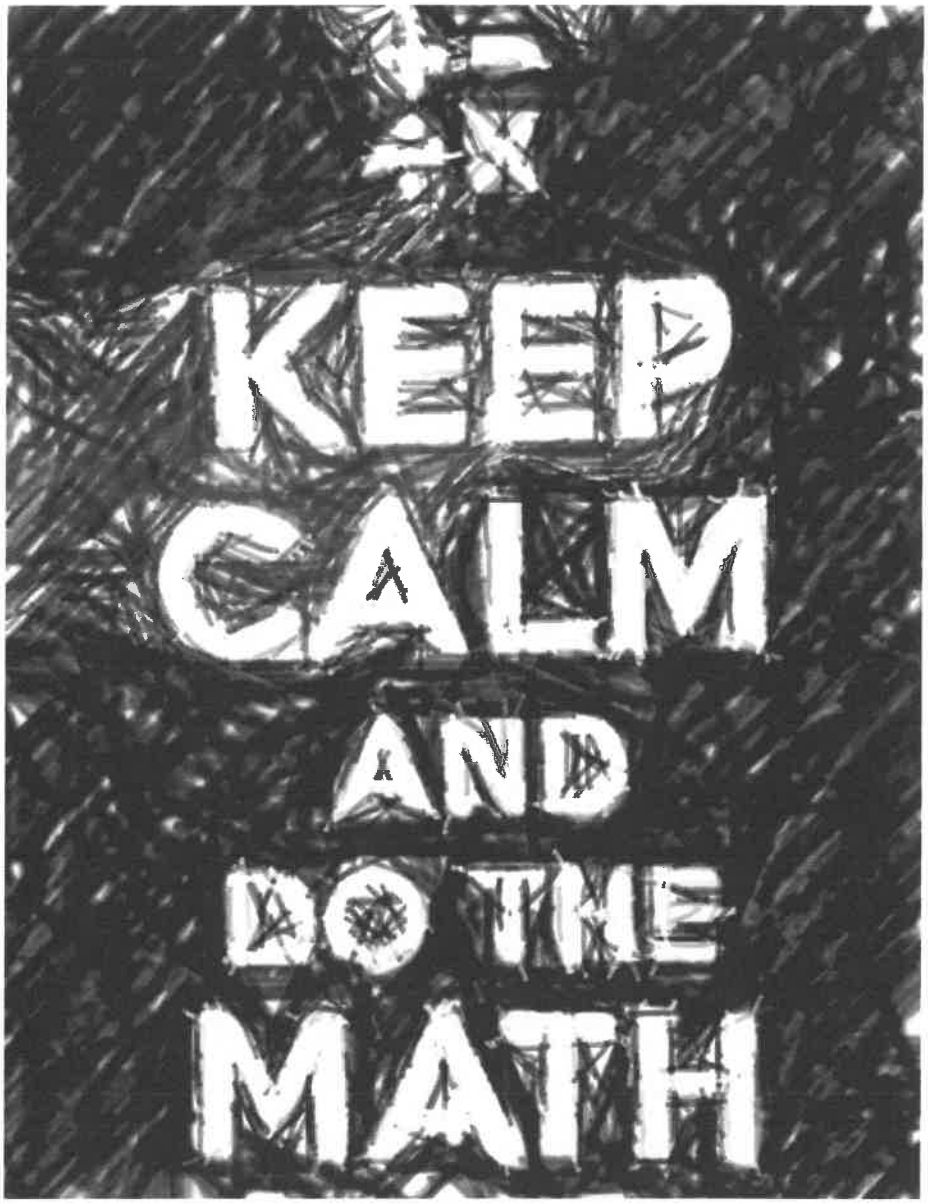
NAME: _____

Math P.A.T. Prep

Equations - SOLUTIONS

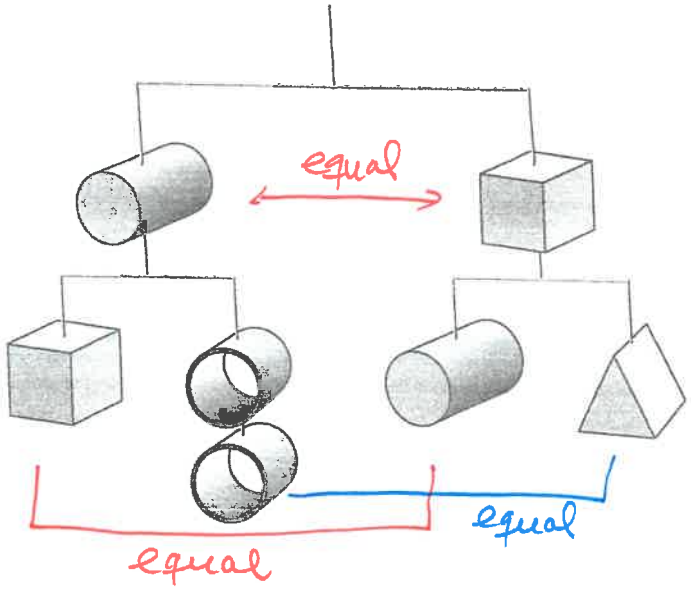


St. Brendan School

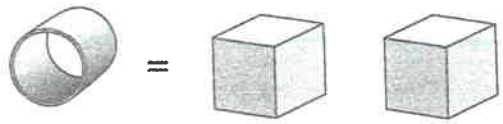
Mr. Martínez

EQUATIONS

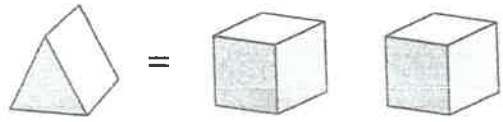
The following diagram represents a balanced mobile.



34. Which of the following equations correctly represents the relationship between some of the objects shown in the diagram above?

A. 

B. 

C. 

D. 

- Balanced means Right side = left side
- EQUIVALENT means
  - Same Terms
  - Same Variable + exponent
  - Same Coefficient

$2.15x + 7.8 = 25$

$\times 100 = 215x$

$\times 100 = 2500$

$\times 100 = 780$

24. Which of the following equations is equivalent to the equation shown above?

A. $215x + 780 = 2\,500$

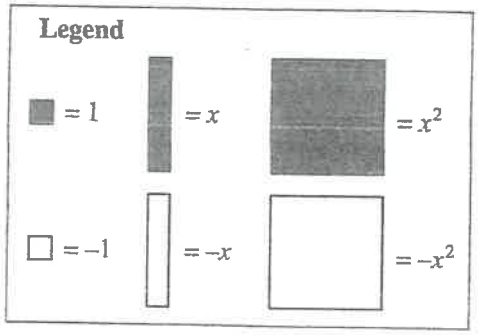
B. $215x + 780 = 250$

C. $215x + 78 = 2\,500$

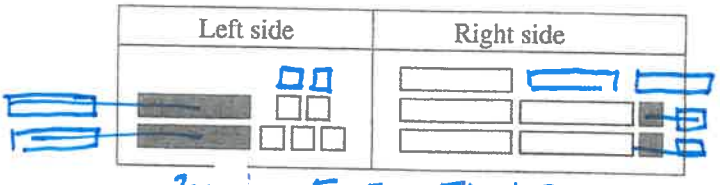
D. $215x + 78 = 25$

- 215x indicates 2.15x was multiplied by 100.
- thus, all terms must be multiplied by 100

Remember
$-x = 2$
is the same as
$x = -2$



The left and right sides of an equation are represented below.



$2x - 5 = -5x + 2$

9. The solution to the equation above can be represented by

A. ▬ = ■

B. ▬ = ■ ■

C. ▬ = □

D. ▬ = □ □

Strategy 1
- Convert to numbers and letters
- Solve

Numerically

$2x - 5 = -5x + 2$

$2x + 5x = 2 + 5$

$7x = 7$

$x = \frac{7}{7} = 1$

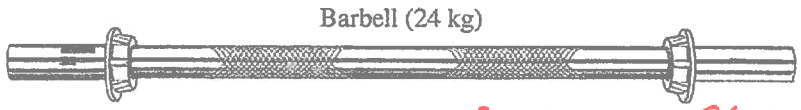
$x = 1$

$-7 = -7x$

- Remember that, at the end, you MUST only have Rectangles on one side AND squares on the other

Strategy 2
- Eliminate all Rectangles on Right by bringing in Rectangles to make zero pairs.
- Whatever you do to one side being to one side you must do to the other.
* Make zero pairs
- Eliminate left squares by bringing to squares to make zero pairs as
- Repeat above

A weight-lifter adds a certain number of equally weighted plates to the barbell shown below. The weighted plates are identical to one another.



$24 + x = 60$ $x = 60 - 24 = 36$ kg of plates

6 6 6

One weighted plate (? kg)

6 6 6

A. 36 kg → not possible, as this is the total plates weight

B. 12 kg → not possible, as this would mean there are only 3 plates

C. 6 kg

D. 4 kg

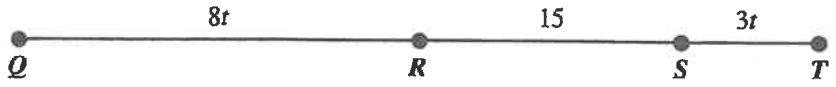
$36/6 =$ 6 plates → 3 on each side

$36/4 = 9$ plates, not possible

If the total mass of the barbell and plates equals 60 kg, and if each side of the barbell has the same number of plates, then one weighted plate could have a mass of

Setting Up an Equation When Parts are Known

Line segment QT is 48 units.



1. Which of the following linear equations represents the length of line segment QT?

A. $5t + 15 = 48$
B. $11t + 15 = 48$
C. $5t - 15 = 48$
D. $11t - 15 = 48$

$48 = \overline{QR} + \overline{RS} + \overline{ST}$
$= 8t + 15 + 3t$
$48 = 11t + 15$

The total length of time it takes for a single passenger train to travel between Vancouver and Toronto is 80 h.

Starting Location	Ending Location	Time (h)
Vancouver	Jasper	$\frac{5}{9}x$
Jasper	Winnipeg	$\frac{2}{3}x$
Winnipeg	Toronto	x

20
24
36

21. How long does it take the train to travel between Winnipeg and Toronto?

A. 24 h
B. 36 h
C. 44 h
D. 53 h

• have to find x.

Total travel time = 80 h = $\frac{5x}{9} + \left(\frac{2x}{3}\right)\frac{3}{3} + (x)\frac{9}{9}$

$80 = \frac{5x}{9} + \frac{6x}{9} + \frac{9x}{9} = \frac{20x}{9}$

$80 \times 9 = 20x$

$\hookrightarrow \frac{720}{20} = x$

$x = 36$ h

Numerical Response

8. At a picnic for 49 people, 4 families each brought an equal number of lawn chairs. If 5 more lawn chairs were still needed, then how many chairs did each family bring?

Answer: 11

$49 - 5 = 44$ chairs among 4 families
$44/4 = 11$ chairs

The relationship between two variables is given in the equation $35 + 15n = A$.

22. Which of the following situations could be represented using the equation above?

A. The price of a caterer for a party is \$35 for each dinner ordered and \$15 for each dessert ordered. — not true

B. The bill for framing a painting is \$35 for each square metre of glass required and \$15 for the wooden frame. — not true

C. The fee for a computer consultant is \$15 for an administration charge and \$35 for each hour worked. — not true

D. The cost of silk screening a design on T-shirts is \$15 for each shirt created and a \$35 design fee.

Notice that
- Constants have no variable attached to them
- Constant are things like:
  - one-time fee
  - down payment

18. Marc has a certain number of coins that are dimes, d, and quarters, q. Which of the following expressions represents the value of Marc's money in cents?

A. $10d + 25q$ — 10 cents per dime; 25 cents per quarter
B. $35(d + q)$
C. $35d + q$
D. $d + q$

Quarter = 25 cents
Dime = 10 cents

Alice works 8 hours a day as a waitress in a restaurant. She earns \$12.50 an hour plus money received from tips, t.

23. Which of the following equations represents Alice's total earnings, E, for one day of work?

A. $E = 8(12.50) + t$ — 8 hours per hour
B. $E = 8(12.50 + t)$
C. $E = 8t + 12.50$
D. $E = 8 + 12.50t$

8 h x \$12.50/h + tips

Catherine sells cupcakes, c, for \$1.50 each. The ingredients for each cupcake cost her \$0.30, and the sum of all of her other expenses is \$20.00/month.

6. Which of the following expressions represents Catherine's profit each month?

A. $1.5c - (20 + 0.3c)$
B. $20c - (1.5 + 0.3c)$
C. $(20 + 0.3c) - 1.5c$
D. $(1.5 + 0.3c) - 20c$

to make a profit, the expenses have to be less than money earned.!

Profit → $(1.50)c$
Cost → $0.30c + 20$

$1.50c - (0.3c + 20)$
↓ earned ↓ spent

Solve By Substitution

The amount of money, A, Hanna receives selling bracelets, b, at a local market is represented by the relation $A = 5b$. Her expenses, E, for making the bracelets are represented by the relation $E = 20 + b$.

9. What is the minimum number of bracelets that Hanna needs to sell to pay for her expenses?

A. 4 bracelets
B. 5 bracelets
C. 6 bracelets
D. 7 bracelets

$b \geq 5$

$E = 20 + b$ $\quad 5b \geq 20 + b \rightarrow 4b \geq 20$