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A Growing Business

Combining Linear Equations

Problem Set

Write a linear function in two different ways to represent each problem situation.

1. Mei paints and sells ceramic vases for \$35 each. Each month she typically breaks 3 vases in the kiln. Write a linear function that represents the total amount Mei earns each month selling vases taking into account the value of the vases she breaks.

$$f(x) = 35(x - 3)$$

$$f(x) = 35x - 105$$

2. Isabel makes and sells fruit pies at her bakery for \$12.99 each. Each month she gives away 4 pies as samples. Write a linear function that represents the total amount Isabel earns each month selling fruit pies taking into account the value of the pies she gives away as samples.

3. Mattie sells heads of lettuce for \$1.99 each from a roadside farmer's market stand. Each week she loses 2 heads of lettuce due to spoilage. Write a linear function that represents the total amount Mattie earns each week selling heads of lettuce taking into account the value of the lettuce she loses due to spoilage.

4. Carlos prints and sells T-shirts for \$14.99 each. Each month 5 T-shirts are misprinted and cannot be sold. Write a linear equation that represents the total amount Carlos earns each month selling T-shirts taking into account the value of the T-shirts that cannot be sold.

5. Odell prints and sells posters for \$20 each. Each month 1 poster is misprinted and cannot be sold. Write a linear equation that represents the total amount Odell earns each month taking into account the value of the poster that cannot be sold.

6. Emilio builds and sells homemade wooden toys for \$40 each. Each month he donates 3 toys to a children's hospital. Write a linear equation that represents the total amount Emilio earns each month selling toys taking into account the toys he donates.

Write a linear function to represent each problem situation.

7. A cereal manufacturer has two production lines. Line A produces a variety of cereal that is sold for \$3 per box. Line A typically produces 4 boxes per day that do not meet company standards and cannot be sold. Line B produces a variety of cereal that is sold for \$2 per box. Line B typically produces 6 boxes per day that do not meet company standards and cannot be sold. Line A and Line B produce the same total number of boxes each day.

The linear functions $a(x) = 3(x - 4)$ and $b(x) = 2(x - 6)$ represent the total amount each line can produce taking into account the boxes that do not meet company standards and cannot be sold. Write a linear function that represents the total number of boxes the lines can produce combined.

Line A: $\frac{1}{2}x$

$$a(x) = 3\left(\frac{1}{2}x - 4\right)$$

Line B: $\frac{1}{2}x$

$$b(x) = 2\left(\frac{1}{2}x - 6\right)$$

$$\begin{aligned}c(x) &= a(x) + b(x) \\ &= 3\left(\frac{1}{2}x - 4\right) + 2\left(\frac{1}{2}x - 6\right) \\ &= \frac{3}{2}x - 12 + \frac{2}{2}x - 12 \\ &= \frac{5}{2}x - 24\end{aligned}$$

The linear function $c(x) = \frac{5}{2}x - 24$ represents the total number of boxes that Line A and Line B can produce combined.

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8. A pretzel manufacturer has two production lines. Line A produces a variety of pretzel that is sold for \$2.40 per bag. Line A typically produces 3 bags per day that do not meet company standards and cannot be sold. Line B produces a variety of pretzel that is sold for \$3.60 per bag. Line B typically produces 4 bags per day that do not meet company standards and cannot be sold. Line A produces 3 times as many bags as Line B each day.

The linear functions $a(x) = 2.4(x - 3)$ and $b(x) = 3.6(x - 4)$ represent the total number of bags each line can produce taking into account the bags that do not meet company standards and cannot be sold. Write a linear function that represents the total number of bags the lines can produce combined.

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9. Carlos has a roadside stand that sells peaches. He sells his peaches for \$1.99 per pound. He typically loses 5 pounds per week to spoilage. Hector also has a roadside stand that sells peaches. He sells his peaches for \$2.49 per pound. He typically only loses 1 pound per week to spoilage. Carlos' stand sells twice as many peaches per week as Hector's stand.

The linear functions $c(x) = 1.99(x - 5)$ and $h(x) = 2.49(x - 1)$ represent the total amount each stand can earn taking into account the peaches lost to spoilage. Write a linear function that represents the total amount that Carlos and Hector can earn combined.

10. A lamp manufacturer has two production lines. Line A produces a lamp model that is sold for \$24.99 each. Line A typically produces 2 lamps per day that do not meet company standards and cannot be sold. Line B produces a lamp model that is sold for \$34.99 each. Line B typically produces 1 lamp per day that does not meet company standards and cannot be sold. Line A produces half as many lamps as Line B each day.

The linear functions $a(x) = 24.99(x - 2)$ and $b(x) = 34.99(x - 1)$ represent the total number of lamps each line can produce taking into account the lamps that do not meet company standards and cannot be sold. Write a linear function that represents the total number of lamps the lines can produce combined.

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11. A jean manufacturer has two production lines. Line A produces a style that is sold for \$42 each. Line A typically produces 2 pairs per day that do not meet company standards and cannot be sold. Line B produces a style that can be sold for \$65 each. Line B typically produces 3 pairs per day that do not meet company standards and cannot be sold. Line A produces three times as many pairs of jeans as Line B each day.

The linear functions $a(x) = 42(x - 2)$ and $b(x) = 65(x - 3)$ represent the total number of pairs of jeans that each line can produce taking into account the jeans that do not meet company standards and cannot be sold. Write a linear function that represents the total number of pairs of jeans the lines can produce combined.

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- 12.** Jada makes and sells handmade puzzles for \$32 each. Each month she donates 2 puzzles to a retirement community. Ronna also makes and sells handmade puzzles for \$28 each. Each month she donates 2 puzzles to a childcare center. Jada and Ronna make the same number of puzzles each month.

The linear functions $j(x) = 32(x - 2)$ and $r(x) = 28(x - 2)$ represent the total amount each girl can earn taking into account the puzzles that are donated and not sold. Write a linear function that represents the total amount Jada and Ronna can earn combined.