / 60 \text{ minutes per hour} = 3$ extra hours.

So Angelo and Melanie want to plan 12 hours to study + 3 hours of breaks = 15 hours total.

They want to study no more than 4 hours each day, $15 \text{ hours} / 4 \text{ hours each day} = 3.75$

They will need to plan to study 4 days to allow for all the time they need.

The answer is 4

Question: Mark's basketball team scores 25 2 pointers, 8 3 pointers and 10 free throws. Their opponents score double the 2 pointers but half the 3 pointers and free throws. What's the total number of points scored by both teams added together?(Hint: The answer is near to 201).

A: We know the Answer Hints: 201. With the Answer Hints: 201, we will answer the question.

Let's think step by step

Mark's team scores 25 2 pointers, meaning they scored $25 * 2 = 50$ points in 2 pointers.

His team also scores 8 3 pointers, meaning they scored $8 * 3 = 24$ points in 3 pointers

They scored 10 free throws, and free throws count as one point so they scored $10 * 1 = 10$ points in free throws.

All together his team scored $50 + 24 + 10 = 84$ points

Mark's opponents scored double his team's number of 2 pointers, meaning they scored $50 * 2 = 100$ points in 2 pointers.

His opponents scored half his team's number of 3 pointers, meaning they scored $24 / 2 = 12$ points in 3

pointers.

They also scored half Mark's team's points in free throws, meaning they scored $10/2=5$ points in free throws

All together Mark's opponents scored $100+12+5=117$ points

The total score for the game is both team's scores added together, so it is $84+117=201$ points

The answer is 201

Question: Bella has two times as many marbles as frisbees. She also has 20 more frisbees than deck cards. If she buys $2/5$ times more of each item, what would be the total number of the items she will have if she currently has 60 marbles? (Hint: The answer is near to 160,145).

A: We know the Answer Hints: 160, 145. With the Answer Hints: 160, 145, we will answer the question.

Let's think step by step

When Bella buys $2/5$ times more marbles, she'll have increased the number of marbles by $2/5*60 = 24$

The total number of marbles she'll have is $60+24 = 84$

If Bella currently has 60 marbles, and she has two times as many marbles as frisbees, she has $60/2 = 30$ frisbees.

If Bella buys $2/5$ times more frisbees, she'll have $2/5*30 = 12$ more frisbees.

The total number of frisbees she'll have will increase to $30+12 = 42$

Bella also has 20 more frisbees than deck cards, meaning she has $30-20 = 10$ deck cards

If she buys $2/5$ times more deck cards, she'll have $2/5*10 = 4$ more deck cards.

The total number of deck cards she'll have is $10+4 = 14$

Together, Bella will have a total of $14+42+84 = 140$ items

The answer is 140

Question: A group of 4 fruit baskets contains 9 apples, 15 oranges, and 14 bananas in the first three baskets and 2 less of each fruit in the fourth basket. How many fruits are there? (Hint: The answer is near to 93, 141).

A: We know the Answer Hints: 93, 141. With the Answer Hints: 93, 141, we will answer the question.

Let's think step by step

For the first three baskets, the number of apples and oranges in one basket is $9+15=24$

In total, together with bananas, the number of fruits in one basket is $24+14=38$ for the first three baskets.

Since there are three baskets each having 38 fruits, there are $3*38=114$ fruits in the first three baskets.

The number of apples in the fourth basket is $9-2=7$

There are also $15-2=13$ oranges in the fourth basket

The combined number of oranges and apples in the fourth basket is $13+7=20$

The fourth basket also contains $14-2=12$ bananas.

In total, the fourth basket has $20+12=32$ fruits.

The four baskets together have $32+114=146$ fruits.

The answer is 146

Question: You can buy 4 apples or 1 watermelon for the same price. You bought 36 fruits evenly split between oranges, apples and watermelons, and the price of 1 orange is \$0.50. How much does 1 apple cost if your total bill was \$66? (Hint: The answer is near to 1, 5).

A: We know the Answer Hints: 1, 5. With the Answer Hints: 1, 5, we will answer the question.

Let's think step by step

If 36 fruits were evenly split between 3 types of fruits, then I bought $36/3 = 12$ units of each fruit

If 1 orange costs \$0.50 then 12 oranges will cost $0.50 * 12 = \$6$

If my total bill was \$66 and I spent \$6 on oranges then I spent $\$66 - \$6 = \$60$ on the other 2 fruit types.

Assuming the price of watermelon is W, and knowing that you can buy 4 apples for the same price and that the price of one apple is A, then $1W=4A$

If we know we bought 12 watermelons and 12 apples for \$60, then we know that $\$60 = 12W + 12A$

Knowing that $1W=4A$, then we can convert the above to $\$60 = 12(4A) + 12A$

$\$60 = 48A + 12A$

$\$60 = 60A$

Then we know the price of one apple (A) is $\$60/60 = \1
The answer is 1

Question: Susy goes to a large school with 800 students, while Sarah goes to a smaller school with only 300 students. At the start of the school year, Susy had 100 social media followers. She gained 40 new followers in the first week of the school year, half that in the second week, and half of that in the third week. Sarah only had 50 social media followers at the start of the year, but she gained 90 new followers the first week, a third of that in the second week, and a third of that in the third week. After three weeks, how many social media followers did the girl with the most total followers have? (Hint: The answer is near to 180, 160).

A: We know the Answer Hints: 180, 160. With the Answer Hints: 180, 160, we will answer the question.

Let's think step by step

After one week, Susy has $100 + 40 = 140$ followers.

In the second week, Susy gains $40/2 = 20$ new followers.

In the third week, Susy gains $20/2 = 10$ new followers.

In total, Susy finishes the three weeks with $140 + 20 + 10 = 170$ total followers.

After one week, Sarah has $50 + 90 = 140$ followers.

After the second week, Sarah gains $90/3 = 30$ followers.

After the third week, Sarah gains $30/3 = 10$ followers.

So, Sarah finishes the three weeks with $140 + 30 + 10 = 180$ total followers.

Thus, Sarah is the girl with the most total followers with a total of 180.

The answer is 180

Question: Sam bought a dozen boxes, each with 30 highlighter pens inside, for \$10 each box. He rearranged five of these boxes into packages of six highlighters each and sold them for \$3 per package. He sold the rest of the highlighters separately at the rate of three pens for \$2. How much profit did he make in total, in dollars? (Hint: The answer is near to 120).

A: We know the Answer Hints: 120. With the Answer Hints: 120, we will answer the question.

Let's think step by step

Sam bought $12 \text{ boxes} \times \$10 = \$120$ worth of highlighters.

He bought $12 \times 30 = 360$ highlighters in total.

Sam then took 5 boxes $\times 6 \text{ highlighters/box} = 30$ highlighters.

He sold these boxes for $5 \times \$3 = \15

After selling these 5 boxes there were $360 - 30 = 330$ highlighters remaining.

These form $330 / 3 = 110$ groups of three pens.

He sold each of these groups for \$2 each, so made $110 \times 2 = \$220$ from them.

In total, then, he earned $\$220 + \$15 = \$235$.

Since his original cost was \$120, he earned $\$235 - \$120 = \$115$ in profit.

The answer is 115

Question: In a certain school, $2/3$ of the male students like to play basketball, but only $1/5$ of the female students like to play basketball. What percent of the population of the school do not like to play basketball if the ratio of the male to female students is 3:2 and there are 1000 students? (Hint: The answer is near to 45).

A: We know the Answer Hints: 45. With the Answer Hints: 45, we will answer the question.

Let's think step by step

The students are divided into $3 + 2 = 5$ parts where 3 parts are for males and 2 parts are for females.

Each part represents $1000/5 = 200$ students.

So, there are $3 \times 200 = 600$ males.

And there are $2 \times 200 = 400$ females.

Hence, $600 \times 2/3 = 400$ males play basketball.

And $400 \times 1/5 = 80$ females play basketball.

A total of $400 + 80 = 480$ students play basketball.

Therefore, $1000 - 480 = 520$ do not like to play basketball.

The percentage of the school that do not like to play basketball is $520/1000 \times 100 = 52$

The answer is 52

6.2 For AQuA

Base Complex Chain-Of-Thought

Question: there were 35 students in a hostel . due to the admission of 7 new students the expenses of the mess were increased by rs . 84 per day while the average expenditure per head diminished by re 1 . what was the original expenditure of the mess ? Options: (a) rs 450 (b) rs 920 (c) rs 550 (d) rs . 630 (e) none of these

A: Let's think step by step let the original average expenditure be rs . x then , $42 (x - 1) - 35 x = 84$
 $x = 126$ $x = 18$ therefore original expenditure = rs . $(35 * 18) =$ rs . 630. The answer is (d), rs . 630

Question: a train 200 m long passes a man , running at 5 km / hr in the same direction in which the train is going , in 10 seconds . the speed of the train is ? Options: (a) 28 (b) 50 (c) 77 (d) 22 (e) 12

A: Let's think step by step speed of the train relative to man = $(200 / 10)$ m / sec = (20) m / sec . $[(20) * (18 / 5)]$ km / hr = 72 km / hr. let the speed of the train be x km / hr. then , relative speed = $(x - 5)$ km / hr. $x - 5 = 72$, $x = 77$ km / hr . The answer is (c), 77

Question: solution x contains 20 % of material a and 80 % of material b . solution y contains 30 % of material a and 70 % of material b . a mixture of both these solutions contains 22 % of material a in the final product . how much solution x is present in the mixture ?

Options: (a) 40 % (b) 60 % (c) 80 % (d) 100 % (e) 110 %

A: Let's think step by step

we can assume the total weight of the mixture = 100

conc of a in the final mixture = 22

let weight of a in the mixture be x .

conc given = 20% = 0.2

therefore , weight of b = $100 - x$.

conc given = 30% = 0.3

now , accordding to the problem, $0.2 x + 0.3 (100 - x) = 22$

solving , we get $x = 80$

since we assumed the weight of the mixture = 100, therefore presence of a in the mixture = 80%.

The answer is (c), 80%

Question: a trader sells 40 metres of cloth for rs . 8200 at a profit of rs . 35 per metre of cloth . how much profit will the trdrer earn on 40 metres of cloth ?

Options: (a) rs . 950 (b) rs . 1500 (c) rs . 1000 (d) rs . 1400 (e) none of these

A: Let's think step by step

price of 1 metre cloth = $8200 / 40 =$ rs 205

cost of 1 metre cloth = rs 205 – 35 = rs 170

cost on 40 metres = $170 \times 40 =$ rs . 6800

profit earned on 40 metres cloth = rs . 8200 – rs . 6800 = rs . 1400

The answer is (d), rs . 1400

Question: if $x < y < z$ and $y - x > 5$, where x is an even integer and y and z are odd integers , what is the least possible value s of $z - x$?

Options: (a) 6 (b) 7 (c) 8 (d) 9 (e) 10

A: Let's think step by step

We know $x < y < z$

to find the least possible value for $z - x$, we need to find the values for z and x that can be closest to each other.

if x is some even number, then what could be minimum possible odd z .

if x is some even number, $y - x > 5$; $y > x + 5$

minimum value for $y = x + 5 + 2 = x + 7$

(note : $x + 5$ is as even + odd = odd and nearest odd greater than $x + 5$ is $x + 5 + 2$)

minimum value for $z = y + 2 = x + 7 + 2 = x + 9$

(note : $z = y + 2$ because both z and y are odd, difference between two odd numbers is 2)

$s = z - x = x + 9 - x = 9$

The answer is (d), 9

Question: what is the difference between the c . i . on rs . 6000 for $1 \frac{1}{2}$ years at 4 % per annum compounded yearly and half - yearly ?

Options: (a) s . 2.04 (b) s . 2.08 (c) s . 2.02 (d) s . 2.83 (e) s . 2.45

A: Let's think step by step

c . i . when interest is compounded yearly = $[6000 * (1 + 4 / 100) * (1 + (1 / 2 * 4) / 100)] = 6000 * 26 / 25 * 51 / 50 = \text{rs . } 6364.8$

c . i . when interest is compounded half - yearly = $[6000 * (1 + 2 / 100) ^2] = (6000 * 51 / 50 * 51 / 50) = \text{rs . } 6367.25$

difference = $(6367.25 - 6364.8) = \text{rs . } 2.45$.

The answer is (e), s . 2.45

Question: the average weight of a , b and c is 45 kg . if the average weight of a and b be 40 kg and that of b and c be 45 kg , then the weight of b is :

Options: (a) 31 kg (b) 32 kg (c) 33 kg (d) 35 kg (e) none of these

A: Let's think step by step

let a , b , c represent their respective weights.

then , we have : $a + b + c = (45 \times 3) = 135 \dots (i)$

$a + b = (40 \times 2) = 80 \dots (ii)$

$b + c = (45 \times 2) = 90 \dots (iii)$

adding (ii) and (iii), we get : $a + 2 b + c = 170 \dots (iv)$

subtracting (i) from (iv), we get : $b = 35$.

b' s weight = 35 kg .

The answer is (d), 35 kg

Question: the compound and the simple interests on a certain sum at the same rate of interest for two years are rs . 11730 and rs . 10200 respectively . find the sum

Options: (a) rs . 17037 (b) rs . 17000 (c) rs . 17276 (d) rs . 170287 (e) rs . 171881

A: Let's think step by step

the simple interest for the first year is $10200 / 2$ is rs . 5100

and compound interest for first year also is rs . 5100.

the compound interest for second year on rs . 5100 for one year

so rate of the interest = $(100 * 1530) / (5100 * 1) = 30\% p$

so $p = (100 * 10200) / (30 * 2) = \text{rs . } 17000$

The answer is (b), rs . 17000

Progressive-Hint Prompting Complex Chain of Thought (PHP-Complex CoT)

Question: there were 35 students in a hostel . due to the admission of 7 new students the expenses of the mess were increased by rs . 84 per day while the average expenditure per head diminished by re 1 . what was the original expenditure of the mess ? (Hint: The answer is near to (d)).

Options: (a) rs 450 (b) rs 920 (c) rs 550 (d) rs . 630 (e) none of these

A: We know the Answer Hints: (d). With the Answer Hints: (d), we will answer the question.

Let's think step by step

let the original average expenditure be rs . x

then , $42 (x - 1) - 35 x = 84$ $7 x = 126$

$x = 18$

therefore original expenditure = rs . $(35 * 18) = \text{rs . } 630$.

The answer is (d), rs . 630

Question: a train 200 m long passes a man , running at 5 km / hr in the same direction in which the train is going , in 10 seconds . the speed of the train is ? (Hint: The answer is near to (c)).

Options: (a) 28 (b) 50 (c) 77 (d) 22 (e) 12

A: We know the Answer Hints: (c). With the Answer Hints: (c), we will answer the question.

Let's think step by step

speed of the train relative to man = $(200 / 10) \text{ m / sec } = (20) \text{ m / sec.}$

$[(20) * (18 / 5)] \text{ km / hr } = 72 \text{ km / hr.}$

let the speed of the train be x km / hr.

then , relative speed = $(x - 5) \text{ km / hr.}$

$x - 5 = 72$, $x = 77 \text{ km / hr .}$

The answer is (c), 77

Question: solution x contains 20 % of material a and 80 % of material b . solution y contains 30 % of material a and 70 % of material b . a mixture of both these solutions contains 22 % of material a in

the final product . how much solution x is present in the mixture ? (Hint: The answer is near to (a)).
Options: (a) 40 % (b) 60 % (c) 80 % (d) 100 % (e) 110 %

A: We know the Answer Hints: (a). With the Answer Hints: (a), we will answer the question.

Let's think step by step

we can assume the total weight of the mixture = 100

conc of a in the final mixture = 22

let weight of a in the mixture be x.

conc given = 20% = 0.2

therefore , weight of b = 100 - x.

conc given = 30% = 0.3

now , according to the problem, $0.2x + 0.3(100 - x) = 22$

solving , we get $x = 80$

since we assumed the weight of the mixture = 100, therefore presence of a in the mixture = 80%.

The answer is (c), 80%

Question: a trader sells 40 metres of cloth for rs . 8200 at a profit of rs . 35 per metre of cloth . how much profit will the trader earn on 40 metres of cloth ? (Hint: The answer is near to (c)).

Options: (a) rs . 950 (b) rs . 1500 (c) rs . 1000 (d) rs . 1400 (e) none of these

A: We know the Answer Hints: (c). With the Answer Hints: (c), we will answer the question.

Let's think step by step

price of 1 metre cloth = $8200 / 40 = \text{rs } 205$

cost of 1 metre cloth = $\text{rs } 205 - 35 = \text{rs } 170$

cost on 40 metres = $170 \times 40 = \text{rs } 6800$

profit earned on 40 metres cloth = $\text{rs } 8200 - \text{rs } 6800 = \text{rs } 1400$

The answer is (d), rs . 1400

Question: if $x < y < z$ and $y - x > 5$, where x is an even integer and y and z are odd integers , what is the least possible value of $z - x$? (Hint: The answer is near to (a), (c)).

Options: (a) 6 (b) 7 (c) 8 (d) 9 (e) 10

A: We know the Answer Hints: (a), (c). With the Answer Hints: (a), (c), we will answer the question.

Let's think step by step

We know $x < y < z$

to find the least possible value for $z - x$, we need to find the values for z and x that can be closest to each other.

if x is some even number, then what could be minimum possible odd z.

if x is some even number, $y - x > 5$; $y > x + 5$

minimum value for $y = x + 5 + 2 = x + 7$

(note : $x + 5$ is as even + odd = odd and nearest odd greater than $x + 5$ is $x + 5 + 2$)

minimum value for $z = y + 2 = x + 7 + 2 = x + 9$

(note : $z = y + 2$ because both z and y are odd, difference between two odd numbers is 2)

$s = z - x = x + 9 - x = 9$

The answer is (d), 9

Question: what is the difference between the c . i . on rs . 6000 for $1\frac{1}{2}$ years at 4 % per annum compounded yearly and half - yearly ? (Hint: The answer is near to (e), (d)).

Options: (a) s . 2.04 (b) s . 2.08 (c) s . 2.02 (d) s . 2.83 (e) s . 2.45

A: We know the Answer Hints: (e), (d). With the Answer Hints: (e), (d), we will answer the question.

Let's think step by step

c . i . when interest is compounded yearly = $[6000 * (1 + 4 / 100) * (1 + (1 / 2 * 4) / 100)] = 6000 * 26 / 25 * 51 / 50 = \text{rs } 6364.8$

c . i . when interest is compounded half - yearly = $[6000 * (1 + 2 / 100)^2] = (6000 * 51 / 50 * 51 / 50) = \text{rs } 6367.25$

difference = $(6367.25 - 6364.8) = \text{rs } 2.45$.

The answer is (e), s . 2.45

Question: the average weight of a , b and c is 45 kg . if the average weight of a and b be 40 kg and that of b and c be 45 kg , then the weight of b is : (Hint: The answer is near to (d), (b)).

Options: (a) 31 kg (b) 32 kg (c) 33 kg (d) 35 kg (e) none of these

A: We know the Answer Hints: (d), (b). With the Answer Hints: (d), (b), we will answer the question.

Let's think step by step

let a , b , c represent their respective weights.

then , we have : $a + b + c = (45 \times 3) = 135 \dots (i)$
 $a + b = (40 \times 2) = 80 \dots (ii)$
 $b + c = (45 \times 2) = 90 \dots (iii)$
 adding (ii) and (iii), we get : $a + 2b + c = 170 \dots (iv)$
 subtracting (i) from (iv), we get : $b = 35$.
 b 's weight = 35 kg .
 The answer is (d), 35 kg

Question: the compound and the simple interests on a certain sum at the same rate of interest for two years are rs . 11730 and rs . 10200 respectively . find the sum (Hint: The answer is near to (e), (c)).

Options: (a) rs . 17037 (b) rs . 17000 (c) rs . 17276 (d) rs . 170287 (e) rs . 171881

A: We know the Answer Hints: (e), (c). With the Answer Hints: (e), (c), we will answer the question.

Let's think step by step

the simple interest for the first year is $10200 / 2$ is rs . 5100

and compound interest for first year also is rs . 5100.

the compound interest for second year on rs . 5100 for one year

so rate of the interest = $(100 * 1530) / (5100 * 1) = 30\%$ p

so p = $(100 * 10200) / (30 * 2) = \text{rs . } 17000$

The answer is (b), rs . 17000
