NAME _____

Lesson 1 Combining Terms

PRE-ALGEBRA

$3a + 2a = a + a + a + a + a$
$= 5a$

$3a + 2a = (3 + 2)\,a$
$= 5a$

$3b - 2b = b + b + b - b - b$
$= \underline{1b}$ or $\underline{b}$

$3b - 2b = (3 - 2)\,b$
$= \underline{1b}$ or $\underline{b}$

Complete the following:

	a	b	c
1.	$d + 3d =$ 4d	$5e + 2e =$ _____	$7f + 2f =$ _____
2.	$4g - 3g =$ _____	$8h - 4h =$ _____	$5j - j =$ _____
3.	$2k + k =$ _____	$5l - 3l =$ _____	$3m + 2m =$ _____
4.	$5n + 3n =$ _____	$2p - p =$ _____	$4q - q =$ _____
5.	$8r - 2r =$ _____	$5s + 4s =$ _____	$5t + t =$ _____
6.	$4u + 3u =$ _____	$9v - v =$ _____	$3w + w =$ _____

Complete the following.

	a	b
7.	If $a = 5$, then $3a + 2a =$ 25.	If $b = 3$, then $5b - 2b =$ _____.
8.	If $c = 2$, then $3c + c =$ _____.	If $d = 1$, then $3d - d =$ _____.
9.	If $e = 5$, then $2e + 2e =$ _____.	If $f = 4$, then $5f - 4f =$ _____.
10.	If $g = 2$, then $g + 3g =$ _____.	If $h = 5$, then $2h - h =$ _____.
11.	If $j = 3$, then $2j + 4j =$ _____.	If $k = 3$, then $4k - 3k =$ _____.
12.	If $l = 5$, then $3l + 3l =$ _____.	If $m = 1$, then $6m - m =$ _____.

CHAPTER 4

$$x + 5x = 18$$
$$6x = 18$$
$$x = \frac{18}{6}$$
$$x = 3$$

Check

$$x + 5x = 18$$
$$3 + (5 \times 3) = 18$$
$$3 + 15 = 18$$
$$18 = 18$$

If $x + 5x = 18$, then $x =$ _____ and $5x =$ _____.

$$y + y + 3 = 27$$
$$2y + 3 = 27$$
$$2y = 27 - 3$$
$$2y = 24$$
$$y = 24 \div 2$$
$$y = 12$$

Check

$$y + y + 3 = 27$$
$$12 + 12 + 3 = 27$$
$$27 = 27$$

If $y + y + 3 = 27$, then $y =$ _____

Solve each equation.

	a	*b*	*c*
1.	$4a + a = 25$	$7b + b = 72$	$c + 6c = 49$
2.	$d + d + 2 = 22$	$e + e + 8 = 28$	$f + f - 6 = 30$
3.	$3g + g = 48$	$h + h - 5 = 25$	$5j + j = 54$
4.	$k + k + 4 = 44$	$3l + l = 72$	$m + m - 7 = 19$
5.	$n + 8n = 108$	$p + p + 12 = 60$	$2q + q = 72$

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Lesson 3 Problem Solving PRE-ALGEBRA

Larry is twice as old as Marvin. Their combined age is 24 years. How old is each boy?

If x stands for Marvin's age, then $2x$ stands for Larry's age.

Equation: $x + 2x = 24$

Marvin is 8 years old.

Larry is 16 years old.

$x + 2x = 24$
$3x = 24$
$x = 24 \div 3$
$x = 8$

Since $x = 8$,
$2x = 2 \times 8$ or 16.

Check

$x + 2x = 24$
$8 + (2 \times 8) = 24$
$8 + 16 = 24$
$24 = 24$

CHAPTER 4

Write an equation for each problem. Solve each problem.

1. An office has 28 workers. There are three times as many men as women. How many women are there? How many men are there?

Equation: _____

There are _____ women and _____ men.

1.

2. During the summer Kim worked four times as many days as Lana. They worked a total of 75 days. How many days did each work?

Equation: _____

Lana worked _____ days. Kim worked _____ days.

2.

3. A truck has a mass of 4200 kg. The mass of the truck body is six times that of the engine. What is the mass of the engine? What is the mass of the truck body?

Equation: _____

The mass of the engine is _____ kg and the mass of the truck body is _____ kg.

3.

4. Jair is three times as old as Sue. Their combined age is 52. How old is each person?

Equation: _____

Sue is _____ years old. Jair is _____ years old.

4.

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Lesson 4 Problem Solving PRE-ALGEBRA

In an election between two girls, 75 votes were cast. Bianca received 5 more votes than Jaime. How many votes did each girl receive?

If x stands for the number of votes for Jaime, then $x + 5$ stands for the number of votes for Bianca.

Equation: $x + (x + 5) = 75$

Jaime received 35 votes.

Bianca received 40 votes.

$$x + (x + 5) = 75$$
$$2x + 5 = 75$$
$$2x = 75 - 5$$
$$2x = 70$$
$$x = 35$$

Since $x = 35$,

$x + 5 = 35 + 5$ or 40.

Check

$x + (x + 5) = 75$

$35 + 35 + 5 = 75$

$75 = 75$

Write an equation for each problem. Solve each problem.

1. Paul made 7 more gadgets than Jeremy. Together they made 55 gadgets. How many did each man make?

Equation: _____

Paul made _____ gadgets and Jeremy made _____.

1.

2. Two pairs of shoes cost $58. One pair costs $6 more than the other. How much did each pair cost?

Equation: _____

One pair cost $_____ and the other cost $_____.

2.

3. Yoko's mass is 8 kg more than Tara's mass. Their combined mass is 92 kg. What is each girl's mass?

Equation: _____

Tara's mass is _____ kg and Yoko's mass is _____ kg.

3.

4. Lisa has 12 more cases to unload than Mick does. They have a total of 150 cases to unload. How many cases does each have to unload?

Equation: _____

Mick has _____ cases and Lisa has _____ cases.

4.

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Lesson 5 Problem Solving PRE-ALGEBRA

Max has two boards that have a combined length of 16 m. One board is 1 m longer than twice the length of the other. What is the length of each board?

If x stands for the length of the shorter board, then $2x + 1$ stands for the length of the longer board.

Equation: $x + (2x + 1) = 16$

$$x + (2x + 1) = 16$$
$$3x + 1 = 16$$
$$3x = 16 - 1$$
$$3x = 15$$
$$x = 5$$

The shorter board is 5 m long.

Since $x = 5$,
$2x + 1 = (2 \times 5) + 1$ or 11.

The longer board is 11 m long.

Check

$$x + (2x + 1) = 16$$
$$5 + (2 \times 5) + 1 = 16$$
$$5 + 10 + 1 = 16$$
$$16 = 16$$

CHAPTER 4

Write an equation for each problem. Solve each problem.

1. Mark and Bill have a combined mass of 85 kg. Mark's mass is 20 kg less than twice Bill's mass. What is each boy's mass?

Equation: _____

Bill's mass is _____ kg.

Mark's mass is _____ kg.

1.

2. Cara and Amber have saved $43. Amber has saved $3 more than three times the amount Cara has saved. How much money has each girl saved?

Equation: _____

Cara has saved $_____.

Amber has saved $_____.

2.

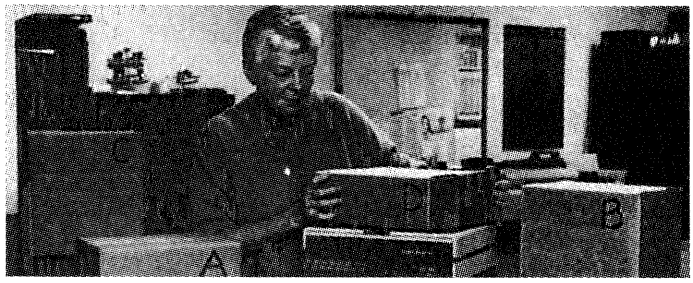
3. A carpenter cut a board that was 5 m long into two pieces. The longer piece is 1 m longer than three times the length of the shorter piece. What is the length of each piece?

Equation: _____

The shorter piece is _____ m long.

The longer piece is _____ m long.

3.



Write an equation for each problem. Solve each problem.

1. Elise said that Box A is 2 kg heavier than Box D. She also said that together these boxes have a mass of 16 kg. What is the mass of each box?

Equation: _____

Box A's mass is _____ kg.

Box D's mass is _____ kg.

1.

2. Box C is twice as heavy as Box A. Together their mass is 27 kg. What is the mass of each box?

Equation: _____

Box A's mass is _____ kg.

Box C's mass is _____ kg.

2.

3. Box B's mass is 1 kg more than twice the mass of Box D. They have a combined mass of 22 kg. What is the mass of each box?

Equation: _____

Box B's mass is _____ kg.

Box D's mass is _____ kg.

3.

4. Elise's mass is 1 kg more than Mark's. Their total mass is 97 kg. What is the mass of each person?

Equation: _____

Mark's mass is _____ kg.

Elise's mass is _____ kg.

4.

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Lesson 6 Problem Solving

PRE-ALGEBRA

distance = rate × time

$d = r \times t$

A robin flew 171 km in 3 hours.
At what speed did the robin fly?

Equation: $171 = r \times 3$

The robin flew 57 km per hour.

$d = r \times t$

$171 = r \times 3$

$\frac{171}{3} = r$

$57 = r$

CHAPTER 4

Write an equation for each problem. Solve each problem.

1. At 450 km per hour, how far can a plane fly in 5 h?

Equation: _____

The plane can fly _____ km in 5 h.

1.

2. The Willards want to travel 744 km in 12 h. They plan to travel the same distance each hour. At what speed would they travel?

Equation: _____

They would travel _____ km per hour.

2.

3. A ship averages 25 knots per hour. How far can the ship travel in 2 days?

Equation: _____

The ship can travel _____ knots in 2 days.

3.

4. At what speed would a plane have to fly in order to travel 780 km in 2 h?

Equation: _____

It would fly at _____ km per hour.

4.

5. At 204.8 km per hour, how far can a race car travel in 4 h?

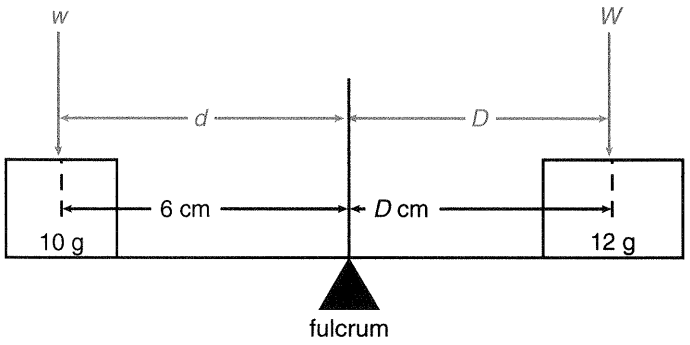
Equation: _____

It can travel _____ km in 4 h.

5.

Lesson 6 Problem Solving PRE-ALGEBRA

For all levers, $w \times d = W \times D$.



To balance the lever (or scale), how far from the fulcrum must the 12-gram mass be placed?

$w \times d = W \times D$

$10 \times 6 = 12 \times D$

$\frac{60}{12} = D$

$5 = D$

Check

$w \times d = W \times D$

$10 \times 6 = 12 \times 5$

$60 = 60$

The 12-g mass must be placed _____ cm from the fulcrum.

Write an equation for each problem. Solve each problem.

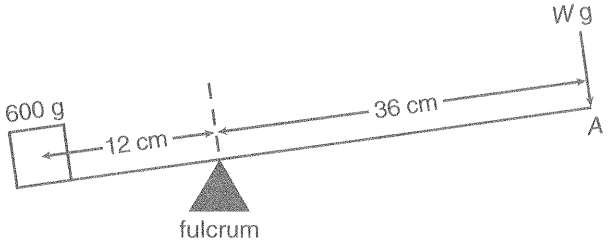
1. A 60-kg boy sits 2 m from the fulcrum of a seesaw. How far from the fulcrum should a 40-kg girl sit so the seesaw is balanced?

Equation: _____

She should sit _____ m from the fulcrum.

1.

2. How much mass would have to be applied at point A so that the lever is balanced?

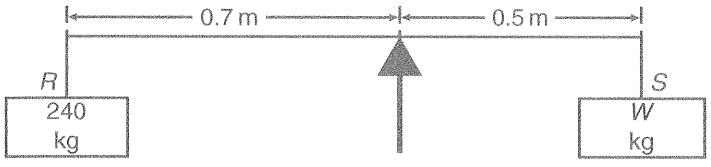


Equation: _____

_____ g would have to be applied at point A.

2.

3. What mass is needed at point S on the scale so that the scale is balanced?



Equation: _____

_____ kg are needed at point S.

3.

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CHAPTER 4 PRACTICE TEST

Using Pre-Algebra

Solve each problem.

1. Maggie worked three times as many hours as Ann. They worked a total of 32 h. How many hours did Ann work?

Equation: _____

Ann worked _____ h.

1.

2. An eraser and a pencil cost 87¢. The pencil cost 9¢ more than the eraser. How much did the pencil cost?

Equation: _____

The pencil cost _____ ¢.

2.

3. Dane and Jim earned 215 points in a contest. Dane earned 5 more than twice as many points as Jim. How many points did each boy earn?

Equation: _____

Jim earned _____ points.

Dane earned _____ points.

3.

4. Darla scored twice as many points as the combined scores of Gina and Hikaru. Darla scored 88 points. Gina scored 20 points. How many points did Hikaru score?

Hikaru scored _____ points.

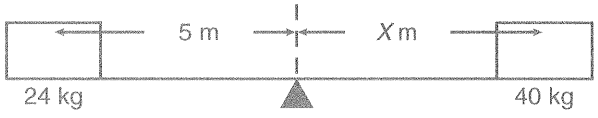
4.

5. At 51 km per hour, how far can a car travel in 3 h?

It can travel _____ km in 3 h.

5.

6. To balance the lever, how far from the fulcrum must the 40-kg mass be placed?



It must be _____ m from the fulcrum.

6.

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CHAPTER 5 PRETEST

Ratio, Rate, Proportion, and Percent

Circle each proportion below.

	a	*b*
1.	$\frac{3}{16} = \frac{6}{24}$	$\frac{7}{8} = \frac{28}{32}$
2.	$\frac{8}{20} = \frac{4}{5}$	$\frac{2}{3} = \frac{10}{15}$
3.	$\frac{7}{9} = \frac{21}{27}$	$\frac{24}{15} = \frac{8}{5}$

Solve each of the following.

4.	$\frac{n}{3} = \frac{9}{27}$	$\frac{3}{5} = \frac{15}{n}$
5.	$\frac{5}{6} = \frac{n}{36}$	$\frac{n}{8} = \frac{3}{6}$
6.	$\frac{8}{24} = \frac{n}{15}$	$\frac{n}{10} = \frac{9}{15}$
7.	$\frac{10}{25} = \frac{8}{n}$	$\frac{42}{n} = \frac{3}{4}$

Complete the following.

	a	*b*
8.	_____ is 12% of 36.	7 is _____ % of 16.
9.	$\frac{1}{2}$ is 50% of _____.	45 is 75% of _____.
10.	$\frac{2}{5}$ is _____% of $\frac{1}{2}$.	_____ is 30% of 200.
11.	3.6 is 80% of _____.	1.8 is _____% of 2.4.
12.	_____ is 6.7% of 83.	135 is _____% of 90.