


Name _____

Date _____

1. Each  has a value of 9. Find the value of each row. Then add the rows to find the total.

a. $6 \times 9 = \underline{54}$



$5 \times 9 = 45$



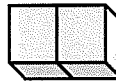
$1 \times 9 = \underline{9}$

$$\begin{aligned} 6 \times 9 &= (5 + 1) \times 9 \\ &= (5 \times 9) + (1 \times 9) \\ &= 45 + \underline{9} \\ &= \underline{54} \end{aligned}$$

b. $7 \times 9 = \underline{63}$



$5 \times 9 = 45$



$\underline{2} \times 9 = \underline{18}$

$$\begin{aligned} 7 \times 9 &= (5 + \underline{2}) \times 9 \\ &= (5 \times 9) + (\underline{2} \times 9) \\ &= 45 + \underline{18} \\ &= \underline{63} \end{aligned}$$

c. $8 \times 9 = \underline{72}$



$5 \times 9 = \underline{45}$



$\underline{3} \times 9 = \underline{27}$

$$\begin{aligned} 8 \times 9 &= (5 + \underline{3}) \times 9 \\ &= (5 \times 9) + (\underline{3} \times 9) \\ &= 45 + \underline{27} \\ &= \underline{72} \end{aligned}$$

d. $9 \times 9 = \underline{81}$



$5 \times 9 = \underline{45}$

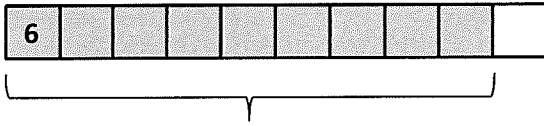


$\underline{4} \times 9 = \underline{36}$

$$\begin{aligned} 9 \times 9 &= (5 + \underline{4}) \times 9 \\ &= (5 \times 9) + (\underline{4} \times 9) \\ &= 45 + \underline{36} \\ &= \underline{81} \end{aligned}$$

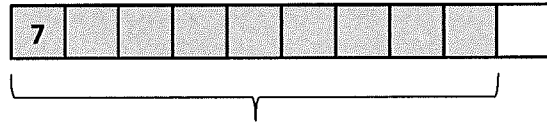
2. Find the total value of the shaded blocks.

a. $9 \times 6 = \underline{54}$



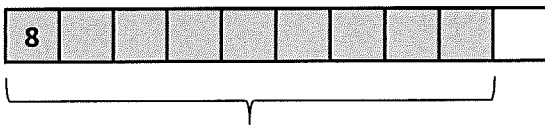
$$\begin{aligned} 9 \text{ sixes} &= 10 \text{ sixes} - 1 \text{ six} \\ &= \underline{60} - 6 \\ &= \underline{54} \end{aligned}$$

b. $9 \times 7 = \underline{63}$



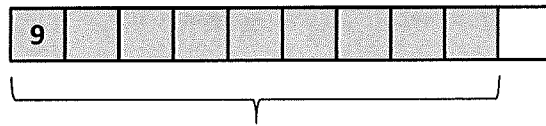
$$\begin{aligned} 9 \text{ sevens} &= 10 \text{ sevens} - 1 \text{ seven} \\ &= \underline{70} - 7 \\ &= \underline{63} \end{aligned}$$

c. $9 \times 8 = \underline{72}$



$$\begin{aligned} 9 \text{ eights} &= 10 \text{ eights} - 1 \text{ eight} \\ &= \underline{80} - 8 \\ &= \underline{72} \end{aligned}$$

d. $9 \times 9 = \underline{81}$



$$\begin{aligned} 9 \text{ nines} &= 10 \text{ nines} - 1 \text{ nine} \\ &= \underline{90} - \underline{9} \\ &= \underline{81} \end{aligned}$$

3. Matt buys a pack of postage stamps. He counts 9 rows of 4 stamps. He thinks of 10 fours to find the total number of stamps. Show the strategy that Matt might have used to find the total number of stamps.



$$\begin{aligned} 9 \text{ fours} &= 10 \text{ fours} - 1 \text{ four} \\ &= 40 - 4 \\ &= 36 \end{aligned}$$

4. Match.

Left side helicopters (multiplication):

- 3×9
- 9×9
- 8×9
- 9×4
- 2×9

Center clouds (products/quotients):

- 81
- 10
- 27
- 5
- 36
- 1
- 6
- 72
- 18
- 8

Right side helicopters (division):

- $45 \div 9$
- $9 \div 9$
- $90 \div 9$
- $72 \div 9$
- $54 \div 9$

Connections shown by lines:

- 3×9 connects to 27
- 9×9 connects to 81
- 8×9 connects to 72
- 9×4 connects to 36
- 2×9 connects to 18
- $45 \div 9$ connects to 5
- $9 \div 9$ connects to 1
- $90 \div 9$ connects to 10
- $72 \div 9$ connects to 8
- $54 \div 9$ connects to 6



Lesson 12:
Date:

Apply the distributive property and the fact $9 = 10 - 1$ as a strategy to multiply.
7/31/13




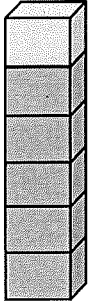
3.D.15



Name _____

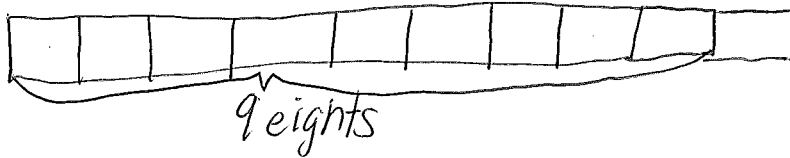
Date _____

1. Each  has a value of 9. Complete the equations to find the total value of the tower of blocks.



$$\begin{aligned} \underline{6} \times 9 &= (5 + \underline{1}) \times 9 \\ &= (5 \times \underline{9}) + (\underline{1} \times \underline{9}) \\ &= 45 + \underline{9} \\ &= \underline{54} \end{aligned}$$

2. Hector solves 9×8 by subtracting 1 eight from 10 eights. Draw a model and explain Hector's strategy.



$$\begin{aligned} 9 \text{ eights} &= 10 \text{ eights} - 1 \text{ eight} \\ &= 80 - 8 \\ &= 72 \end{aligned}$$

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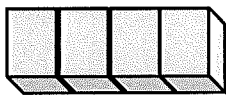
1. Find the value of each row. Then add the rows to find the total.

a. Each  has a value of 6.

$9 \times 6 = \underline{54}$



$5 \times 6 = 30$



$4 \times 6 = \underline{24}$

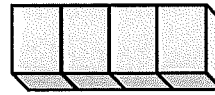
$$\begin{aligned} 9 \times 6 &= (5 + 4) \times 6 \\ &= (5 \times 6) + (4 \times 6) \\ &= 30 + \underline{24} \\ &= \underline{54} \end{aligned}$$

b. Each  has a value of 7.

$9 \times 7 = \underline{63}$



$5 \times 7 = \underline{35}$



$\underline{4} \times 7 = \underline{28}$

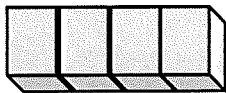
$$\begin{aligned} 9 \times 7 &= (5 + \underline{4}) \times 7 \\ &= (5 \times 7) + (\underline{4} \times 7) \\ &= 35 + \underline{28} \\ &= \underline{63} \end{aligned}$$

c. Each  has a value of 8.

$9 \times 8 = \underline{72}$



$5 \times 8 = \underline{40}$

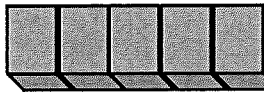


$\underline{4} \times 8 = \underline{32}$

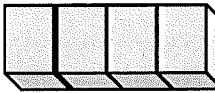
$$\begin{aligned} 9 \times 8 &= (5 + \underline{4}) \times 8 \\ &= (5 \times 8) + (\underline{4} \times \underline{8}) \\ &= 40 + \underline{32} \\ &= \underline{72} \end{aligned}$$

d. Each  has a value of 9.

$9 \times 9 = \underline{81}$



$5 \times 9 = \underline{45}$

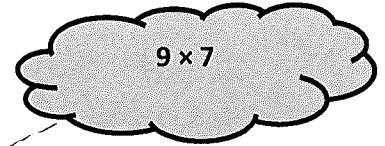
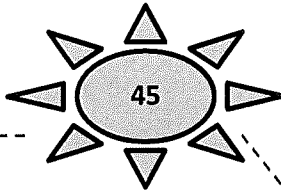


$\underline{4} \times 9 = \underline{36}$

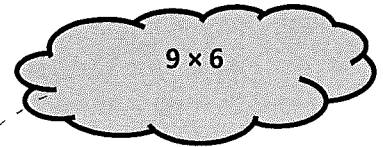
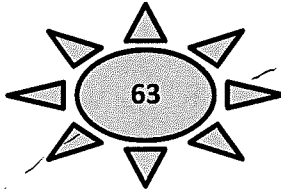
$$\begin{aligned} 9 \times 9 &= (5 + \underline{4}) \times 9 \\ &= (5 \times 9) + (\underline{4} \times \underline{9}) \\ &= 45 + \underline{36} \\ &= \underline{81} \end{aligned}$$

2. Match.

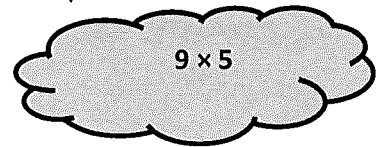
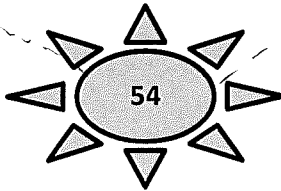
a. $9 \text{ fives} = 10 \text{ fives} - 1 \text{ five}$
 $= 50 - 5$



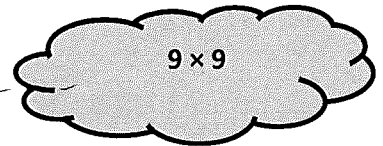
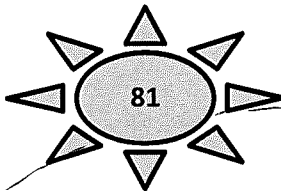
b. $9 \text{ sixes} = 10 \text{ sixes} - 1 \text{ six}$
 $= \underline{60} - 6$



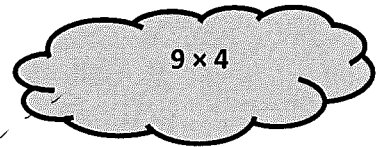
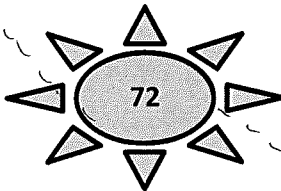
c. $9 \text{ sevens} = 10 \text{ sevens} - 1 \text{ seven}$
 $= \underline{70} - 7$



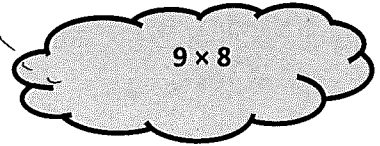
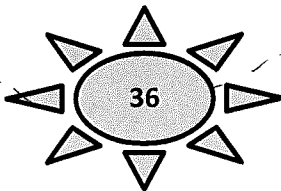
d. $9 \text{ eights} = 10 \text{ eights} - 1 \text{ eight}$
 $= \underline{80} - 8$



e. $9 \text{ nines} = 10 \text{ nines} - 1 \text{ nine}$
 $= \underline{90} - 9$



f. $9 \text{ fours} = 10 \text{ fours} - 1 \text{ four}$
 $= \underline{40} - 4$



Name _____

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1. a. Skip-count by nine.

9, 18, 27, 36, 45, 54, 63, 72, 81, 90

b. Look at the **tens** place in the count-by. What is the pattern? *It increases by 10 each time.*

c. Look at the **ones** place in the count-by. What is the pattern? *It decreases by 1 each time.*

2. Complete to make true statements.

a. 10 more than 0 is 10

1 less is 9.

$1 \times 9 =$ 9

f. 10 more than 45 is 55

1 less is 54.

$6 \times 9 =$ 54

b. 10 more than 9 is 19

1 less is 18.

$2 \times 9 =$ 18

g. 10 more than 54 is 64

1 less is 63.

$7 \times 9 =$ 63

c. 10 more than 18 is 28

1 less is 27.

$3 \times 9 =$ 27

h. 10 more than 63 is 73

1 less is 72.

$8 \times 9 =$ 72

d. 10 more than 27 is 37

1 less is 36.

$4 \times 9 =$ 36

i. 10 more than 72 is 82

1 less is 81.

$9 \times 9 =$ 81

e. 10 more than 36 is 46

1 less is 45.

$5 \times 9 =$ 45

j. 10 more than 81 is 91

1 less is 90.

$10 \times 9 =$ 90

3. a. Analyze the equations in Problem 2. What is the pattern?

+ 10 and - 1

b. Use the pattern to find the next 4 facts. Show your work.

$11 \times 9 = 99$

$12 \times 9 = 108$

$13 \times 9 = 117$

$14 \times 9 = 126$

$10 \times 9 = 90$

$90 + 10 = 100$

$100 - 1 = 99$

$99 + 10 = 109$

$109 - 1 = 108$

$108 + 10 = 118$

$118 - 1 = 117$

$117 + 10 = 127$

$127 - 1 = 126$

c. Kent notices another pattern in Problem 2. His work is shown below. He sees that:

- the tens digit in the product is 1 less than the number of groups
- the ones digit in the product is 10 minus the number of groups

	tens digit	ones digit
$2 \times 9 = \underline{18}$	$\underline{1} = 2 - 1$	$\underline{8} = 10 - 2$
$3 \times 9 = \underline{27}$	$\underline{2} = 3 - 1$	$\underline{7} = 10 - 3$
$4 \times 9 = \underline{36}$	$\underline{3} = 4 - 1$	$\underline{6} = 10 - 4$
$5 \times 9 = \underline{45}$	$\underline{4} = 5 - 1$	$\underline{5} = 10 - 5$

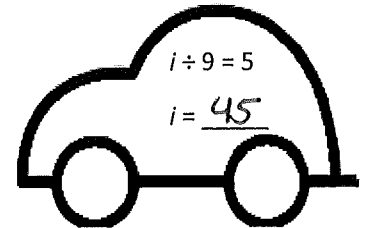
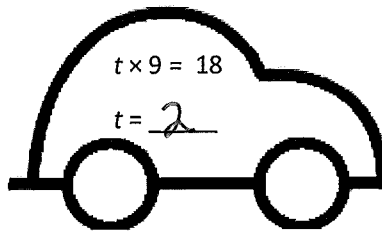
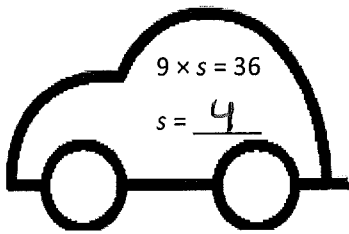
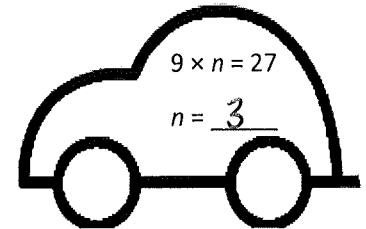
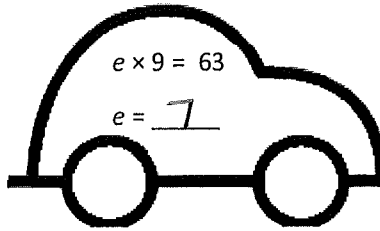
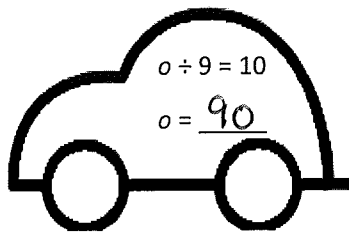
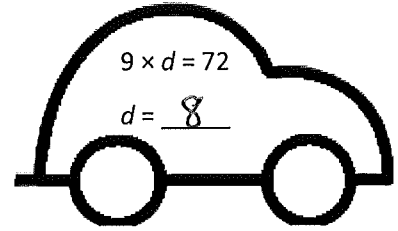
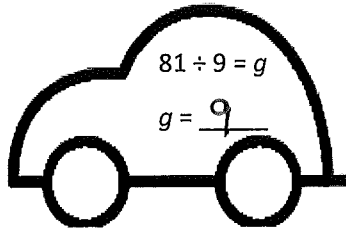
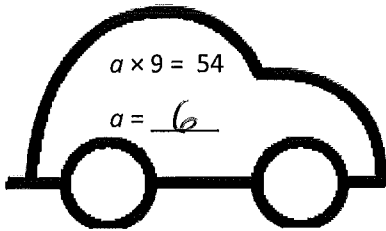
Use Kent's strategy to solve 6×9 and 7×9 .

6×9	7×9
$5 = 6 - 1$	$6 = 7 - 1$
$4 = 10 - 6$	$3 = 10 - 7$
54	63

d. Show an example of when Kent's pattern doesn't work.

11×9
 $10 = 11 - 1$ $9 = 10 - 1$
 109 instead of 99.

4. Each number sentence contains a letter representing the unknown. Find the value of each unknown. Then write the letters that match the answers to solve the riddle.



How do you make one vanish?

$\frac{a}{6} \frac{d}{8} \frac{d}{8} \frac{a}{6} \frac{'g'}{9} \frac{a}{6} \frac{n}{3} \frac{d}{8} \frac{i}{45} \frac{t}{2} \frac{s}{4} \frac{g}{9} \frac{o}{90} \frac{n}{3} \frac{e}{7}$

Name _____

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1. $6 \times 9 = 54$

What is 10 more than 54? 64What is 1 less? 63

$7 \times 9 =$ 63

$8 \times 9 = 72$

What is 10 more than 72? 82What is 1 less? 81

$9 \times 9 =$ 81

2. Explain the pattern used in Problem 1.

The pattern is add 10 then subtract 1.

Name _____

Date _____

1. a. Skip-count by nines down from 90.

90, 81, 72, 63, 54, 45, 36, 27, 18, 9

- b. Look at the tens place in the count-by. What is the pattern?

The tens decreases by 1 ten as you count down.

- c. Look at the ones place in the count-by. What is the pattern?

The ones place increases by 1 as you count down.

2. Each number sentence contains a letter representing the unknown. Find the value of each unknown.

$$a \times 9 = 18$$

$$a = \underline{2}$$

$$m \div 9 = 3$$

$$m = \underline{27}$$

$$e \times 9 = 45$$

$$e = \underline{5}$$

$$f \div 9 = 4$$

$$f = \underline{36}$$

$$9 \times d = 81$$

$$d = \underline{9}$$

$$w \div 9 = 6$$

$$w = \underline{54}$$

$$9 \times s = 90$$

$$s = \underline{10}$$

$$k \div 9 = 8$$

$$k = \underline{72}$$

3. Solve.

a. What is 10 more than 0? 10
 What is 1 less? 9
 $1 \times 9 = \underline{9}$

b. What is 10 more than 9? 19
 What is 1 less? 18
 $2 \times 9 = \underline{18}$

c. What is 10 more than 18? 28
 What is 1 less? 27
 $3 \times 9 = \underline{27}$

d. 10 more than 27? 37
 What is 1 less? 36
 $4 \times 9 = \underline{36}$

e. What is 10 more than 36? 46
 What is 1 less? 45
 $5 \times 9 = \underline{45}$

f. What is 10 more than 45? 55
 What is 1 less? 54
 $6 \times 9 = \underline{54}$

g. What is 10 more than 54? 64
 What is 1 less? 63
 $7 \times 9 = \underline{63}$

h. What is 10 more than 63? 73
 What is 1 less? 72
 $8 \times 9 = \underline{72}$

i. What is 10 more than 72? 82
 What is 1 less? 81
 $9 \times 9 = \underline{81}$

j. What is 10 more than 81? 91
 What is 1 less? 90
 $10 \times 9 = \underline{90}$

4. Explain the pattern in Problem ³ and use the pattern to find the next 3 facts.

$11 \times 9 = \underline{99}$

$12 \times 9 = \underline{108}$

$13 \times 9 = \underline{117}$

The pattern is add 10 subtract 1.