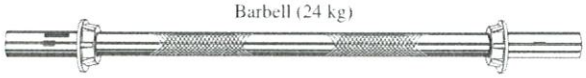
Pattern and Relations 3

Name: _____

Use the following information to answer question 17.

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

Barbell (24 kg)



One weighted plate (? kg)

60 - 24 = 36

18 | 18

6+6+6 | 6+6+6

17. 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

A. 36 kg
B. 12 kg
C. 6 kg
D. 4 kg

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. $10d + 25q$ ← 10d + 25q
B. $35(d + q)$
C. $35d + q$
D. $d + q$

Use the following equation to answer question 24.

$2.15x + 7.8 = 25$

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. $215x + 78 = 25$ ✗

Use the following information to answer numerical-response question 7.

Alan, Bob, and Charles worked together on a job and earned a combined total of $380. Alan earned $40 less than Bob. Charles earned twice as much as Alan.

Numerical Response

7. How much did Alan earn?

Answer: $ 85

(Record your answer in the numerical-response section on the answer sheet.)

A + B + C = 380

A + 40 = B

C = 2A

A + (A + 40) + 2A = 380

A + A + 40 + 2A = 380

4A + 40 = 380

4A = 340

A = 85

Pattern and Relations 3

Name: _____

Use the following information to answer numerical-response question 1.

A piggy bank contains only quarters and nickels, and there is a total of 60 coins. The total value of the coins in the bank is $7.40.

Numerical Response

1. How many quarters are in the piggy bank?

Answer: 38

(Record your answer in the numerical-response section on the answer sheet.)

$q+n=60 \Rightarrow q=60-n$

$0.25q+0.05n=7.40$

$25q+5n=740$

$25(60-n)+5n=740$

$1500-25n+5n=740$

$1500-20n=740$

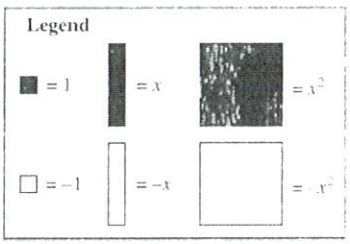
$-1500 \quad -1500$

$-20n=-760$

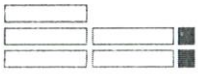
$\frac{-20n}{-20}=\frac{-760}{-20}$

$n=38$

Use the following information to answer question 9.



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

Left side	Right side
	

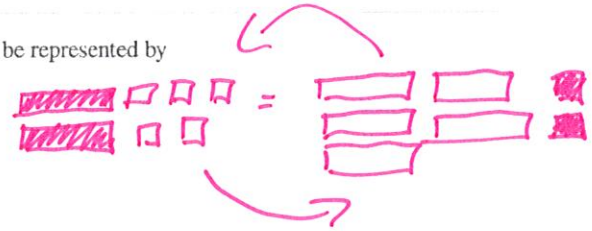
9. The solution to the equation above can be represented by

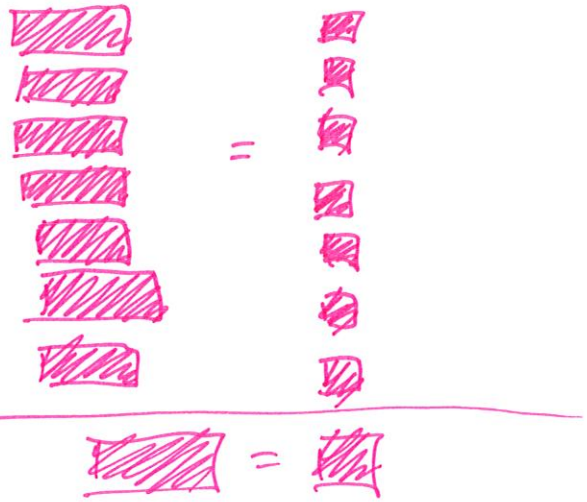
A. 

B. 

C. 

D. 





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

$+5x \quad +5x$

$7x-5=+2$

$+5 \quad +5$

$7x=7$

$x=1$

Pattern and Relations 3

Name: _____

Use the following information to answer question 17.

T J M

Tara, Jennifer, and Mindy donated some money to a charity. Jennifer donated twice as much as Tara, and Mindy donated $10 less than Jennifer.

17. If the **total** amount donated to the charity is $50, then how much money did Tara donate?

A. $6
B. $8
C. $12
D. $24

$J = 2T \Rightarrow \frac{J}{2} = T$ $T + J + M = 50$

$J = M + 10 \Rightarrow J - 10 = M$ $\frac{J}{2} + J + (J - 10) = 50$

$\frac{J}{2} + \frac{2J}{2} + \frac{2J}{2} - 10 = 50$ $60 = \frac{5}{2}J$

$\frac{2}{5}(60) = \left(\frac{5}{2}J\right)\frac{2}{5}$

$24 = J$

$\frac{J}{2} = T$

$\frac{24}{2} = 12$

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

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

$\frac{5}{9}x + \frac{2}{3}x + x = 80$

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

$9 \cdot \frac{20x}{9} = 80 \cdot 9$

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

$x = 36$

31. The value of x in the equation $2(x + 5) - 12 = 50$ is

A. 24
B. 26
C. 32
D. 36

$2x + 10 - 12 = 50$

$2x - 2 = 50$

$+2 \quad +2$

$2x = 52$

$\frac{2x}{2} = \frac{52}{2}$

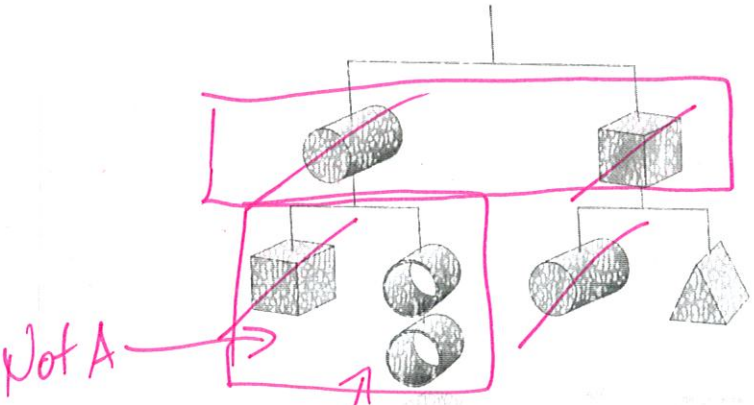
$x = 26$

Pattern and Relations 3

Name:_____

Use the following information to answer question 34.

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. 

Numerical Response

6. The value of x in the equation $\frac{x}{5} + 1 = 26$ is 125.

(Record your answer in the numerical-response section on the answer sheet.)

$\frac{x}{5} + 1 = 26$

$\frac{x}{5} = 25$

$5\left(\frac{x}{5}\right) = (25)5$

$x = 125$

Pattern and Relations 3

Name: _____

Use the following information to answer numerical-response question 10.

Patricia wants to buy a new pair of ice skates that cost $250 including GST. She already has $86 she plans to use towards this purchase. She earns $10.25/hour at her part-time job.

Numerical Response

$250 = 86 + 10.25x$
$164 = 10.25x$
$x = 16$

10. What is the minimum number of hours that she must work to save enough money to purchase the pair of ice skates?

Answer: 16 **hours**

(Record your answer in the numerical-response section on the answer sheet.)

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 $E = 20 + b$.

19. 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

$A = E$
$5b = 20 + b$
$4b = 20$
$b = 5$

Use the following information to answer question 6.

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. $(1.5 + 0.3c) - 20c$

$1.5c - (0.3c + 20)$
profit — expenses

15. The value of x in the equation $3(2x - 1) = \frac{1}{2}(x + 6)$ is

A. $\frac{8}{11}$
B. $\frac{12}{11}$
C. $\frac{14}{11}$
D. $\frac{18}{11}$

$6(2x - 1) = x + 6$
$12x - 6 = x + 6$
$+6 \quad +6$
$12x = x + 12$
$-x \quad -x$
$11x = 12$
$x = \frac{12}{11}$

Pattern and Relations 3

Name: _____

Use the following information to answer numerical-response question 5.

In one month, Dale earned $180.00. He earned $45.00 by washing cars, and the rest by mowing lawns.

Numerical Response

$180 = 45 + 9L \Rightarrow \frac{135}{9} = \frac{9L}{9}$

$L = 15$

5. How many lawns did Dale mow if he received $9.00 for each lawn that he mowed?

Answer: 15 **lawns**

(Record your answer in the numerical-response section on the answer sheet.)

Amy has already saved $50 toward the purchase of a new camera that has a total cost of $235. She earns the rest of the money she needs to buy the camera by babysitting her sister. Each time she babysits, she is paid $15.

Numerical Response

5. What is the minimum number of times Amy must babysit her sister in order to earn enough money to purchase the camera?

Answer: 13 **times**

(Record your answer in the numerical-response section on the answer sheet.)

$235 = 50 + 15x$

$-50 \quad -50$

$\frac{185}{15} = \frac{15x}{15}$

$x = 12.3$

$x = 13$

14. The value of x in the equation $3(2x - 1) = \frac{1}{2}(x + 6)$ is

A. $\frac{8}{11}$

B. $\frac{12}{11}$

C. $\frac{14}{11}$

D. $\frac{18}{11}$

15 on last Page