Name_____

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1.

Computing Wind Speed   With a tail wind, a small Piper air-
craft can fly 600 miles in 3 hours. Against this same wind, the
Piper can fly the same distance in 4 hours. Find the average
wind speed and the average airspeed of the Piper.

2.

Computing Wind Speed   The average airspeed of a single-
engine aircraft is 150 miles per hour. If the aircraft flew the
same distance in 2 hours with the wind as it flew in 3 hours
against the wind, what was the wind speed?

3.

Financial Planning   Carletta has $10,000 to invest. As her
financial consultant, you recommend that she invest in
Treasury bills that yield 6%, Treasury bonds that yield 7%,
and corporate bonds that yield 8%. Carletta wants to have
an annual income of $680, and the amount invested in corpo-
rate bonds must be half that invested in Treasury bills. Find
the amount in each investment.

4.

Landscaping   A landscape company is hired to plant trees
in three new subdivisions. The company charges the devel-
oper for each tree planted, an hourly rate to plant the trees,
and a fixed delivery charge. In one subdivision it took 166
labor hours to plant 250 trees for a cost of $7520. In a second
subdivision it took 124 labor hours to plant 200 trees for a cost
of $5945. In the final subdivision it took 200 labor hours to
plant 300 trees for a cost of $8985. Determine the cost for each
tree, the hourly labor charge, and the fixed delivery charge.
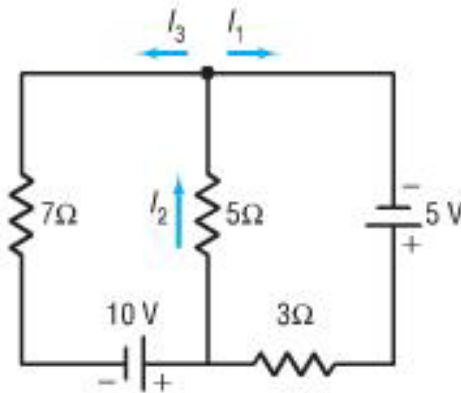*Sources: gurney.com; www.bx.org*

5.

Curve Fitting Find real numbers a, b, and c so that the graph of the function $y = ax^2 + bx + c$ contains the points $(-1, 4)$, $(2, 3)$, and $(0, 1)$.

6.

Electricity: Kirchhoff's Rules An application of Kirchhoff's Rules to the circuit shown results in the following system of equations:

$$\begin{cases} I_2 = I_1 + I_3 \\ 5 - 3I_1 - 5I_2 = 0 \\ 10 - 5I_2 - 7I_3 = 0 \end{cases}$$

Find the currents I_1, I_2, and I_3.

Source: Physics for Scientists & Engineers, 3rd ed., by Serway. © 1990 Brooks/Cole, a division of Thomson Learning.

7.

Pharmacy A doctor's prescription calls for the creation of pills that contain 12 units of vitamin B_{12} and 12 units of vitamin E. Your pharmacy stocks two powders that can be used to make these pills: one contains 20% vitamin B_{12} and 30% vitamin E, the other 40% vitamin B_{12} and 20% vitamin E. How many units of each powder should be mixed in each pill?