

MATH SKILLS:

- 16 ounces = 1 pound
- 8 pints = 1 gallon
- 4 quarts = 1 gallon
- 2000 lbs = 1 ton
- Shapes
 - $(\# \text{ of sides} - 2) * 180 = \text{Total \# of degrees}$
 - Supplemental angle - add up to 180 degrees
 - Complementary angle - add up to 90 degrees
- Words to Equations:
 - If 2 times r exceeds one-half of t by 5, which of the following represents the relationship between r and t.
 - $2r - .5t = 5$
 - or.. $4r - t = 10$
 - If 3 times x exceeds 1/3 of y by 9, which of the following is the equation that shows the relationship between x and y?
 - $3x - 1/3 * y = 9$
 - or.. $9x - y = 27$
- Questions about how fast people can do a job together
 - Time actually needed / Time needed to do the job alone = 1
 - Ex. One recruiter can complete a certain assignment in 40 minutes; another can complete the same assignment in one hour. How long would it take to complete the assignment if they worked together?
 - $x/40 + x/60 = 1$, $x=24$ minutes
- Question with an acid solution. Take the pure acid volume as X.
 - $P1 * V1 + P2 * V2 = P3 * V3$
 - $P1 * V1$ would be $X * 1$
 - $P2 * V2$ is volume of first * percentage of first
 - $P3 * V3 = (X + \text{volume of first solution}) * \text{volume of final}$
 - solve for X
 - Example: How much pure acid must be added to 12 ounces of a 40% acid solution in order to produce a 60% acid solution?
 - $100x + 480 = 60(12+x)$, $x=6$
- A can complete a project in 20 days and B can complete the same project in 30 days. If A and B start working on the project together and A quits 10 days before the project is completed, in how many days will the project be completed?
 - Explanatory Answer If A can do complete a project in 20 days, then A will complete 1/20 th of the project in a day. Similarly, B will complete 1/30 th of the project in a day. Let the total number of days taken to complete the project be x days. Then, B would have worked for all x days, while A would have worked for $(x - 10)$ days. Therefore, A would have completed $\frac{x-10}{20}$ th of the project and B would have complete $\frac{x}{30}$ th of the project. $\frac{x-10}{20} + \frac{x}{30} = 1$; Solving for x, we get $x = 18$.
- Questions about discount price

- Amount of discount / Original price = % of reduction
- reduction * 100 = final answer %
- When you divide by a decimal, make it a whole number and move the dividend's decimal the same amount. Don't change the decimal in the final answer.
- A businesswoman spends $\frac{1}{5}$ of her income for rent, and $\frac{3}{8}$ of the remainder goes towards salary. How much does she have remaining.
 - First take $\frac{1}{5}$ away from 1, giving her $\frac{4}{5}$. Multiply $\frac{4}{5} * \frac{3}{8} = \frac{12}{40} = \frac{3}{10}$.
 - $\frac{3}{10}$ is the final answer
- Traveling / Gas mileage / average speed question
 - Take the gallons of gas used * miles per gallon to get total miles traveled
 - Take miles traveled / average speed = hours
- A purchaser paid 17.16 for an article that had recently been increased in price by 4%. What was the price before the increase?
 - $x / 100 = 17.16 / 104$
 - solve for x = 16.50
- A naval detachment has enough rations to feed 16 people for 10 days. If 4 more people join the detachment, for how many fewer days will the rations last?
 - First get the total rations, $16 * 10 = 160$.
 - 4 more people = 20 people. So divide $160 / 20 = 8$ days
 - 8 is 2 less days.
- A field can be plowed by 9 machines in 5 hours. If 3 machines are broken and cannot be used, how many hours will it take to plow the field?
 - $9 * 5 = 45$ total machine hours to finish job
 - 3 broken, so 6 will be used
 - $45 / 6 = 7.5$ hours
- In a 3 hour examination of 320 questions, there are 40 mathematics problems. If twice as much time should be allowed for each mathematics problem as each of the other questions, how many minutes should be spent on the mathematics problems?
 - Let x = minutes to be spent on each problem
 - $40 * x + 1/2 * x * 280 = 180$
 - solve for x, x = 1 minute
 - plug back in to initial, $40 * 1 = 40$ minutes
- A tank that holds 450 gallons of water can be filled by 1 pipe in 15 minutes, and emptied by another in 30. How long would it take to fill the tank if both pipes are open?
 - $450 / 15 = 30$ gallons per minute fill rate
 - $450 / 30 = 15$ gallons per minute empty rate
 - $30 \text{ gpm} - 15 \text{ gpm} = 15 \text{ gpm}$ with both pipes open
 - so $450 \text{ gallons} / 15 \text{ gpm} = 30$ minutes
- If a driver completes a trip of 120 miles at a rate of 30mph, at what rate would the driver have to travel on the return trip in order to average 40mph for the round trip?
 - 30mph for 4 hours = 120 miles. So round trip is 240 miles.
 - 240 miles @ 40mph would take 6 hours.
 - She used up 4 hours on the way there, so she has to complete the last 120 miles in 2 hours.
 - $D = R * T$, $R = 60 \text{ mph}$
- A bridge crosses a river that is 1520 feet wide. One bank of the river holds $\frac{1}{5}$ of the

bridge and the other holds $\frac{1}{6}$. How long is the bridge?

- $(\frac{1}{6}) * x + (\frac{1}{5}) * x + 1520 = x$
- Common denominator: $5x + 6x + 45600 = 30x$

Solve for $x = 2,400$ feet long