

1. Fitness Universe has a membership fee of \$50, after which individual visits to the gym are \$5.50. Non-members pay \$8.00 per visit. Stuart is going to exercise at the gym regularly, and is wondering whether it makes sense to become a member. How regularly would Stuart need to visit this gym, in order for a membership to be worth it?
2. A large telephone company sent out an offer for pre-paid phone cards. The table below accompanied the ad and summarized their offer. Does this data form a linear relationship? Explain your answer. Which offer has the best rate per minute?

75-minute card	150-minute card	300-minute card	500-minute card	1000-minute card	1500-minute card
\$4.95	\$9.90	\$19.80	\$30.00	\$56.00	\$75.00

3. Alden paid to have some programs printed for the football game last weekend. The printing cost per program was 54 cents, and the plan was to sell them for 75 cents each. Poor weather kept many fans away from the game; however, so unlucky Alden was left with 100 unsold copies, and lost \$12 on the venture. How many programs did Alden have printed?
4. When a third of a number is subtracted from a half of the same number, 60 is the result. Find the number.
5. Alex was hired to unpack and clean 576 very small items of glassware, at five cents per piece successfully unpacked. For every item broken during the process, however, Alex had to pay \$1.98. At the end of the job, Alex received \$22.71. How many items did Alex break?
6. To graph linear equations such as  $3x + 5y = 30$ , one can put the equation into slope/intercept form, but (unless the slope is needed) it is easier to find the  $x$ - and  $y$ -intercepts and use them to sketch the graph. Find the axis intercepts of each of the following and use them to draw the given line. An equation  $ax + by = c$  is said to be in *standard form*.  
**(a)**  $20x + 50y = 1000$  **(b)**  $4x - 3y = 72$
7. Raisins make up two thirds of a well-mixed bowl of peanuts and raisins. If half the mixture is removed and replaced with peanuts, what fraction of the bowl will be raisins?
8. Wes walks from home to a friend's house to borrow a bicycle, and then rides the bicycle home along the same route. By walking at 4 mph and riding at 8 mph, Wes takes 45 minutes for the whole trip. Find the distance that Wes walked.
9. When asked to solve the system of equations  $5x + 2y = 8$  and  $x - 3y = 22$  Kelly said "Oh that's easy — you just set them equal to each other." Looking puzzled, Wes replied

MPs on linear functions

Schettino

“Well, I know the method of *linear combinations*, and I know the method of *substitution*, but I do not know what method you are talking about.” First, explain each of the methods to which Wes is referring, and show how they can be used to solve the system. Second, explain why Wes did not find sense in Kelly’s comment. Third, check that your answer agrees with the diagram.

10. A restaurant has 23 tables. Some of the tables seat 4 persons and the rest seat 2 persons. In all, 76 persons can be seated at once. How many tables of each kind are there?
11. A math teacher is designing a test, and wants  $(3, -4)$  to be the solution to the system of equations  $\{3x - 5y = a, 7x + y = b\}$ . What values should the teacher use for  $a$  and  $b$ ?