

Variables That Change Together: Input and Output

Grade 6 math · Worksheet Answer Key · Standards: 6.EE.C.9

Each solution names the variables, shows the equation and substitutes carefully. Compare every step with your own work, not only the final answer, and redo any problem where the equation differed.

Standards: 6.EE.C.9 · **Level:** Grade 6

Problem 1 Naming the variables

- Independent: number of tickets sold. Dependent: money collected, because the money depends on how many tickets were sold.
- Independent: minutes on the treadmill. Dependent: calories burned.
- Independent: outside temperature. Dependent: number of lemonades sold.

(a) tickets → money; (b) minutes → calories; (c) temperature → lemonades

Problem 2 Who depends on whom?

The height depends on how many weeks have passed. Time moves on by itself, and the plant grows in response.

Dependent variable: h (height); independent variable: w

Problem 3 An equation from a price

The cost is \$4 times the number of hours, so $c = 4h$. The cost depends on the hours.

$c = 4h$; the dependent variable is c

Problem 4 Complete the table

$7 \times 2 = 14$, $7 \times 4 = 28$, $7 \times 6 = 42$, $7 \times 8 = 56$.

x	2	4	6	8
y	14	28	42	56

14, 28, 42, 56

Problem 5 Substitute the input

$55 \times 3 = 165$. $55 \times 6 = 330$. $55 \times 10 = 550$.

$d = 165, 330$ and 550 miles

Problem 6 Equation from a table

$18 \div 2 = 9$, $27 \div 3 = 9$, $45 \div 5 = 9$, $72 \div 8 = 9$. Each y is 9 times x .

$y = 9x$

Problem 7 Reading the ticket graph

Each ticket adds \$5: (1, 5), (2, 10), (3, 15), (4, 20). So $c = 5n$. For 9 tickets: $5 \times 9 = 45$.

(a) $c = 5n$; (b) \$45

Problem 8 An age difference

Zoe's age is Leo's age plus 4. For $l = 9$: $z = 9 + 4 = 13$. For $z = 21$: $21 = l + 4$, so $l = 21 - 4 = 17$.

(a) $z = l + 4$; (b) 13 years old; (c) 17 years old

Problem 9 Muffin boxes

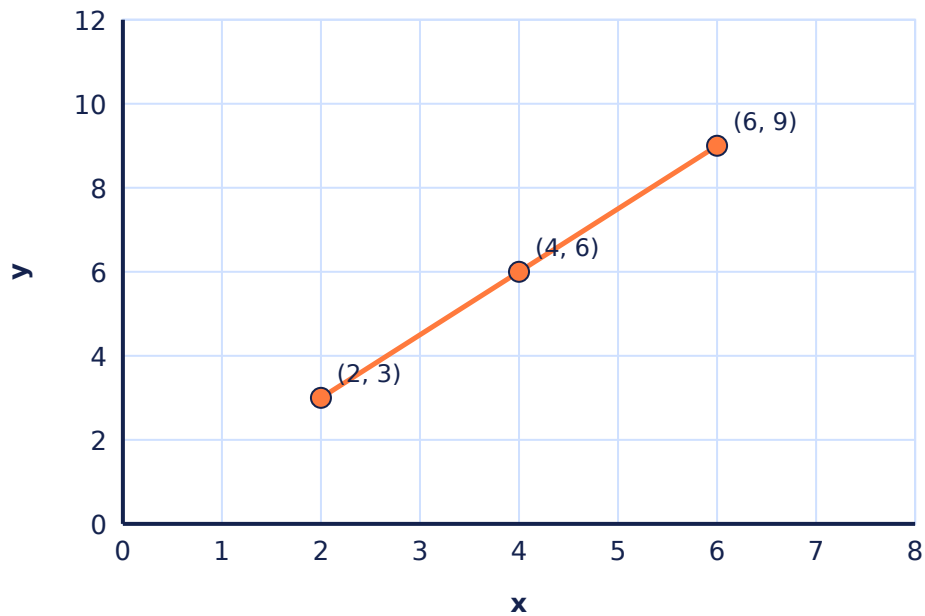
$6 \times 3 = 18$, $6 \times 5 = 30$, $6 \times 8 = 48$, $6 \times 12 = 72$.

b (boxes)	3	5	8	12
m (muffins)	18	30	48	72

$m = 6b$

Problem 10 Graph from a table

Plot (2, 3), (4, 6) and (6, 9). Each y is 1.5 times x : $3 \div 2 = 1.5$, $6 \div 4 = 1.5$, $9 \div 6 = 1.5$.



$$y = 1.5x$$

Problem 11 Song downloads

$1.25 \times 2 = 2.50$, $1.25 \times 4 = 5.00$, $1.25 \times 8 = 10.00$, $1.25 \times 10 = 12.50$.

n	2	4	8	10
c (dollars)	2.50	5.00	10.00	12.50

$$c = 1.25n$$

Problem 12 Which equation fits?

Each y is 5 more than x : $2 + 5 = 7$, $4 + 5 = 9$, $6 + 5 = 11$, $8 + 5 = 13$. The equation $5x$ would give 10 for $x = 2$, so it fails.

$$y = x + 5$$

Problem 13 The cyclist graph

- After 3 hours the cyclist has traveled 36 miles.
- Each hour adds 12 miles, so $d = 12t$. Check: $12 \times 3 = 36$.
- $12 \times 7 = 84$.

(a) 36 miles in 3 hours; (b) $d = 12t$; (c) 84 miles

Problem 14 Cyclist versus runner

$c = 14t$ and $r = 9t$.

- a. At 3 hours: $14 \times 3 = 42$ and $9 \times 3 = 27$, and $42 - 27 = 15$.
- b. The gap is $14t - 9t = 5t$. Set $5t = 25$, so $t = 5$.

(a) 15 miles; (b) 5 hours

Problem 15 Hiking pace

- a. $d = 2.5t$
- b. $2.5 \times 2 = 5$, $2.5 \times 4 = 10$, $2.5 \times 6 = 15$.
- c. $2.5 \times 3.6 = 9$.
- d. $2.5t = 14$, so $t = 14 \div 2.5 = 5.6$.

t (hours)	2	4	6
d (miles)	5	10	15

(a) $d = 2.5t$; (b) 5, 10, 15 miles; (c) 9 miles; (d) 5.6 hours

Problem 16 Food truck sales

- a. The number of tacos n is independent. $r = 3.75n$.
- b. $3.75 \times 24 = 90$.
- c. $3.75n = 146.25$, so $n = 146.25 \div 3.75 = 39$. Check: $3.75 \times 39 = 146.25$.

(a) $r = 3.75n$; (b) \$90; (c) 39 tacos

Problem 17 Filling a kiddie pool

- a. Time m is independent. The gallons depend on the minutes.
- b. Each minute adds 18 gallons, so $g = 18m$.
- c. $18 \times 11 = 198$.
- d. $18m = 504$, so $m = 504 \div 18 = 28$.

(a) minutes; (b) $g = 18m$; (c) 198 gallons; (d) 28 minutes

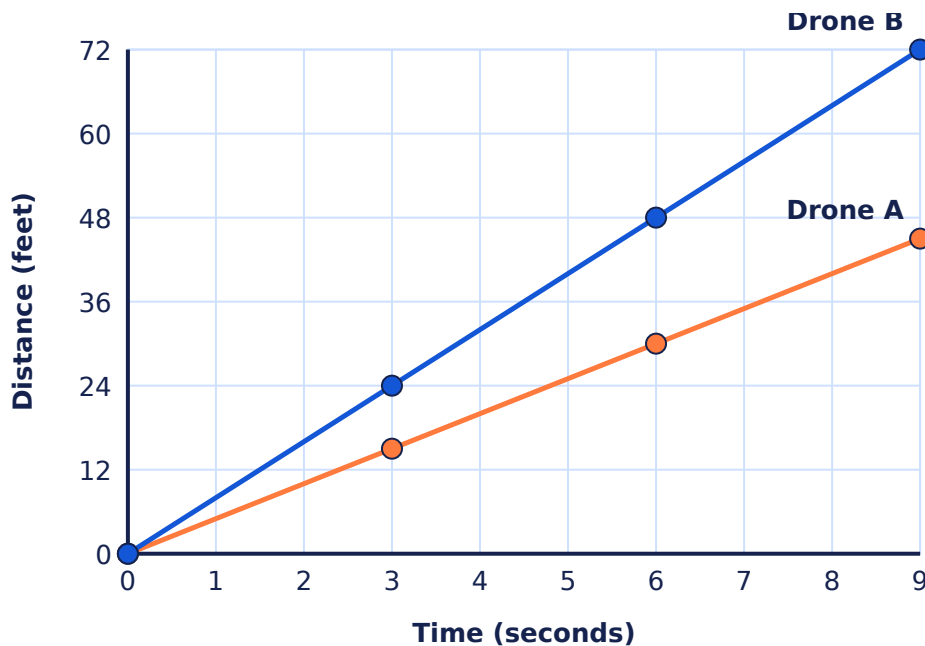
Problem 18 Weekend job pay

- a. $e = 11.5h$
- b. $11.5 \times 6 = 69$. $11.5 \times 9 = 103.5$. $11.5 \times 13 = 149.5$.
- c. $11.5h = 230$, so $h = 20$. Check: $11.5 \times 20 = 230$.

(a) $e = 11.5h$; (b) \$69, \$103.50, \$149.50; (c) 20 hours

Problem 19 Two drones

- Drone A gains 5 feet per second: $a = 5t$. Drone B gains 8 feet per second: $b = 8t$.
- At 4 seconds: $32 - 20 = 12$.
- The gap is $8t - 5t = 3t$. Set $3t = 27$, so $t = 9$.



At 9 seconds the gap is $72 - 45 = 27$ feet.

(a) $a = 5t$, $b = 8t$; (b) 12 feet; (c) 9 seconds

Problem 20 Trail mix comparison

- Mix A: $A = 6.40w$. Mix B: $B = 5.20w$.
- $6.40 \times 7.5 = 48$. $5.20 \times 7.5 = 39$. $48 - 39 = 9$.
- $D = 6.40w - 5.20w = 1.20w$. For $w = 7.5$: $1.20 \times 7.5 = 9$, which matches part (b).

(a) $A = 6.40w$, $B = 5.20w$; (b) \$9; (c) $D = 1.20w$, \$9