2025 August AMC 10 Week 1&2

2025 August AMC 10 Week 1 Day 1 - Percents

1 A store is selling a commodity. Due to reduction of purchase price by 6.4%, the profit rate increased by 8%. Then the original profit ratio of this commodity is ______ .

A. 16% B. 17% C. 18% D. 19% E. 20%

Answer B

Solution Let the original cost price be a dollars, and the original profit rate be x.

According to the problem: $\dfrac{a(1+x)-a(1-6.4\%)}{a(1-6.4\%)}=x+8\%$

Solving this equation gives: $x=17\%$

Answer: 17%.

2 A fruit company purchased $52,000$ kilograms of apples at a cost of 0.98 dollars per kilogram, with an additional $1,840$ dollars in transportation and other expenses. The estimated loss due to spoilage is 1%. If the company hopes to make a 17% profit after selling all the apples, what should the retail price per kilogram be?

A. 1 dollars B. 1.1 dollars C. 1.2 dollars D. 1.3 dollars E. 1.5 dollars

Answer C

Solution Total cost of the purchase:$0.98\times 52{,}000+1{,}840=50{,}960+1{,}840=52{,}800$ dollars

Total quantity available for sale: $52{,}000\times(1-1\%)=52{,}000\times 99\%=51{,}480\ \mathrm{kg}$

Let the retail price per kilogram be x dollars.

Then: $52{,}800\times(1+17\%)=x\times 51{,}480$

$x=\dfrac{52{,}800\times 1.17}{51{,}480}$

$x=1.2$

Answer: The retail price per kilogram should be 1.20 dollars.

3 A container A holds $90\,\mathrm{mL}$ of saline solution with a salt concentration of 10.5%, and container B holds $210\,\mathrm{mL}$ of saline solution with a salt concentration of 11.7%. If the same amount of solution is taken from both containers and poured into the other container, then stirred evenly, the resulting salt concentrations in both containers become equal. How many milliliters of solution were poured out from each container?

A. 55 B. 57 C. 59 D. 63 E. 67

Answer D

Solution After exchanging, the salt concentration becomes:

$(90\times10.5\%+210\times11.7\%)\div(90+210)\times100\%=11.34\%$

Volume of exchanged solution: $\dfrac{90\times11.34\%-90\times10.5\%}{11.7\%-10.5\%}=63\,\mathrm{mL}$

Each of containers A and B had $63\,\mathrm{mL}$ of solution exchanged.

4 A store purchased a batch of goods and planned to sell them at a 40% markup. After selling 80% of the goods at the marked-up price, the store decided to sell the remaining goods at 50% off in order to clear the stock quickly. After all the goods were sold, the store was unexpectedly charged an additional 150 dollars tax, which caused the actual profit to be only half of the originally expected profit. What was the cost price of this batch of goods?

A. 2500 dollars B. 2600 dollars C. 2700 dollars D. 2800 dollars

E. 2900 dollars

Answer A

Solution Let the cost price be x dollars. Then the equation is:

$(1.4x\times0.8+1.4x\times0.5\times0.2)-x-150=\dfrac{1}{2}\times0.4x$

Solving this gives: $x = 2500$

Answer: The cost price of the goods was 2500 dollars.

5 Three types of saline solutions with salt concentrations of 20%, 18%, and 16% are mixed in certain proportions to obtain $100\,\mathrm{g}$ of a solution with a salt concentration of 18.8%. If the amount of 18% saline solution is $30\,\mathrm{g}$ more than that of the 16% saline solution, how many grams of the 16% saline solution were used?

A. 6 grams B. 10 grams C. 12 grams D. 15 grams E. 20 grams

Answer B

Solution $\text{Let the saline solution with } 20\% \text{ concentration be } A,\ 18\% \text{ be } B,\ \text{and } 16\% \text{ be } C.$

Let the mass of solution B be $x\,\mathrm{g}$, then the mass of solution C is $(x-30)\,\mathrm{g}$, and the mass of solution A is $(130-2x)\,\mathrm{g}$.

The total salt content equation is:

$20\% \times (130-2x) + 18\% \times x + 16\% \times (x-30) = 100 \times 18.8\%$

Solving gives:$x = 40$

Then: $\text{Solution } A: 130-2x = 130-2\times 40 = 50\,\mathrm{g}$

$\text{Solution } C: 40-30 = 10\,\mathrm{g}$

Answer: The masses of the saline solutions with concentrations of 20%, 18%, and 16% are $50\,\mathrm{g}$, $40\,\mathrm{g}$, and $10\,\mathrm{g}$, respectively.

2025 August AMC 10 Week 1 Day 2 - Fractions and Ratios

6 The total number of students in School A and School B is in the ratio of $4:5$.

The number of boys in School A and School B is in the ratio of $2:3$.

If School A has 230 girls and School B has 250 girls, how many students are there in total across both schools?

A. 845 B. 855 C. 865 D. 875 E. 885

Answer B

Solution Let the number of boys in School A be $2x$, then the number of boys in School B is $3x$.

According to the given ratio, we can set up the proportion:

$(2x + 230) : (3x + 250) = 4 : 5$

Using the property of proportions (cross multiplication), we get:

$5(2x + 230) = 4(3x + 250)$

Solving the equation gives:

$x = 75$

Therefore, School A has $2 \times 75 = 150$ boys,

and School B has $3 \times 75 = 225$ boys.

The total number of students in both schools is: $150 + 225 + 230 + 250 = 855$.

7 In a garage, there are some two-wheeled motorcycles and four-wheeled cars. The ratio of the number of vehicles to the number of wheels is $2 : 5$.

What is the ratio of the number of motorcycles to the number of cars?

A. $3 : 1$ B. $1 : 3$ C. $4 : 1$ D. $1 : 4$ E. $3 : 2$

Answer A

Solution Let there be x motorcycles and y cars.

According to the problem: $x + y = \frac{2}{5}(2x + 4y)$

Multiply both sides by 5: $5x + 5y = 4x + 8y$

Solving gives: $x = 3y$

Therefore, the ratio of motorcycles to cars is $x : y = 3 : 1$

8 At a school, the number of students in Grade 7 and Grade 8 is the same, and the number of students in Grade 9 is $\frac{4}{5}$ of that in Grade 8.

It is known that the number of boys in Grade 7 is equal to the number of girls in Grade 8, and that the number of boys in Grade 9 accounts for $\frac{1}{4}$ of the total number of boys across all three grades.

What fraction of the total number of students across the three grades are girls?

A. $\frac{9}{19}$ B. $\frac{10}{19}$ C. $\frac{11}{19}$ D. $\frac{11}{21}$
E. $\frac{10}{21}$

Answer D

Solution Let the number of boys in Grade 7 be m and the number of girls be n.

Then, in Grade 8, there are n boys and m girls.

The total number of students in Grade 9 is $\frac{4}{5}(m+n)$.

So, the total number of students across all three grades is:

$m+n+n+m+\frac{4}{5}(m+n)=\frac{14}{5}(m+n)$

Let the number of boys in Grade 9 be x.

According to the problem: $x=\frac{1}{4}(m+n+x)$

Solving this gives: $x=\frac{1}{3}(m+n)$

So, the number of girls in Grade 9 is: $\frac{4}{5}(m+n)-\frac{1}{3}(m+n)=\frac{7}{15}(m+n)$

Thus, the total number of girls across all grades is:

$n+m+\frac{7}{15}(m+n)=\frac{22}{15}(m+n)$

The fraction of girls among all students is: $\frac{\frac{22}{15}(m+n)}{\frac{14}{5}(m+n)}=\frac{11}{21}$

Answer: C.

9 The ratio of the number of students participating in a math competition from School A and School B is $7:8$, and the ratio of the number of students who won awards is $2:3$. Each school has 240 students who did not win an award. How many students participated in the competition in total?

A. 650　B. 680　C. 720　D. 760　E. 780

Answer C

Solution Let the number of students participating from School A and School B be $7x$ and $8x$ respectively.

According to the problem, the number of students who did **not** win awards in each school is: $(7x-240):(8x-240)=2:3$

Solving the equation gives: $x=48$

Therefore, the total number of participants from both schools is: $7x+8x=15x=720$ students.

10 There are two bags of fruit. Take $\frac{1}{5}$ of the fruit out of Bag A and 1103 grams of fruit out of Bag B, and the two bags of fruit will weigh the same. Now, if $\frac{1}{2}$ of the remaining fruit in Bag B is taken out, the weight of the fruit that is still in Bag B will be $\frac{1}{3}$ of the original weight of all the fruit in Bag B. In the first place, there are ( ) grams of fruit in the two bags.

A. 6066.5　B. 6068　C. 6076.5　D. 6079　E. 6076

Answer A

Solution Let the original amount of fruit in Bag A and Bag B be a grams and b grams, respectively.

From Bag A, $\frac{1}{5}$ was taken out, so the remaining amount is $\left(1-\frac{1}{5}\right)a=\frac{4}{5}a$.

From Bag B, 1103 grams were taken out, so the remaining amount is

$b-1103$.

Thus, $\frac{4}{5}a=b-1103$.

Next, half of the remaining fruit in Bag B was taken out, so the remaining amount is

$\left(1-\frac{1}{2}\right)(b-1103)=\frac{1}{2}(b-1103)$.

It is also given that this remaining amount equals $\frac{1}{3}b$: $\frac{1}{2}(b-1103)=\frac{1}{3}b$.

Solving this equation: $\frac{1}{2}b-\frac{1103}{2}=\frac{1}{3}b \Rightarrow \frac{1}{6}b=\frac{1103}{2} \Rightarrow b=3309$.

Substitute back: $\frac{4}{5}a = b - 1103 = 3309 - 1103 = 2206 \Rightarrow a = \frac{2206 \times 5}{4} = 2757.5.$

So the total original weight of the fruit is: $a + b = 2757.5 + 3309 = 6066.5$ grams.

Answer: The original total weight of the fruit was 6066.5 grams.

2025 August AMC 10 Week 1 Day 3 - Mean, Median and Mode

11 There are two groups of numbers. The average of the first group is 12.8, and the average of the second group is 10.2. The overall average of the two groups combined is 12.02. What is the ratio of the number of elements in the second group to that in the first group?

A. $\frac{3}{7}$ B. $\frac{7}{3}$ C. $\frac{2}{7}$ D. $\frac{7}{2}$
E. $\frac{2}{3}$

Answer A

Solution There are a numbers in the first group and b numbers in the second group.

According to the problem,

$(12.8a + 10.2b) \div (a + b) = 12.02.$

Simplifying gives:

$0.78a = 1.82b,$

which leads to:

$b = \frac{3}{7}a.$

Therefore, the number of elements in the second group is $\frac{3}{7}$ of the number in the first group.

12 A data set containing 20 numbers, some of which are 6, has mean 45. When all the 6s are removed, the data set has mean 66. How many 6s were in the original data set?

A. 4 B. 5 C. 6 D. 7 E. 8

Answer D

Solution Let the number of 6s in the original data set be k. Numbers in the original data set have sum $20 \cdot 45 = 900$, and the data set with the 6s removed has sum $900 - 6k$. Thus

$$\frac{900 - 6k}{20 - k} = 66.$$

Solving this equation for k yields $k = 7$. For example, the data set could consist of 7 copies of 6 and 13 copies of 66.

13 Jane plans to enter the numbers $1, 2, \cdots, N$ into the computer to calculate their average. When she thought she had finished entering the numbers, the computer showed that only $(N - 1)$ numbers had been entered, and the average was $35\frac{5}{7}$. Assuming the $(N - 1)$ numbers were entered correctly, what is the missing number?

A. 10 B. 53 C. 56 D. 65 E. 67

Answer C

Solution First, estimate the value of N:

If the missing number is N (the largest possible value), then the average would be $\frac{1 + 2 + \cdots + (N - 1)}{N - 1} = \frac{N}{2}$;

If the missing number is 1 (the smallest possible value), then the average would be $\frac{2 + 3 + \cdots + N}{N - 1} = \frac{N}{2} + 1$.

This shows that the actual average, $35\frac{5}{7}$, must lie between $\frac{N}{2}$ and $\frac{N}{2} + 1$.

That means N can only be 70 or 71.

Moreover, since the fraction $35\frac{5}{7}$ must be derived from a total divided by $(N - 1)$, and the denominator $(N - 1)$ must be divisible by 7, we conclude that $N = 71$.

Now calculate:

$35\frac{5}{7}\times(N-1)=35\frac{5}{7}\times 70=2500.$

This should equal the sum from 1 to 71 minus the missing number.

The sum from 1 to 71 is $\frac{71\times 72}{2}=2556,$

so the missing number is:

$2556-2500=56.$

14 Mr. Wang wrote a sequence of consecutive natural numbers starting from 1 on the blackboard: $1,2,3,4,\cdots$. Then he erased three numbers, two of which were prime numbers. If the average of the remaining numbers is $19\frac{8}{9}$, what is the maximum possible sum of the two prime numbers that were erased?

A. 40 B. 50 C. 60 D. 70 E. 80

Answer C

Solution $1+2+3+\ldots+n=\frac{(1+n)\cdot n}{2}$

The average of these numbers is: $\frac{\frac{(1+n)\cdot n}{2}}{n}=\frac{1+n}{2}$

So the average is around 20, which suggests that n is around 40.

Since 3 numbers were erased, the number of remaining numbers should be a multiple of 9.

Therefore, $n=39$.

The sum of numbers from 1 to 39 is: $1+2+3+\ldots+39=780$

After erasing 3 numbers, 36 remain. The total sum of the remaining numbers is:

$19\frac{8}{9}\times 36=716$

So the sum of the 3 erased numbers is: $780-716=64$

Among the prime numbers less than 39, the maximum possible sum of two primes that add up to no more than 64 is: $37+23=60 \quad \text{or} \quad 31+29=60$.

15 In a math competition, the top 60 students received awards. Originally, there were 5 first prize winners, 15 second prize winners, and 40 third prize winners. After an adjustment, the numbers changed to 10 first prize winners, 20 second prize winners, and 30 third prize winners.

After the adjustment:

The average score of first prize winners decreased by 3 points,

The average score of second prize winners decreased by 2 points,

The average score of third prize winners decreased by 1 point.

If the original average score of second prize winners was 7 points higher than that of third prize winners, how many points higher is the adjusted average score of first prize winners compared to that of second prize winners?

A. 1 B. 2 C. 3 D. 4 E. 5

Answer E

Solution Let the adjusted average scores of the first, second, and third prize winners be x, y, and z, respectively.

According to the problem:

$$\begin{cases} 5(x+3)+15(y+2)+40(z+1)=10x+20y+30z \\ y+2=(z+1)+7 \end{cases}$$

Simplifying:

$$\begin{cases} x+y=2z+17 \\ y=z+6 \end{cases}$$

Therefore:

$$x-y=5$$

Answer: After the adjustment, the average score of the first prize winners is 5 points higher than that of the second prize winners.

2025 August AMC 10 Week 2 Day 1 - Distance Word Problems 1

16 Place A and Place B were $71\ \mathrm{km}$ apart. Calvin and Yvonne departed from the two places respectively and travelled towards each other. Calvin started his journey 20 minutes later than Yvonne, but he travelled faster than Yvonne by $3\ \mathrm{km/h}$. The two of them came across each other two hours after Calvin's departure from Place A. Calvin travelled at ( ) $\mathrm{km/h}$.

A. 15 B. 16 C. 17 D. 18 E. 19

Answer D

Solution Let A travel at x km per hour, and B travel at $(x-3)$ km per hour.

$2x+\frac{7}{3}(x-3)=71$

Solving gives: $x=18$.

$\therefore A$ travels at 18 km per hour.

17 The ratio of the speed of train A to that of train B was $5:4$. Train B departed first and travelled from station B to station A. When it was $72\mathrm{km}$ away from station B, train A left station A for station B. The two trains met each other at point X. The ratio of the distance between point X and station A to that between point X and station B was $3:4$. The distance between station A and station B was ( ) km.

A. 300 B. 305 C. 315 D. 330 E. 335

Answer C

Solution Let t be the time taken by A from departure until meeting B.

Let A's speed be $5x$, and B's speed be $4x$.

When A and B meet, the ratio of the distances they have traveled is $(72+4xt):5xt=4:3$, which simplifies to $xt=27$.

Here, t is the time from A's departure to the meeting.

Let the distance between A and B be s.

Then $s=72+4xt+5xt=72+9xt=72+9\times 27=315\ \mathrm{km}$.

18 Andy was training on a circular track 400 meters long. After completing the first lap, he felt that his performance was not ideal. So he increased his speed by 15%, and as a result, he finished the lap 9 seconds faster than in the first lap. How many seconds did it take him to run the first lap?

A. 68 B. 69 C. 70 D. 71 E. 72

Answer B

Solution Let t be the time Andy took to run the first lap.

From the problem, Andy's speed for the first lap is: $\text{distance}\div\text{time}=400\div t=\frac{400}{t}$.

Increasing his speed by 15% for the second lap, the speed becomes:

$(1+15\%)\times\frac{400}{t}=\frac{460}{t}$.

Thus, the time taken for the second lap is: $\text{distance}\div\text{speed}=400\div\left(\frac{460}{t}\right)=\frac{20t}{23}$.

Since the second lap is 9 seconds faster than the first lap: $t-\frac{20t}{23}=9$,

which gives $t=69$ seconds.

Therefore, Andy took 69 seconds to run the first lap.

19 The distance between A and B is 500 km. Two people, A and B, set out at the same time from A to B on bicycles. Person A rides 30 km per day, while person B rides 50 km per day but rests every other day. At the end of the ___ day, the distance from B for person B is twice the distance from B for person A.

A. 13 B. 14 C. 15 D. 16 E. 17

Answer C

Solution Casework:

(1) If the number of days is even, then for B it is equivalent to riding $$

50 $div2 = 25$ \text{km per day}.$$

Let n be the number of days such that at the end of day n, B's distance from B is twice A's distance from B.

We have the equation: $500 - 25n = 2(500 - 30n)$, which gives $n = \frac{100}{7}$, not a valid solution.

(2) If the number of days is odd, then except for the last day (when B rides 50 km), B rides 25 km per day on the previous days.

Let n be the number of days such that at the end of day n, B's distance from B is twice A's distance from B.

We have the equation $500 - 25(n-1) - 50 = 2(500 - 30n)$, which gives $n = 15$, a valid solution.

Thus, at the end of the 15th day, B's distance from B is twice A's distance from B.

20 On a circular track, 2015 flags are placed at equal intervals. Person A and person B start at the same time from the same flag, running in the same direction. When they both return to the starting point together again, A has run 23 laps and B has run 13 laps. Excluding the starting flag position, how many times does A overtake B exactly at a flag position?

A. 1 B. 2 C. 3 D. 4 E. 5

Answer D

Solution Let the distance between two adjacent flags be 1, so the circumference of the track is 2015.

Since $v_A : v_B = 23 : 13$, let $v_A = 23x$ and $v_B = 13x$.

For A to overtake B, A must run n more laps than B.

Then:

$(23x - 13x)t = 2015n$

$10x \cdot t = 2015n$

Thus, the time taken for A to overtake B is: $t = \frac{403n}{2x}$.

In this time, A covers a distance of: $23x \times \frac{403n}{2x} = \frac{23 \times 403}{2}n$.

For A to overtake B exactly at a flag position, the distance covered must be an integer, which requires n to be even.

Thus: $n = 2, 4, 6, 8, 10$ (the maximum is 10 extra laps).

However, when $n = 10$, both runners return to the starting point.

Therefore, A overtakes B exactly at a flag position 4 times.

2025 August AMC 10 Week 2 Day 2 - Distance Word Problems 2

21 After its speed was increased, a certain train departed from City A at $21{:}00$ and arrived punctually at City B at $07{:}00$ the next day. Its travel time was 2 hours shorter than before the speed increase, and its average speed was $20\ \mathrm{km/h}$ faster than before. What is the distance between the two cities (in km)?

A. 800 B. 1000 C. 1200 D. 1400 E. 1500

Answer C

Solution Let the train's speed before the increase be v km/h, and the distance between the two cities be $s\ \mathrm{km}$.

From the problem, the following equations can be set up:

$$\begin{cases} \frac{s}{10} = v + 20 \\ \frac{s}{12} = v \end{cases}$$

It is easy to solve and obtain $v = 100$, $s = 1200$.

22 Person A starts walking from A to B, and 5.5 minutes later, Person B starts walking from B to A. Person B walks 30 meters per minute faster than Person A.They meet at point C along the

way. The time taken by Person A to travel from A to C is 4 minutes longer than from C to B. The time taken by Person B to travel from C to A is 3 minutes longer than from B to C. What is the distance between A and B in meters?

A. 1080 B. 1440 C. 1250 D. 1880 E. 2140

Answer B

Solution Let A walk x meters per minute, then B's speed is $x+30$ meters per minute.

Let t minutes be the time B takes to walk from B to C.

From the problem, we have:

$$\begin{cases} \dfrac{5.5x+tx}{x}=\dfrac{t(x+30)}{x}+4 \\ \dfrac{5.5x+tx}{x+30}=t+3 \end{cases}$$

Solving the system gives:

$$\begin{cases} x=90 \\ t=4.5 \end{cases}$$

Verification shows $x=90$, $t=4.5$ satisfy the original equations.

Therefore, $x=90$, $t=4.5$.

The time A spends from A to C is $5.5+4.5=10$ minutes, and the distance AB is:

$5.5\times90+4.5\times90+4.5\times120=1440$ meters.

23 The research vessel Xuelong carried out a scientific expedition to Antarctica. Departing from Shanghai at its maximum speed of 19 knots (1 knot = 1 nautical mile per hour), it would take more than 30 days to reach Antarctica. This time, the vessel departed from Shanghai at a speed of 16 knots and, after a certain number of days, successfully arrived at its destination. It then worked in the polar region for a certain number of days before returning at a speed of 12 knots. On the 83rd day after leaving Shanghai, due to weather conditions, its sailing speed dropped to 2 knots. Two days later, it continued at a speed of 14 knots for another 4 days to return to Shanghai. How many days did the Xuelong work in Antarctica?

A. 1 B. 2 C. 3 D. 4 E. 5

Answer C

Solution Let x be the number of days the Xuelong took to travel from Shanghai to Antarctica, and y be the number of days it worked in Antarctica.

Then: $16x=(82-x-y)\times 12+2\times 2+14\times 4$

Simplifying gives the indeterminate equation: $7x+3y=261$

From this, we find: $y=10 \quad \text{or} \quad y=3$

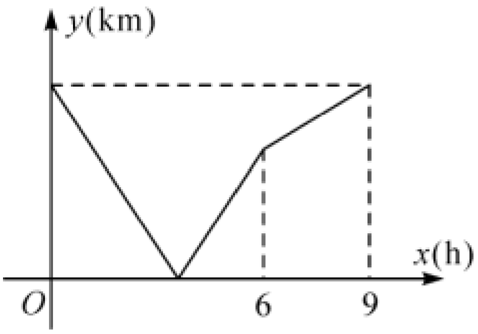
When $y=10$, $x=33$; when $y=3$, $x=36$.

Since traveling from Shanghai to Antarctica at the maximum speed of 19 knots (1 knot = 1 nautical mile/hour) takes more than 30 days, we have:

$$16x \geqslant 19\times 30 \quad \Rightarrow \quad x \geqslant \frac{19\times 30}{16}=35\frac{5}{8}$$

Therefore, $y=3$ fits the conditions of the problem.

24 An express train departs from City A toward City B, while a slow train departs from City B toward City A. Both trains depart at the same time and stop upon reaching their destinations. Let the travel time of the slow train be x hours, and let the distance between the two trains be y km. The relationship between y and x is shown in the figure. If the two trains meet at a point that is 27 km away from the midpoint between A and B, then what is the distance between A and B?



A. 270km B. 280km C. 290km D. 300km

E. 310km

Answer A

Solution

Let the speed of the express train be $a\ \mathrm{km/h}$ and the speed of the slow train be $b\ \mathrm{km/h}$. Let the distance between City A and City B be $s\ \mathrm{km}$. From the graph, we know that the express train takes 6 hours to travel the entire distance, and the slow train takes 9 hours. This gives the equation: $6a = 9b$

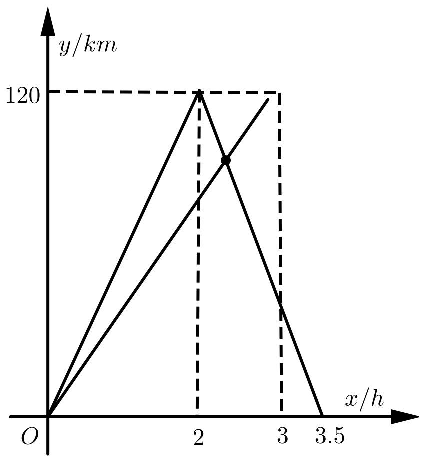
Since the two trains meet at a point $27\ \mathrm{km}$ away from the midpoint between A and B, we have: $\frac{\frac{s}{2}+27}{a} = \frac{\frac{s}{2}-27}{b}$

By substituting $a = \frac{3}{2}b$ into the equation: $\frac{\frac{s}{2}+27}{\frac{3}{2}b} = \frac{\frac{s}{2}-27}{b}$

Solving gives: $s = 270\ (\mathrm{km})$

Therefore, the answer is $270\ \mathrm{km}$.

25 A car and a truck depart from City A toward City B at the same time. After reaching City B, the car immediately returns to City A at a different speed, while the truck stops after reaching City B. The graphs shown represent the relationship between the distance y (in km) from City A and the travel time x (in hours) for the truck and the car, respectively. When the car is returning from City B to City A and meets the truck along the way, what is the distance from City A to the meeting point?



A. $\frac{280}{3}\ \mathrm{km}$

B. $70\ \mathrm{km}$

C. $\frac{7}{3}\ \mathrm{km}$

D. $90\ \mathrm{km}$

E. $\frac{70}{3}\ \mathrm{km}$

Answer A

Solution From the problem, the speed of the car on its return trip to City A is $\frac{120}{3.5-2}=80\ \mathrm{km/h}$.

Let the function representing the truck's distance from City A with respect to travel time be

$y=k_1x$.

Substituting the point $(3,120)$ gives: $3k_1=120$,

so $k_1=40$.

Thus, the truck's distance function is $y=40x$.

Let the function representing the car's distance from City A on its return trip be $y=k_2x+b$.

Substituting the points $(2,120)$ and $(3.5,0)$ gives:

$$\begin{cases} 2k_2+b=120 \\ 3.5k_2+b=0 \end{cases}$$

Solving gives:

$$\begin{cases} k_2=-80 \\ b=280 \end{cases}$$

Thus, the car's distance function on its return trip is

$y=-80x+280$.

Solving the system

$$\begin{cases} y=-80x+280 \\ y=40x \end{cases}$$ gives:

$$\begin{cases} x=\frac{7}{3} \\ y=\frac{280}{3} \end{cases}$$

Therefore, when the car is returning from City B to City A and meets the truck, the meeting point is $\frac{280}{3}$ km from City A.

2025 August AMC 10 Week 2 Day 3 - Work and Efficiency Problems

26 Teams A, B, and C jointly undertake two projects, A and B. The workload of project B is $\frac{4}{5}$ of the workload of project A. If working alone, Teams A, B, and C can complete project B in 40, 48, and 60 days respectively. At the beginning, Teams B and C work together on project A, while Team A works alone on project B. After working for a certain number of days, the arrangement changes so that Team B works alone on project A, while Teams A and C work together on project B. Both projects are completed at the same time. How many days did Team C work on

project B?

A. 3 B. 4 C. 5 D. 6 E. 7

Answer D

Solution Method 1:

Let the total number of days be x.

$$\left(\frac{4}{5\times 40}+\frac{4}{5\times 48}+\frac{4}{5\times 60}\right)x=1+\frac{4}{5}$$

Solving gives $x=36$.

Then the number of days Team C worked on project B is:

$$\left(\frac{4}{5}-\frac{1}{50}\times 36\right)\div\frac{1}{75}=6\text{ days.}$$

Method 2:

Let the workload of project B be $[40,48,60]=240$.

Then the work rates are: Team $A=6$, Team $B=5$, Team $C=4$.

The workload of project A is: $240\div\frac{4}{5}=300$.

The total time for all three teams to complete both projects is: $\frac{240+300}{6+5+4}=36\text{ days.}$

The number of days Team C worked on project B is: $\frac{240-36\times 6}{4}=6\text{ days.}$

27 Liam is processing a batch of parts. If he makes 50 parts per day, he will finish 8 days later than originally planned. If he makes 60 parts per day, he will finish 5 days earlier than originally planned. How many parts are in this batch?

A. 3500 B. 3600 C. 3700 D. 3800 E. 3900

Answer E

Solution Let the originally planned production time be x days, and let the total number of parts be y.

Then: $(x+8)\times 50=y \quad (1)$

$(x-5)\times 60=y \quad (2)$

From equation (2),

$x = \frac{y}{60} + 5$

Substituting into equation (1) gives: $\left(\frac{y}{60} + 5 + 8\right) \times 50 = y$

$50y + 13 \times 50 \times 60 = 60y$

$y = 3900$

Answer: The batch contains 3900 parts.

28 To build a water channel, Team A can finish the job alone in 20 days, and Team B can finish it alone in 30 days. If they work together, their efficiency decreases due to interference: Team A's efficiency becomes $\frac{4}{5}$ of its original, and Team B's efficiency becomes $\frac{9}{10}$ of its original. The plan is to complete the channel in 16 days, with the goal of minimizing the number of days they work together. How many days should the two teams work together?

A. 30 B. 20 C. 15 D. 10 E. 5

Answer D

Solution Team A's individual work rate is $\frac{1}{20}$, and Team B's individual work rate is $\frac{1}{30}$.

When working together, their combined work rate is: $\frac{1}{20} \times \frac{4}{5} + \frac{1}{30} \times \frac{9}{10} = \frac{7}{100}$.

To minimize the number of days they work together, the remaining work should be done by the faster Team A.

Let x be the number of days they work together.

Then: $\frac{7}{100}x + \frac{1}{20}(16 - x) = 1$.

Solving gives $x = 10$.

Therefore, the two teams need to work together for 10 days.

29 Teams A and B are responsible for a project. At the normal rate of work, it would take 60 days to complete. Now, Team A's efficiency increases by one-half, and Team B's efficiency decreases by one-half, and the project takes 84 days to finish. How many days would it take Team A alone to complete the project?

A. 230 B. 250 C. 260 D. 280 E. 290

Answer D

Solution Let Team A's work rate be a and Team B's work rate be b.

We then have the system of equations:

$$\begin{cases} a+b=\frac{1}{60} \\ 1.5a+0.5b=\frac{1}{84} \end{cases}$$

Solving gives:

$$\begin{cases} a=\frac{1}{280} \\ b=\frac{11}{840} \end{cases}$$

Thus, Team A's work rate is $\frac{1}{280}$, meaning Team A alone would take 280 days to complete the project.

30 A group of workers is assigned to load and unload a batch of goods, with each worker working at the same rate.

If all workers work together from the start, the job can be completed in 10 hours.

Now, the method is changed: one worker starts alone, and then every t hours (where t is an integer) one more worker joins.

Each worker who joins continues working until the job is finished.

The last worker added works for a time equal to one quarter of the first worker's total working time.

What is the maximum number of workers that can be used to complete the job?

A. 7 B. 11 C. 13 D. 15 E. 19

Answer C

Solution Let the loading and unloading work take x hours to complete.

The first worker works for x hours, and the last worker works for $\frac{x}{4}$ hours.

Together, they work for $\left(x+\frac{x}{4}\right)$ hours, so the average time worked per person is $\frac{1}{2}\left(x+\frac{x}{4}\right)$ hours.

From the problem statement, we know:

The second worker and the second-to-last worker, the third worker and the third-to-third-last worker, and so on, each also work an average of $\frac{1}{2}\left(x+\frac{x}{4}\right)$ hours.

Therefore: $\frac{1}{2}\left(x+\frac{x}{4}\right)=10$

Solving gives: $x=16$

With the new loading and unloading method, the total time is 16 hours.

Let y be the total number of workers.

Since one worker is added every t hours, the last worker works $(y-1)t$ hours less than the first worker.

From the problem, we have:

$16-(y-1)t=16\times\frac{1}{4}$

$(y-1)t=12$

Since y and t are both positive integers:

$$\begin{cases} y=2, & t=12 \\ y=3, & t=6 \\ y=4, & t=4 \\ y=5, & t=3 \\ y=7, & t=2 \\ y=13, & t=1 \end{cases}$$

Thus, the number of workers could be $2,3,4,5,7$, or 13.

Therefore, the maximum number of workers is 13.