

前测 (Pre-test questions)

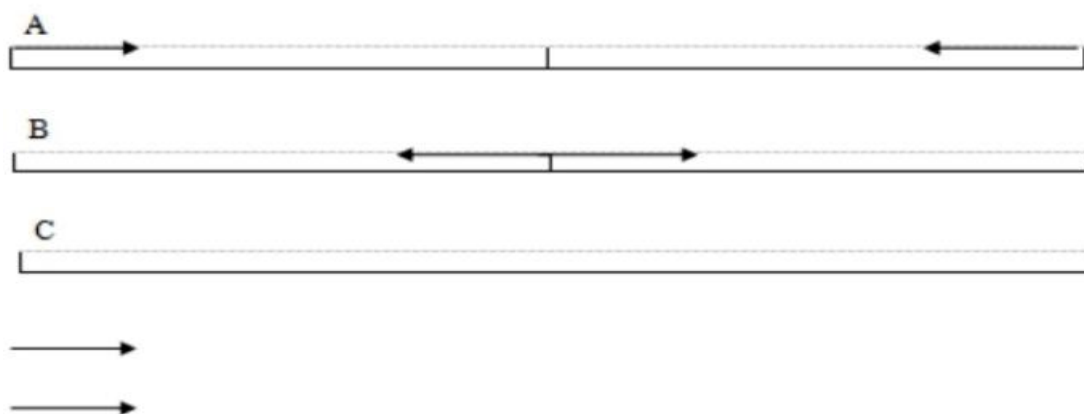
选择题：请选出你认为正确的选项。

(Single-Choice Question: Please select the one you think is correct.)

1. $48+33=$ A 71 B 81 C 82
2. $152+129=$ A 271 B 281 C 291
3. $82-37=$ A 45 B 55 C 44
4. $287-168=$ A 109 B 119 C 129
5. $67\times 5=$ A 315 B 325 C 335
6. $82\times 6=$ A 482 B 492 C 502
7. $98\div 7=$ A 34 B 24 C 14
8. $108\div 3=$ A 34 B 46 C 36

9. 甲乙两人相对而行是指面对面行走，从两边向中间走。那么下面三幅线段图哪副图是在描述相对而行？

(A and B are walking opposite each other means walking face to face, from both sides towards the middle. So, which of the three line drawings below describes walking opposite each other?)



10. 一辆卡车和一辆轿车分别从甲乙两地相对而行，卡车每小时行驶 44 千米，轿车每小时行驶 67 千米，5 小时后相遇。甲乙两地相距多少千米？

(A truck and a car are traveling opposite each other from A and B. The truck travels 44 km per hour and the car travels 67 km per hour, they meet after 5 hours. How many kilometers apart from A to B?)

- A 402km B 455km C 555km

样例学习材料 (Worked example materials)

(1) 无子目标样例 (No Subgoal-Worked Example)

例题 1: 小明和小红分别同时从甲乙两地相对而行，已知小明在甲地出发开车每小时行驶 60 千米，小红在乙地出发骑车每小时行驶 15 千米，经过 2 小时后，俩人相遇，请问甲乙两地相距多少千米？

(Example 1: Ming and Hong move opposite to each other from A and B respectively. It is known that Ming drives from A and travels 60 km per hour, while Hong rides from B and travels 15 km per hour, and the two meet in 2 hours. What is the distance between A and B?)

解(Solving): $(60+15) \times 2$
 $=75 \times 2$
 $=150(\text{km})$

答(Answer): 甲乙两地相距 150 千米。(The distance between A and B is 150 km.)

例题 2: 小龙和小云分别同时从甲乙两地相对而行，已知小龙开车速度为每小时 70 千米，小云的开车速度为每小时 50 千米，经过 3 小时相遇，请问甲乙两地相距多少千米？

(Example 2: Long and Yun move opposite to each other from A and B respectively. It is known that Long driving speed of 70 km per hour, Yun driving speed of 50 km per hour, 3 hours later the two meet. What is the distance between A and B?)

解(Solving): $(70+50) \times 3$
 $=120 \times 3$
 $=360(\text{km})$

答(Answer): 甲乙两地相距 360 千米。(The distance between A and B is 360 km.)

例题 3: 两辆汽车同时从 A、B 两城相对开出，从 A 城开出的汽车每小时行 38 千米，从 B 城开出的汽车每小时行 45 千米，4 小时后两车相遇，A、B 两城的距离是多少千米？

(Example 3: Two cars are traveling opposite each other at the same time from A and B. The car driving from A travels 38 km per hour and the car driving from B travels 45 km per hour, and the two cars meet after 4 hours. What is the distance between A

and B?)

解(Solving): $(38+45) \times 4$
 $=83 \times 4$
 $=332(\text{km})$

答(Answer): 甲乙两地相距 332 千米。(The distance between A and B is 332 km.)

例题 4 两艘客轮同时从两港相对行驶, 甲轮每小时行 44 千米, 乙轮每小时行 32 千米, 经过 4 小时相遇, 两港口相距多少千米?

(Example 4: Two ships travel opposite each other from two ports A and B at the same time, ship A travels 44 km per hour, ship B travels 32 km per hour, and the two ships meet after 4 hours, how far apart are the two ports A and B?)

解(Solving): $(44+32) \times 4$
 $=76 \times 4$
 $=304(\text{km})$

答(Answer): 甲乙两地相距 304 千米。(The distance between A and B is 304 km.)

(2) 子目标样例 (Subgoal-Worked Example)

例题 1: 小明和小红分别同时从甲乙两地相对而行, 已知小明在甲地出发开车每小时行驶 60 千米, 小红在乙地出发骑车每小时行驶 15 千米, 经过 2 小时后, 俩人相遇, 请问甲乙两地相距多少千米?

(Example 1: Ming and Hong move opposite to each other from A and B respectively. It is known that Ming drives from A and travels 60 km per hour, while Hong rides from B and travels 15 km per hour, and the two meet in 2 hours. What is the distance between A and B?)

解(Solving): $60 \times 2 = 120(\text{km})$
 $15 \times 2 = 30(\text{km})$
 $120 + 30 = 150(\text{km})$

答(Answer): 甲乙两地相距 150 千米。(The distance between A and B is 150 km.)

例题 2: 小龙和小云分别同时从甲乙两地相对而行, 已知小龙开车速度为每小时 70 千米, 小云的开车速度为每小时 50 千米, 经过 3 小时相遇, 请问甲乙两地相距多少千米?

(Example 2: Long and Yun move opposite to each other from A and B respectively. It is known that Long driving speed of 70 km per hour, Yun driving speed of 50 km per hour, 3 hours later the two meet. What is the distance between A and B?)

解(Solving) : $70 \times 3 = 210(\text{km})$

$$50 \times 3 = 150(\text{km})$$

$$210 + 150 = 360(\text{km})$$

答(Answer): 甲乙两地相距 360 千米。(The distance between A and B is 360 km.)

例题 3: 两辆气车同时从 A、B 两城相对开出, 从 A 城开出的气车每小时行 38 千米, 从 B 城开出的气车每小时行 45 千米, 4 小时后两车相围, A、B 两城的距离是多少千米?

(Example 3: Two cars are traveling opposite each other at the same time from A and B. The car driving from A travels 38 km per hour and the car driving from B travels 45 km per hour, and the two cars meet after 4 hours. What is the distance between A and B?)

解: (Solving) $38 \times 4 = 152(\text{km})$

$$45 \times 4 = 180(\text{km})$$

$$152 + 180 = 332(\text{km})$$

答: (Answer) 甲乙两地相距 332 千米。(The distance between A and B is 332 km.)

例题 4 两艘客轮同时从两港相对行驶, 甲轮每小时行 44 千米, 乙轮每小时行 32 千米, 经过 4 小时相遇, 两港口相距多少千米?

(Example 4: Two ships travel opposite each other from two ports. A and B at the same time, ship A travels 44 km per hour, ship B travels 32 km per hour, and the two ships meet after 4 hours, how far apart are the two ports A and B?)

解: (Solving) $44 \times 4 = 176(\text{km})$

$$32 \times 4 = 128(\text{km})$$

$$176 + 128 = 304(\text{km})$$

答(Answer): 甲乙两地相距 304 千米。(The distance between A and B is 304 km.)

(3) 选项式子目标标示样例 (Individual Choice Subgoal-Labeled Worked Example)

例题 1: 小明和小红分别同时从甲乙两地相对而行, 已知小明在甲地出发开车每小时行驶 60 千米, 小红在乙地出发骑车每小时行驶 15 千米, 经过 2 小时后, 俩人相遇, 请问甲乙两地相距多少千米?

(Example 1: Ming and Hong move opposite to each other from A and B respectively. It is known that Ming drives from A and travels 60 km per hour, while Hong rides from B and travels 15 km per hour, and the two meet in 2 hours. What is the distance between A and B?)

请在答题纸上写出以下选择题的正确选项。 **(Please write the answers to the following multiple-choice questions on your answer sheet.)**

1. 根据题意, 计算甲乙两地的距离, 就是计算: (According to the question, to calculate the distance between A and B is to calculate what?)

A. 小明和小红的速度差 (Speed gap between Ming and Hong)

B. 小明和小红的路程和 (Sum of the distance travelled by Ming and Hong)

C. 小明和小红的速度和 (Speed sum of Ming and Hong)

2. 已知小明和小红的速度, 那么行驶两小时后, 他们的路程分别是多少千米? (It is known the respective speeds of Ming and Hong, so how many kilometers will they have each traveled after 2 hours of travel?)

A. 75 30 B. 120 75 C. 120 30

3. 甲乙两地相遇多少千米? (What is the distance between A and B?)

A. 150 B. 120 C. 165

解(Solving): $60 \times 2 = 120(\text{km})$

$15 \times 2 = 30(\text{km})$

$120 + 30 = 150(\text{km})$

答(Answer): 甲乙两地相距 150 千米。 (The distance between A and B is 150 km.)

例题 2: 小龙和小云分别同时从甲乙两地相对而行, 已知小龙开车速度为每小时 70 千米, 小云的开车速度为每小时 50 千米, 经过 3 小时相遇, 请问甲乙两地相距多少千米?

(Example 2: Long and Yun move opposite to each other from A and B respectively. It is known that Long driving speed of 70 km per hour, Yun driving speed of 50 km per hour, 3 hours later the two meet. What is the distance between A and B?)

请在答题纸上写出以下选择题的正确选项。(Please write the answers to the following multiple-choice questions on your answer sheet.)

1. 根据题意，计算甲乙两地的距离，就是计算：(According to the question, to calculate the distance between A and B is to calculate what?)

A. 小龙和小云的速度差 (Speed gap between Long and Yun)

B. 小龙和小云的路程和 (Sum of the distance travelled by Long and Yun)

C. 小龙和小云的速度和 (Speed sum of Long and Yun)

2. 已知小龙和小云的速度，那么行驶 3 小时后，他们的路程分别是多少？(It is known the respective speeds of Long and Yun, so how many kilometers will they have each traveled after 3 hours of travel?)

A. 120 210 B. 150 120 C. 210 150

3. 甲乙两地相距多少千米？(What is the distance between A and B?)

A. 120 B. 150 C. 360

解(Solving): $70 \times 3 = 210(\text{km})$

$50 \times 3 = 150(\text{km})$

$210 + 150 = 360(\text{km})$

答(Answer): 甲乙两地相距 360 千米。(The distance between A and B is 360 km.)

例题 3: 两辆汽车同时从 A、B 两城相对开出，从 A 城开出的汽车每小时行 38 千米，从 B 城开出的汽车每小时行 45 千米，4 小时后两车相遇，A、B 两城的距离是多少千米？

(Example 3: Two cars are traveling opposite each other at the same time from A and B. The car driving from A travels 38 km per hour and the car driving from B travels 45 km per hour, and the two cars meet after 4 hours. What is the distance between A and B?)

请在答题纸上写出以下选择题的正确选项。(Please write the answers to the following multiple-choice questions on your answer sheet.)

1. 根据题意，计算甲乙两地的距离，就是计算：(According to the question, to calculate the distance between A and B is to calculate what?)

A. 两辆汽车的速度差 (Speed gap between the two cars)

B. 两辆汽车的路程和 (Sum of the distance travelled by the two cars)

C. 两辆汽车的速度和 (Speed sum of the two cars)

2. 已知两辆车的速度, 那么行驶 4 小时后, 他们的路程分别是多少千米? (It is known the respective speeds of the two cars, so how many kilometers will the two cars have each traveled after 4 hours of travel?)

A. 152 180 B. 152 114 C. 76 180

3. 甲乙两地相距多少千米? (What is the distance between A and B?)

A. 266 B. 335 C. 256

解(Solving): $38 \times 4 = 152(\text{km})$

$45 \times 4 = 180(\text{km})$

$152 + 180 = 332(\text{km})$

答(Answer): 甲乙两地相距 332 千米。(The distance between A and B is 332 km.)

例题 4 两艘客轮同时从两港相对行驶, 甲轮每小时行 44 千米, 乙轮每小时行 32 千米, 经过 4 小时相遇, 两港口相距多少千米?

(Example 4: Two ships travel opposite each other from two ports A and B at the same time, ship A travels 44 km per hour, ship B travels 32 km per hour, and the two ships meet after 4 hours, how far apart are the two ports A and B?)

请在答题纸上写出以下选择题的正确选项。(Please write the answers to the following multiple-choice questions on your answer sheet.)

1. 根据题意, 计算两港口之间的距离, 就是计算: (According to the question, to calculate the distance between A and B is to calculate what?)

A. 两艘轮船的速度差 (Speed gap between the two ships)

B. 两艘轮船的路程和 (Sum of the distance travelled by the two ships)

C. 两艘轮船的速度和 (Speed sum of the two ships)

2. 已知甲乙两艘轮船的速度, 在行驶 4 小时后, 他们的路程分别是多少千米? (It is known the respective speeds of the two ships, so how many kilometers will the two ships have each traveled after 4 hours of travel?)

A. 176 64 B. 88 64 C. 176 128

3. 两港口之间的距离是多少? (What is the distance between the two ports A and B?)

A. 240 B. 152 C.304

解(Solving): $44 \times 4 = 176(\text{km})$

$$32 \times 4 = 128(\text{km})$$

$$176 + 128 = 304(\text{km})$$

答(Answer): 甲乙两地相距 304 千米。(The distance between A and B is 304 km.)

(4) 解答式子目标标示样例 (Focused Subgoal-Labeled Worked Example)

例题 1: 小明和小红分别同时从甲乙两地相对而行, 已知小明在甲地出发开车每小时行驶 60 千米, 小红在乙地出发骑车每小时行驶 15 千米, 经过 2 小时后, 俩人相遇, 请问甲乙两地相距多少千米?

(Example 1: Ming and Hong move opposite to each other from A and B respectively. It is known that Ming drives from A and travels 60 km per hour, while Hong rides from B and travels 15 km per hour, and the two meet in 2 hours. What is the distance between A and B?)

请在答题纸上写出以下提示性问题的答案。**(Please write the answers to the following prompt questions on your answer sheet.)**

1. 根据题意, 计算甲乙两地的距离, 就是计算: (According to the question, to calculate the distance between A and B is to calculate what?)
2. 已知小明和小红的速度, 那么行驶两小时后, 他们的路程分别是多少千米? (It is known the respective speeds of Ming and Hong, so how many kilometers will they have each traveled after 2 hours of travel?)
3. 甲乙两地相遇多少千米? (What is the distance between A and B?)

解(Solving): $60 \times 2 = 120(\text{km})$

$$15 \times 2 = 30(\text{km})$$

$$120 + 30 = 150(\text{km})$$

答(Answer): 甲乙两地相距 150 千米。(The distance between A and B is 150 km.)

例题 2: 小龙和小云分别同时从甲乙两地相对而行, 已知小龙开车速度为每小时 70 千米, 小云的开车速度为每小时 50 千米, 经过 3 小时相遇, 请问甲乙两地相距多少千米?

(Example 2: Long and Yun move opposite to each other from A and B respectively. It is known that Long driving at the speed of 70 km per hour, Yun driving at the speed of

50 km per hour, 3 hours later the two meet. What is the distance between A and B?)

请在答题纸上写出以下提示性问题的答案。(Please write the answers to the following prompt questions on your answer sheet.)

1. 根据题意，计算甲乙两地的距离，就是计算：(According to the question, to calculate the distance between A and B is to calculate what?)

2. 已知小龙和小云的速度，那么行驶 3 小时后，他们的路程分别是多少？(It is known the respective speeds of Long and Yun, so how many kilometers will they have each traveled after 3 hours of travel?)

3. 甲乙两地相距多少千米？(What is the distance between A and B?)

解(Solving): $70 \times 3 = 210(\text{km})$

$$50 \times 3 = 150(\text{km})$$

$$210 + 150 = 360(\text{km})$$

答(Answer): 甲乙两地相距 360 千米。(The distance between A and B is 360 km.)

例题 3: 两辆汽车同时从 A、B 两城相对开出，从 A 城开出的汽车每小时行 38 千米，从 B 城开出的汽车每小时行 45 千米，4 小时后两车相遇，A、B 两城的距离是多少千米？

(Example 3: Two cars are traveling opposite each other at the same time from A and B. The car driving from A travels 38 km per hour and the car driving from B travels 45 km per hour, and the two cars meet after 4 hours. What is the distance between A and B?)

请在答题纸上写出以下提示性问题的答案。(Please write the answers to the following prompt questions on your answer sheet.)

1. 根据题意，计算甲乙两地的距离，就是计算：(According to the question, to calculate the distance between A and B is to calculate what?)

2. 已知两辆车的速度，那么行驶 4 小时后，他们的路程分别是多少千米？(It is known the respective speeds of the two cars, so how many kilometers will the two cars have each traveled after 4 hours of travel?)

3. 甲乙两地相距多少千米？(What is the distance between A and B?)

解(Solving): $38 \times 4 = 152(\text{km})$

$$45 \times 4 = 180(\text{km})$$

$$152 + 180 = 332(\text{km})$$

答(Answer): 甲乙两地相距 332 千米。(The distance between A and B is 332 km.)

例题 4 两艘客轮同时从两港相对行驶, 甲轮每小时行 44 千米, 乙轮每小时行 32 千米, 经过 4 小时相遇, 两港口相距多少千米?

(Example 4: Two ships travel opposite each other from two ports A and B at the same time, ship A travels 44 km per hour, ship B travels 32 km per hour, and the two ships meet after 4 hours, how far apart are the two ports A and B?)

请在答题纸上写出以下提示性问题的答案。(Please write the answers to the following prompt questions on your answer sheet.)

1. 根据题意, 计算两港口之间的距离, 就是计算: (According to the question, to calculate the distance between A and B is to calculate what?)
2. 已知甲乙两艘轮船的速度, 在行驶 4 小时后, 他们的路程分别是多少千米? (It is known the respective speeds of the two ships, so how many kilometers will the two ships have each traveled after 4 hours of travel?)
3. 两港口之间的距离是多少? (What is the distance between the two ports A and B?)

解(Solving): $44 \times 4 = 176(\text{km})$

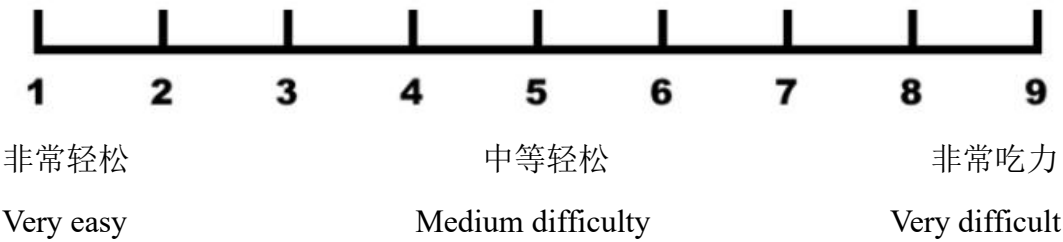
$$32 \times 4 = 128(\text{km})$$

$$176 + 128 = 304(\text{km})$$

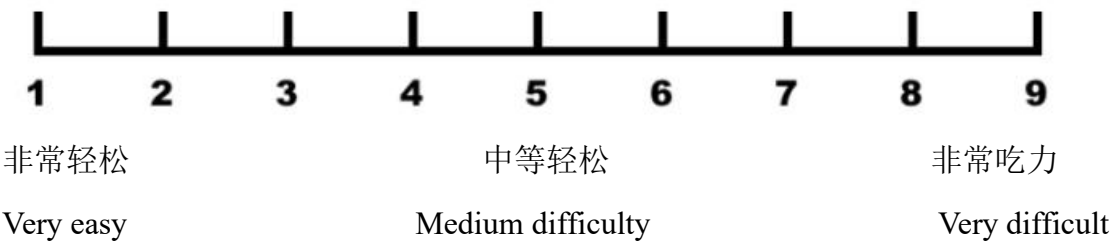
答(Answer): 甲乙两地相距 304 千米。(The distance between A and B is 304 km.)

认知负荷量表(Cognitive load scale)

(1) 心理努力(mental effort)



(2) 任务难度(task difficulty)



工作记忆资源损耗测量材料

(Working memory capacity test materials)

$(6+8)-3=11$	$(3 \times 3)-2=6$	$(4 \times 3)-1=11$			
$(1+8)-5=6$	$(9-3)+4=10$	$(3+2)+6=12$			
$(9 \times 1)+4=13$	$(3 \times 2)+8=15$	$(8 \times 2)-6=10$			
$(4 \times 2)-5=4$	$(7-6)+3=3$	$(5 \times 3)-6=9$	$(1+9)-2=7$		
$(9-1)+4=12$	$(4+3)-6=2$	$(2 \times 6)-8=4$	$(6+3)-1=8$		
$(5 \times 3)-6=8$	$(7-5)+4=6$	$(8-2)+3=10$	$(2 \times 4)-7=1$		
$(9-4)+1=5$	$(7 \times 2)-4=10$	$(5-2)+4=8$	$(1 \times 3)+6=9$	$(8-1)-7=1$	
$(4 \times 3)+2=14$	$(2+5)-6=3$	$(3+8)-2=9$	$(6 \times 2)-4=7$	$(1+7)-5=3$	
$(7-2)+3=6$	$(5 \times 2)-8=2$	$(9-7)+4=7$	$(6-1)+7=13$	$(4 \times 5)-9=11$	
$(2+5)-3=4$	$(4 \times 2)+4=13$	$(9-1)+6=14$	$(7 \times 2)-8=5$	$(6-4)+2=4$	$(3+5)-6=2$
$(8-2)+3=8$	$(5 \times 3)-9=7$	$(2-1)+6=7$	$(4-3)+5=6$	$(1 \times 4)-2=2$	$(7+2)-3=4$
$(2 \times 3)+4=10$	$(9-3)+4=8$	$(5+3)-6=1$	$(3 \times 5)-7=9$	$(6+1)-5=2$	$(6 \times 2)+2=14$

迁移测验材料 (Transfer test materials)

单选题 (Individual choice questions)

1. 甲、乙分别从两地相对而行，甲每分钟走 45 米，乙每分钟走 37 米，经过 3 分钟两人相遇，甲乙两地相距多少米?(A and B are walking opposite each other from two places, A walks 45 meters per minute, B walks 37 meters per minute, after 3 minutes they meet, what is the distance between A and B?)

A. 111 B. 135 C.246

请将答案写在答题纸上，之后按空格键进行下一题。(Please write your answer on the answer sheet, and then press the space bar to answer the next question).

2. 小张和小王分别从 A、B 两地骑行，相对出发。小张每小时行进 12 千米，小王每小时行进 19 千米,经过 3 小时两人在中途相遇，求 A、B 两地相距多少千米?(Zhang and Wang ride opposite each other from A and B respectively. Zhang rides 12 km per hour, Wang rides 19 km per hour, after 3 hours, the two meet, what is the distance between place A and place B?)

A. 36 B. 57 C.93

请将答案写在答题纸上，之后按空格键进行下一题。(Please write your answer on the answer sheet, and then press the space bar to answer the next question).

3. 小龙和小虎分别从相距 84 千米的東西两地相对而行，小龙每小时行进 3 千米，小虎每小时行进 4 千米，问几小时后小龙和小虎可以在中途相遇?(Long and Hu are traveling opposite each other from two places 84 km apart, Long walks 3 km per hour and Hu walks 4 km per hour, how many hours will the two meet?)

A. 12 B. 21 C.28

请将答案写在答题纸上，之后按空格键进行下一题。(Please write your answer on the answer sheet, and then press the space bar to answer the next question).

4. X、Y 两个施工队分别从相距 114 千米的南北两地相对同时施工，已知 X 施工队每天施工 2 千米，Y 施工队每天施工 4 千米，问几天后 X、Y 两队可以相遇?(There are two construction teams (ie. X and Y) respectively from 114 km away from each other A and B two places opposite to start construction, it is known that X construction team construction 2 km per day, Y construction team construction 4 km

per day. How many days later can the two teams meet?)

A. 19 B. 24 C.29

请将答案写在答题纸上，之后按空格键进行下一题。(Please write your answer on the answer sheet, and then press the space bar to answer the next question).

应用题 (Application question)

5. 两辆货车分别从东、西两城同时出发，相对而行，经过 4 小时在物流中心相遇，大货车平均每小时行驶 66 千米，小货车平均每小时行驶 78 千米，求东、西两城的距离？(Two trucks set off from the east and west cities at the same time and travel opposite to each other, after 4 hours meet at the logistics center, the big truck travels 66 km per hour on average, the small truck travels 78 km per hour on average, find the distance between the east and west cities?)

请在答题册上写出完整的解题步骤，之后按空格键进行下一题。(Please write the complete solution on the answer sheet, and then press the space bar to answer the next question).

6. 已知凤凰山和青山溶洞间的距离为 96 千米，其中小李从凤凰山出发，他的速度为 5 千米/时，小郝从青山溶洞出发，他的速度为 3 千米/时，两人同时相对而行，求几小时后他们可以在中途相遇？(It is known that Phoenix Mountain and Castle Peak Cave are 96 km away from each other, Xiao Li from Phoenix Mountain, his speed is 5 km per hour, Xiao from Castle Peak Cave, his speed is 3 km per hour, they both travel opposite to each other, how many hours after they can meet?)