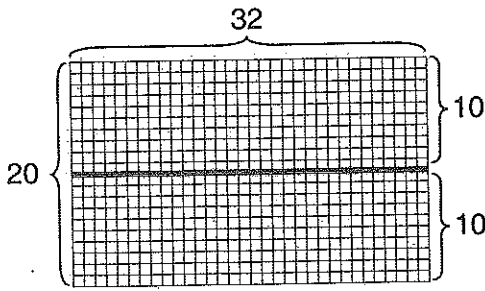


rin wants to multiply 20×32 . She knows how to find 10×32 . She rewrites 20×32 as double 10×32 :



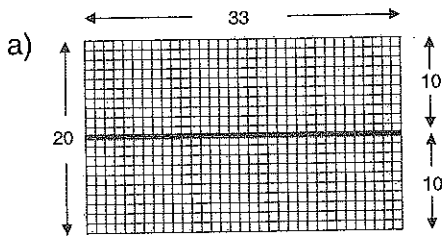
$$\begin{aligned} 20 \times 32 &= 2 \times 10 \times 32 \\ &= 2 \times 320 \\ &= 640 \end{aligned}$$

The picture shows why this works: a 20 by 32 array contains the same number of squares as two 10 by 32 arrays.

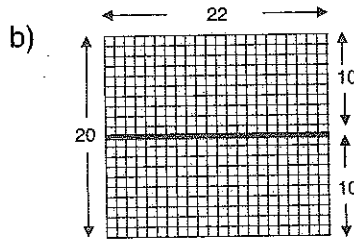
Write each number as a product of 2 factors (where one of the factors is 10):

- a) $30 =$ _____ b) $40 =$ _____ c) $70 =$ _____

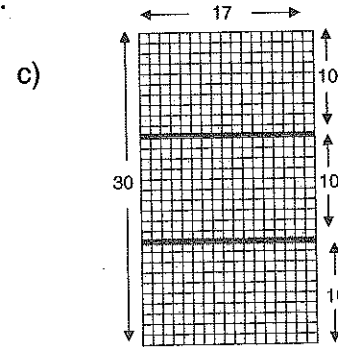
Write 2 equivalent products of each array. The first one is done for you.



$20 \times 33 = 2 \times 10 \times 33$



$20 \times 22 =$ _____



$30 \times 17 =$ _____

3. Find each product in 2 steps:

Step 1: Multiply the second number by 10.

Step 2: Multiply the result by the tens digit of the first number.

- a) $20 \times 34 = 2 \times 340 = 680$ b) $30 \times 13 =$ _____ c) $40 \times 22 =$ _____ d) $50 \times 31 =$ _____

4. Find each product mentally:

- a) $30 \times 22 =$ _____ b) $20 \times 40 =$ _____ c) $20 \times 60 =$ _____ d) $40 \times 27 =$ _____
 e) $20 \times 41 =$ _____ f) $30 \times 92 =$ _____ g) $51 \times 20 =$ _____ h) $30 \times 64 =$ _____
 i) $60 \times 41 =$ _____ j) $61 \times 50 =$ _____ k) $70 \times 30 =$ _____ l) $80 \times 20 =$ _____

5. Estimate each product:

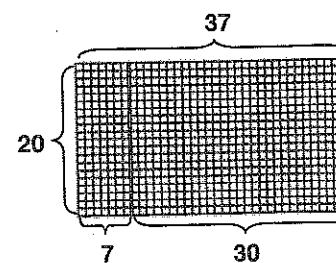
HINT: Round each factor to the leading digit.

- a) $27 \times 39 \approx 30 \times 40 = 1200$ b) $43 \times 51 \approx$ _____ c) $22 \times 47 \approx$ _____
 d) $62 \times 41 \approx$ _____ e) $72 \times 49 \approx$ _____ f) $38 \times 17 \approx$ _____

NS5-28: Multiplying 2-Digit Numbers by Multiples of Ten

Ed multiplies 20×37 by splitting the product into a sum of two smaller products:

$$\begin{aligned} 20 \times 37 &= (20 \times 7) + (20 \times 30) \\ &= 140 + 600 \\ &= 740 \end{aligned}$$



He keeps track of the steps of the multiplication in a chart:

		3	7
x	2	0	
			0

Step 1:

Ed multiplies $2 \times 7 = 14$. He is really multiplying 20×7 so he first writes a zero in the ones place.

		3	7
x	2	0	
		4	0

Step 2:

Next, since $2 \times 7 = 14$, Ed writes the 4 in the tens place and the 1 at the top of the hundreds column.

		3	7
x	2	0	
		7	4

Step 3:

Ed then multiplies $20 \times 30 (= 600)$. As a short cut, he multiplies $2 \times 3 = 6$ and then he adds the 1 from the top of the hundreds column: $6 + 1 = 7 (= 700)$.

1. Practice the first two steps of the multiplication.

NOTE: In one of the questions below, you will not need to regroup the hundreds.

a)

		2	4
x	3	0	
		2	0

b)

		1	5
x	4	0	

c)

		2	5
x	3	0	

d)

		1	2
x	4	0	

e)

		1	5
x	5	0	

2. Multiply:

a)

		5	5
x	2	0	

b)

		3	4
x	4	0	

c)

		2	5
x	4	0	

d)

		4	3
x	5	0	

e)

		1	3
x	6	0	

f)

$$\begin{array}{r} 28 \\ \times 30 \\ \hline \end{array}$$

g)

$$\begin{array}{r} 36 \\ \times 20 \\ \hline \end{array}$$

h)

$$\begin{array}{r} 27 \\ \times 40 \\ \hline \end{array}$$

i)

$$\begin{array}{r} 23 \\ \times 60 \\ \hline \end{array}$$

j)

$$\begin{array}{r} 43 \\ \times 70 \\ \hline \end{array}$$

3. Rewrite each product as a sum then find the answer:

a) $20 \times 13 = (20 \times 10) + (20 \times 3) = 200 + 60 = 260$

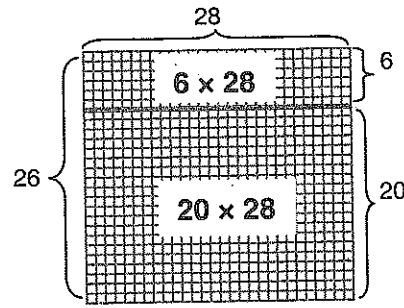
b) $20 \times 42 =$ _____

c) $30 \times 23 =$ _____

S5-29: Multiplying 2 Digits by 2 Digits

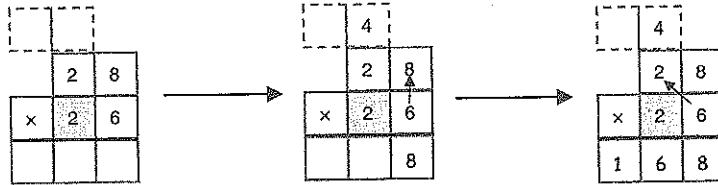
ace multiplies 26×28 by splitting the product into a sum of two smaller products:

$$\begin{aligned} 26 \times 28 &= 6 \times 28 + 20 \times 28 \\ &= 168 + 560 \\ &= 728 \end{aligned}$$



Grace keeps track of the steps of the multiplication using a chart.

Step 1:
She multiplies 6×28 .



Practice the first step of the multiplication:

a)

	2	3
x	1	5

b)

	2	4
x	1	3

c)

	2	6
x	4	2

d)

	4	3
x	5	2

e)

	1	4
x	3	5

f)

	2	5
x	4	2

g)

	3	6
x	4	2

h)

	2	4
x	4	5

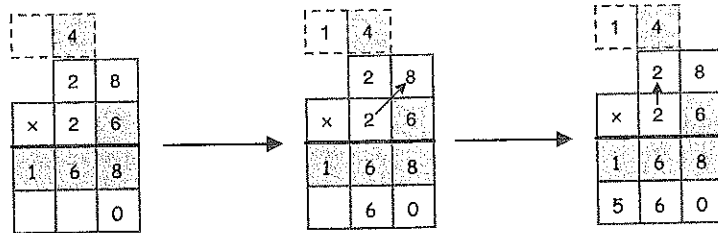
i)

	2	4
x	3	6

j)

	3	4
x	1	3

Step 2:
Grace then multiplies 20×28 .
(Notice she starts by writing a 0 in the ones place because she is multiplying by 20, not by 2).



2. a)

	1	1
x	4	5
	1	1
	9	2

b)

	2	
x	3	6
	1	4
		4

c)

	1	
x	4	3
	1	0
		5

d)

	1	
x	5	4
	1	7
		2

e)

	2	
x	6	4
	1	4
		0

3. Practice the first 2 steps of the multiplication.

a)	b)	c)	d)	e)																																																																																																				
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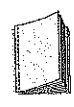
Step 3: Grace completes the multiplication by adding the products of 6×28 and 20×28 .

4. Complete the multiplication by adding the numbers in the last two rows of the chart.

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5. Multiply:

a)	b)	c)	d)	e)																																																																																																				
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6. Find the products:

- a) 27×32 b) 56×73 c) 85×64 d) 19×93 e) 74×86 f) 64×98

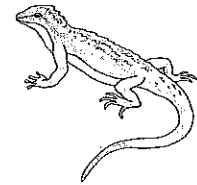
1. Double each number mentally by doubling the ones digit and the tens digit separately.

	23	44	12	31	43	54	83	92	71
Double									

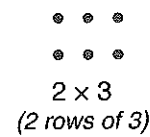
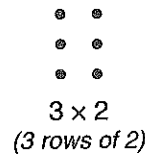
2. Double the ones and tens separately and add the result: $2 \times 36 = 2 \times 30 + 2 \times 6 = 60 + 12 = 72$.

	25	45	16	28	18	17	35	55	39
Double									

3. a) One flower costs 34¢. How much do two flowers cost? _____
 b) One lizard costs 48¢. How much do two lizards cost? _____



4. From the arrays you can see:
 3×2 is the same as 2×3 .



Is 4×5 the same as 5×4 ? Explain.

5. Rearrange the products so you can find the answer mentally.

Example: $2 \times 8 \times 35$
 $= 2 \times 35 \times 8$
 $= 70 \times 8$
 $= 560$

Example: $4 \times 18 \times 25$
 $= 4 \times 25 \times 18$
 $= 100 \times 18$
 $= 1800$

- a) $2 \times 4 \times 25$ b) $2 \times 3 \times 45$ c) $2 \times 6 \times 35$
 d) $2 \times 27 \times 50$ e) $4 \times 75 \times 250$ f) $2 \times 97 \times 500$
 g) $372 \times 4 \times 25$ h) $2 \times 2 \times 15 \times 250$ i) $25 \times 2 \times 50 \times 4$

6. Double the number in the box and halve the number in the circle.

Example: $\boxed{8} \times \textcircled{4} \rightarrow \boxed{16} \times \textcircled{2}$

$\boxed{6} \times \textcircled{4} \rightarrow \boxed{} \times \textcircled{}$

$\boxed{10} \times \textcircled{2} \rightarrow \boxed{} \times \textcircled{}$

$\boxed{7} \times \textcircled{12} \rightarrow \boxed{} \times \textcircled{}$

Does the product change or stay the same? Explain

7. Use halving and doubling to find each product mentally.

Example: 32×5
 $= 16 \times 10$
 $= 160$

a) 42×5

b) 64×5

c) 86×5

1. Fill in the blanks.

a)

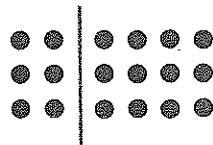


$$3 \times \underline{2} + 3 \times \underline{1}$$

$$= 3 \times (\underline{2} + \underline{1})$$

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

b)

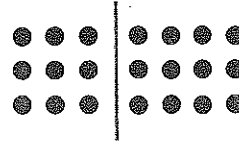


$$3 \times \underline{\quad} + 3 \times \underline{\quad}$$

$$= 3 \times (\underline{\quad} + \underline{\quad})$$

$$= 3 \times \underline{\quad}$$

c)

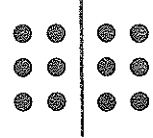


$$3 \times \underline{\quad} + 3 \times \underline{\quad}$$

$$= 3 \times (\underline{\quad} + \underline{\quad})$$

$$= 3 \times \underline{\quad}$$

d)



$$3 \times \underline{\quad} + 3 \times \underline{\quad}$$

$$= 3 \times (\underline{\quad} + \underline{\quad})$$

$$= 3 \times \underline{\quad}$$

e) $3 \times 5 + 3 \times 4$

$$= 3 \times (\underline{5} + \underline{4})$$

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

f) $3 \times 2 + 3 \times 6$

$$= 3 \times (\underline{\quad} + \underline{\quad})$$

$$= 3 \times \underline{\quad}$$

g) $7 \times 4 + 7 \times 3$

$$= 7 \times (\underline{\quad} + \underline{\quad})$$

$$= 7 \times \underline{\quad}$$

h) $9 \times 3 + 9 \times 2$

$$= 9 \times (\underline{\quad} + \underline{\quad})$$

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

2. Write each number in expanded form.

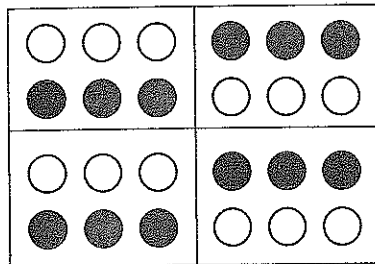
a) $32\,753 = \underline{3 \times 10\,000 + 2 \times 1\,000 + 7 \times 100 + 5 \times 10 + 3}$

b) $45\,326 = \underline{\hspace{10em}}$

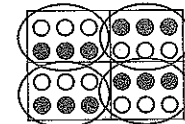
c) $72\,023 = \underline{\hspace{10em}}$



3.



Write as many statements as you can for the array using multiplication, addition, or both.



Example: $(2 \times 3) + (2 \times 3) + (2 \times 3) + (2 \times 3) = 24$

4. Is the given statement always, sometimes, or never true? Explain.

a) $3 \times \square$ is even

b) $5 \times \square$ is a multiple of 5

c) $7 \times \square$ is 0

d) $2 \times \square$ is even

e) $6 \times \square$ is a multiple of 2

f) A factor of a number is greater than the number

5. Explain why the product of two 2-digit numbers must be at least 100.

6. Using the digits 1, 2, 3, and 4, create ...

a) the greatest product

$$\square \times \square \square \square$$

b) the least product

$$\square \times \square \square \square$$

Answer the questions below in your notebook

1. A bee has 6 legs. How many legs do 325 bees have?



2. How many hours are there in the month of January?



3. A 12-sided field has sides 87 metres long. What is the perimeter of the field?

4. Sapin's heart beats 98 times a minute. How many times would it beat in an hour?

5. A harp has 47 strings. How many strings do 12 harps have?

7. A hummingbird flaps its wings 15 times a second.



How many times does it flap its wings in a minute?

6. Find the first four products. (Show your work on a separate piece of paper.) Use the pattern in the products to find the products in e) and f) without multiplying:

a)

	3	7
x		9

b)

	3	7
x	1	2

c)

	3	7
x	1	5

d)

	3	7
x	1	8

e)

	3	7
x	2	1

f)

	3	7
x	2	4

- 8.

Planets	Width (in km)
Mercury	4 850
Mars	6 790
Pluto	3 400

The circumference of a planet is the distance around the planet.

The circumference is always about 3 times the width of the planet.

Use the numbers in the charts to find the approximate circumferences of the planets.

9. Tickets to a play cost \$14.

How much will it cost for a class of 26 students to attend the play?

How much change will they receive from a \$500 payment?



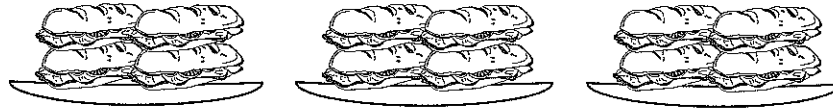
10. Recall that **factors** of a number are whole numbers that multiply to give the number. Two **factors** of 15 are 3 and 5. 15 is called the **product** of 3 and 5.

Say whether each statement below is true or false. Explain your answer.

- The factors of a number are never greater than the number.
- The least factor of a number is always 1.
- A number is always a factor of itself.
- The sum of a pair of factors of a number is always less than the number (i.e. 3 and 2 are factors of 6 and $3 + 2 < 6$).

Rita has 12 sandwiches. A tray holds 4 sandwiches:

There are 3 trays:



What has been shared or divided into sets or groups?

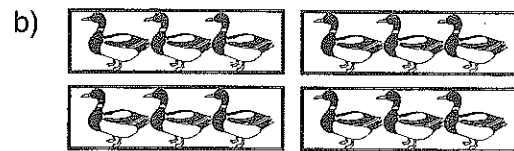
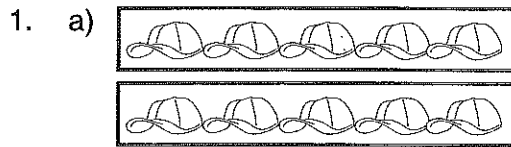
(Sandwiches)

How many sets are there?

(There are 3 sets of sandwiches.)

How many of the things being divided are in each set?

(There are 4 sandwiches in each set.)



What has been shared or divided into sets?

What has been shared or divided into sets?

How many sets? _____

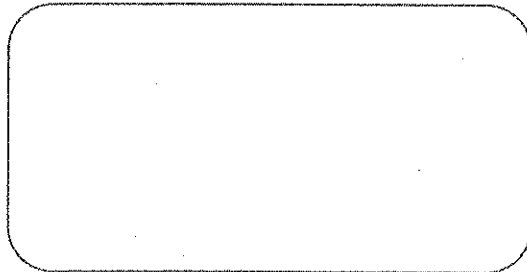
How many sets? _____

How many in each set? _____

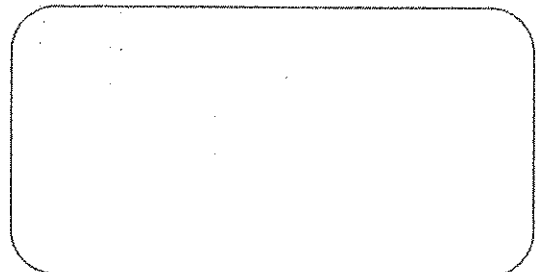
How many in each set? _____

2. Using circles for sets and dots for things, draw a picture to show...

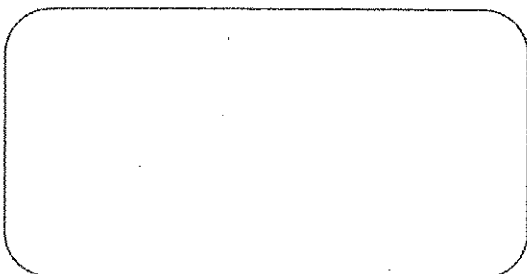
a) 5 sets
4 things in each set



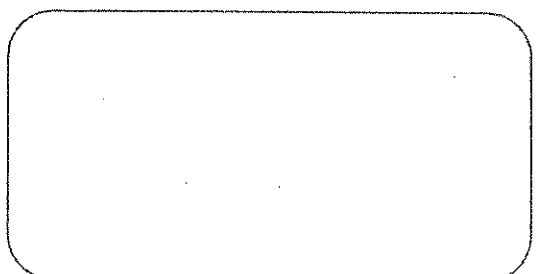
b) 6 groups
3 things in each group











c) 7 sets
3 things in each set



d) 3 sets
4 things in each set



3.

	What has been shared or divided into sets?	How many sets?	How many in each set?
a) 24 toys 4 toys for each girl/boy 6 girls/boys 	24 toys	6	4
b) 8 children 32 crackers 4 crackers for each child 			
c) 18 flowers 3 bouquets 6 flowers in each bouquet 			
d) 9 trees 45 oranges 5 oranges in each tree 			
e) 8 apples in each pack 80 apples 10 packs 			
f) 6 taxis 24 passengers 4 passengers in each taxi 			
g) 35 cows 7 cows in each herd 5 herds 			
h) 7 litters 42 puppies 6 puppies in each litter 			

4. Draw a picture for Questions 3 a), b) and c) using circles for sets and dots for the things being divided.