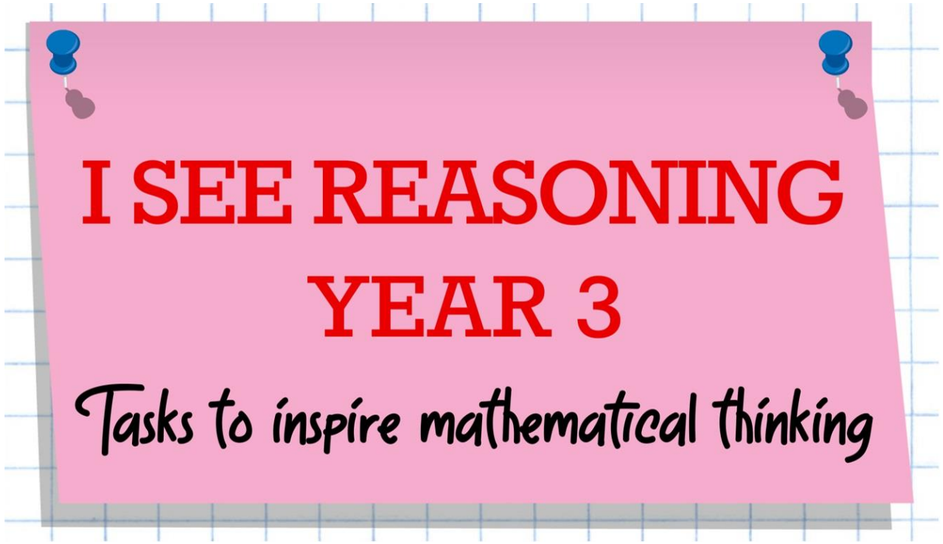
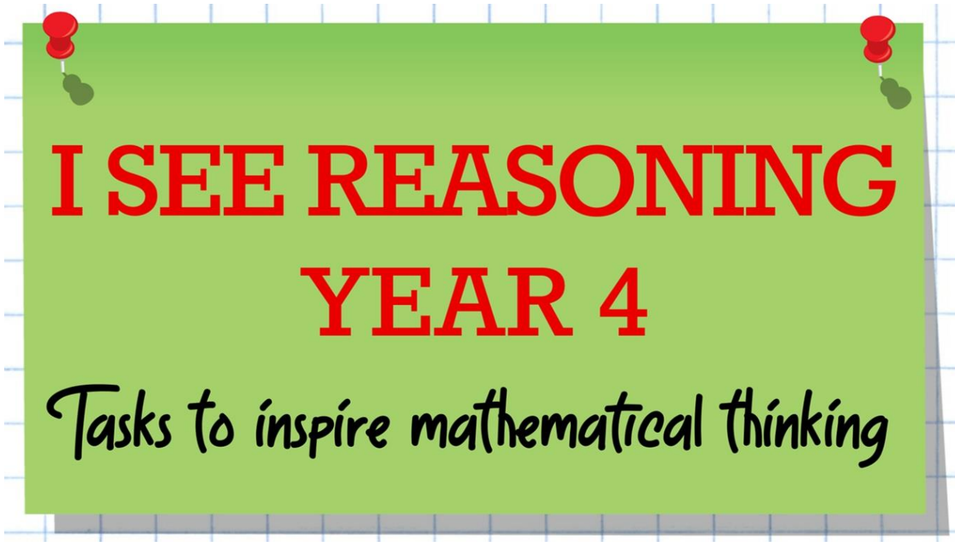
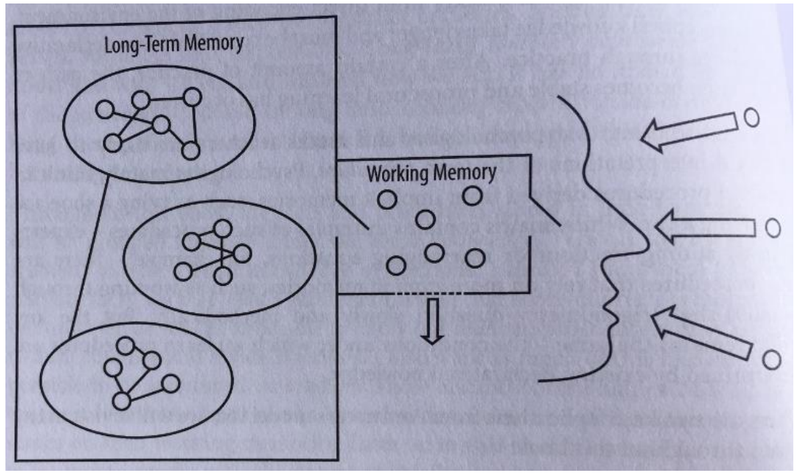
Using I See Reasoning – Y3 & Y4 to Deepen Mathematical Reasoning





I SEE MATHS



Contexts

Explore Concepts

Visual Reps

Misconceptions

Small Steps

Intelligent practice

Spotting Patterns

Comparing methods

Explain reasoning

Creating questions

Multiple answers

Applying in PS

Combining domains

Start of sequence

End of sequence

Contexts

Would you normally use decimal numbers to describe…

…your height in metres?

…your height in centimetres?

…the time it takes in minutes to walk to school?

…the amount of a pizza that is left over?

…your time in a 30 metre sprint race?

Extend: *think of other contexts where decimal are used.*

Contexts

Circle the examples where its size is an area:

The size of your foot

The size of your footprint

The size of your body

The size of your shadow

The size of a country

The size of a border between countries

Explain

Why might a doctor **use rounding** when suggesting how much exercise you need to do each day?

Why does a doctor **not use rounding** when measuring the amount of medicine to give a patient?

Why might we **use rounding** to describe the number of leaves on a tree?

*We need to be **more/less** accurate when… because…*

It is hard to measure… exactly because…

Explore

There are **3 squares** and **2 matchsticks are left over.**

Rearrange the same number of matchsticks.

There are ☐ triangles and ☐ matchsticks are left over.

There are **2** ☐ and **4** matchsticks are left over.

Explain

Question A: How many **triangles** can be made with **12 matchsticks?**

Question B: How many **hexagons** can be made with **24 matchsticks?**

I noticed that…

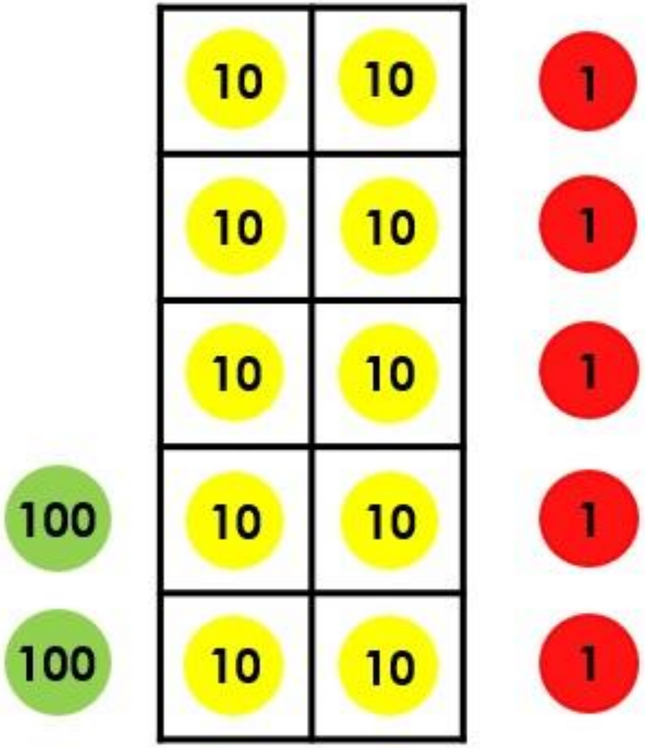
This is because…

Read the Pictures

Part 1: Explain how **both** pictures show **305**

Picture A:

Picture B:

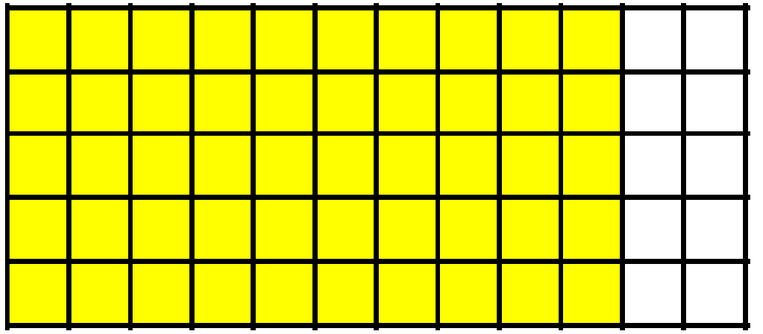


Part 2:
Which picture is **most helpful** for calculating **305 – 10?**

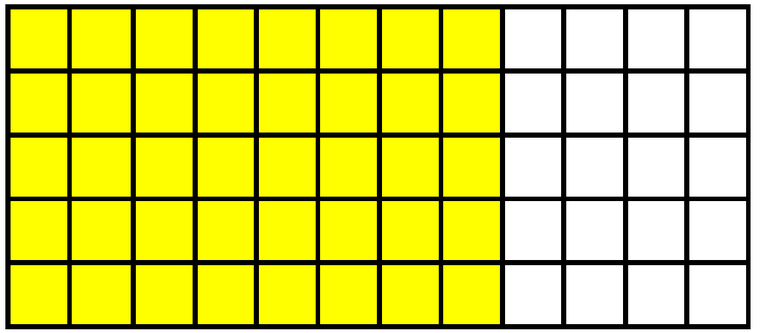
Explain why.

Read the Pictures

12 × 5 can be broken down into:

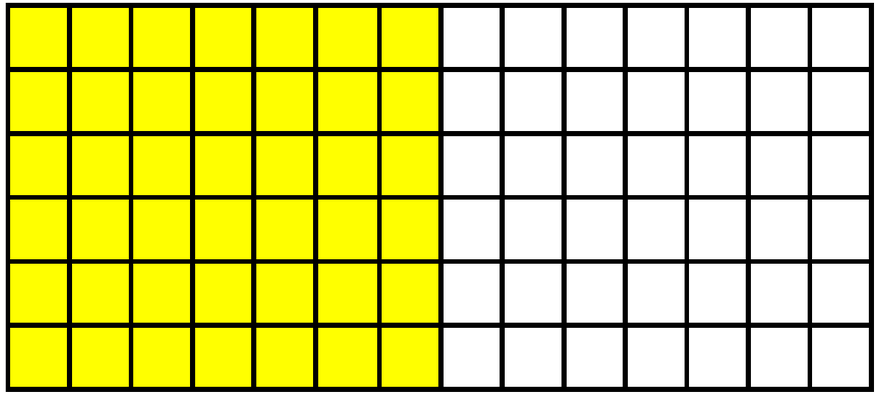


$10 \times 5 + \square \times \square$

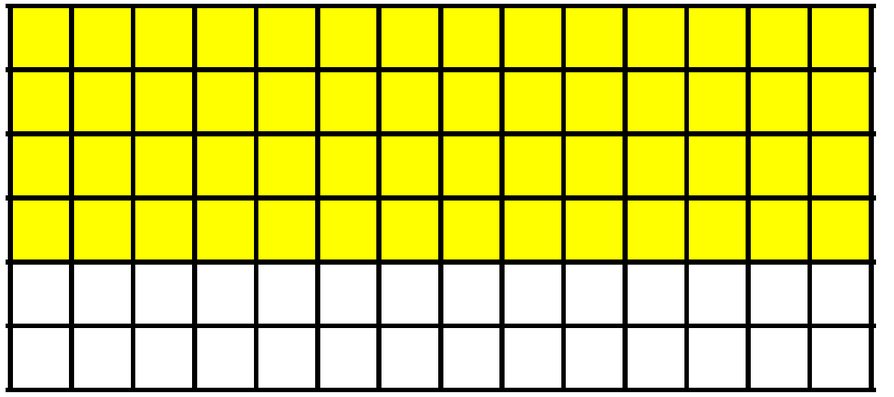


$8 \times 5 + \square \times \square$

14 × 6 can be broken down into:



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



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

Correct or Incorrect? ✓ or ✗

Which of these regroups have been done correctly?

$$\begin{array}{r} {\scriptstyle 4}\\ 5\,{}^{1}6\,8\\ -\,4\,7\,3\\ \hline 5\\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 2}\\ 5\,3\,6^{1}\\ -\,3\,0\,8\\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 6}\\ 7\,{}^{1}8\,6\\ -\,3\,7\,0\\ \hline 6\\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 7\ 1}5\\ 8\,6\,{}^{1}4\\ -\,3\,6\,5\\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 7}\\ 4\,6\,{}^{1}2\\ -\,1\,4\,9\\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 5\ 2}\\ 6\,3\,{}^{1}7\\ -\,3\,3\,9\\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 8\ 9}\\ 9\,0\,{}^{1}2\\ -\,5\,4\,3\\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 4\ 1}\\ 5\,0\,{}^{1}1\\ -\,2\,1\,8\\ \hline \\ \hline \end{array}$$

Show the incorrect examples regrouped correctly.

Part-Complete Examples

$$\begin{array}{r} {\scriptstyle 3}\,{\scriptstyle 1} \\ 7\,\cancel{4}\,5 \\ -\,4\,3\,8 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 1}\,{\scriptstyle 1} \\ 4\,\cancel{2}\,3 \\ -\,3\,2\,6 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 5}\,{\scriptstyle 9}\,{\scriptstyle 1} \\ \cancel{6}\,\cancel{0}\,4 \\ -\,3\,4\,5 \\ \hline \\ \hline \end{array}$$

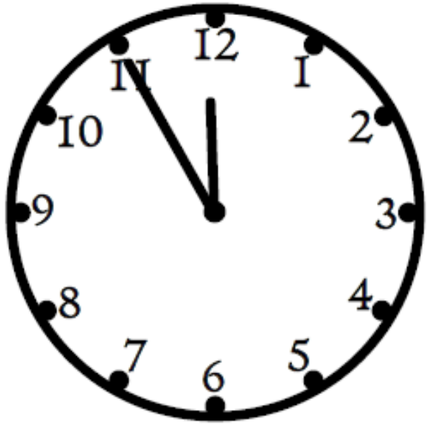
$$\begin{array}{r} 7\,2\,8 \\ -\,6\,4\,8 \\ \hline 0 \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 4}\,{\scriptstyle 1} \\ 6\,2\,\cancel{5}\,2 \\ -\,2\,3\,4\,8 \\ \hline 4 \\ \hline \end{array}$$

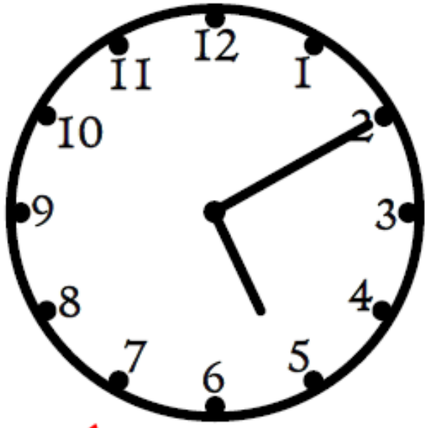
$$\begin{array}{r} 4\,5\,3\,9 \\ -\,1\,6\,4\,7 \\ \hline 2 \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 2}\,{\scriptstyle 1} \\ 7\,0\,\cancel{3}\,0 \\ -\,3\,8\,9\,4 \\ \hline 6 \\ \hline \end{array}$$

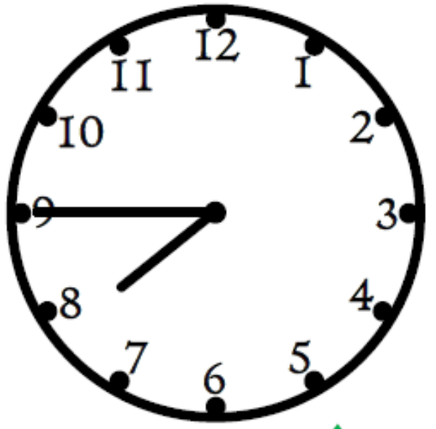
Explain the Mistakes



11:00



5:02



8:45

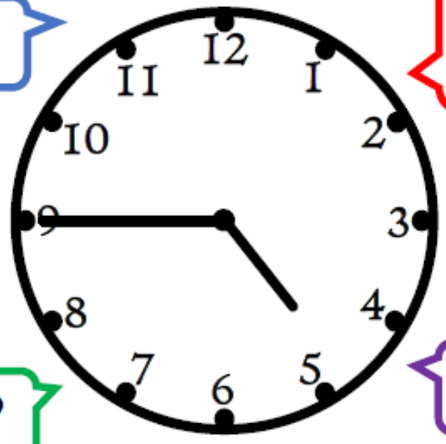
When the minute hand points to… it means…

If the time was… the hour hand would be…

Which Answer?

4:45

Quarter to 5

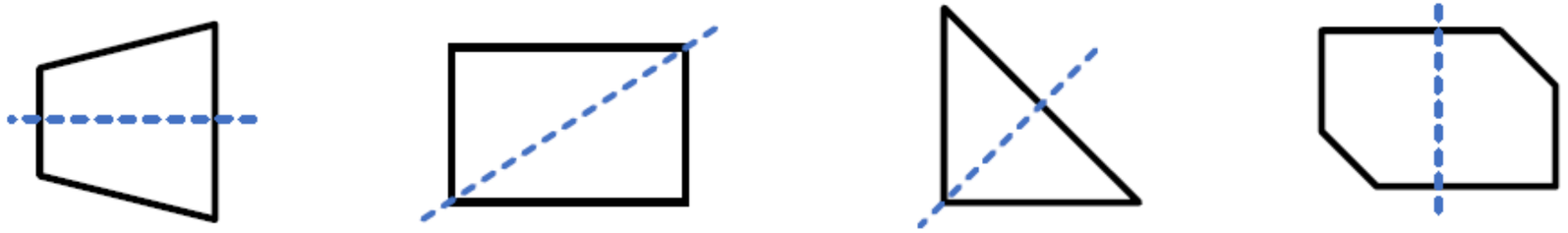


5:09

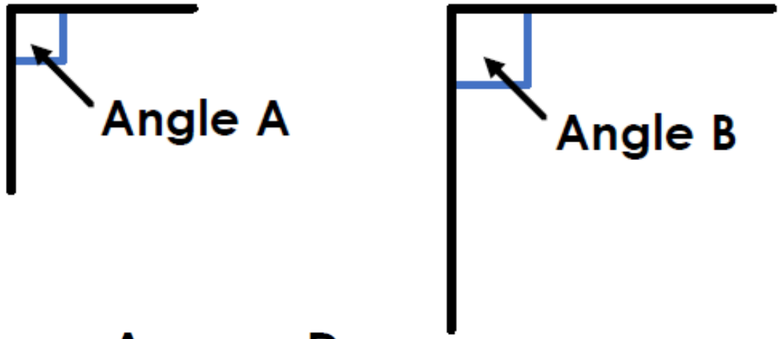
5:45

Correct or Incorrect? ✓ or ✗

Which lines of symmetry are correct?



Explain the Mistake



Angle A is a smaller right angle than angle B

Which Answer?

Answer A:

$$\begin{array}{r} 48 \\ +\ 27 \\ \hline 615 \end{array}$$

Answer B:

$$\begin{array}{r} 48 \\ +\ 27 \\ \hline 21 \end{array}$$

Answer C:

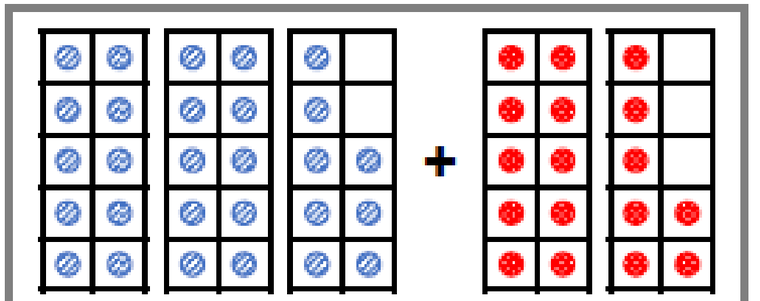
$$\begin{array}{r} 48 \\ +\ 27 \\ \hline 65 \\ 1 \end{array}$$

Answer D:

$$\begin{array}{r} 48 \\ +\ 27 \\ \hline 75 \\ 1 \end{array}$$

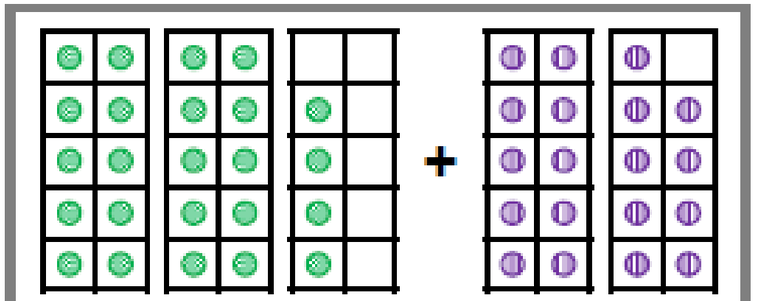
For the incorrect answers, explain the mistakes.

Read the Pictures



28 + 17 is equal to 30 + ☐

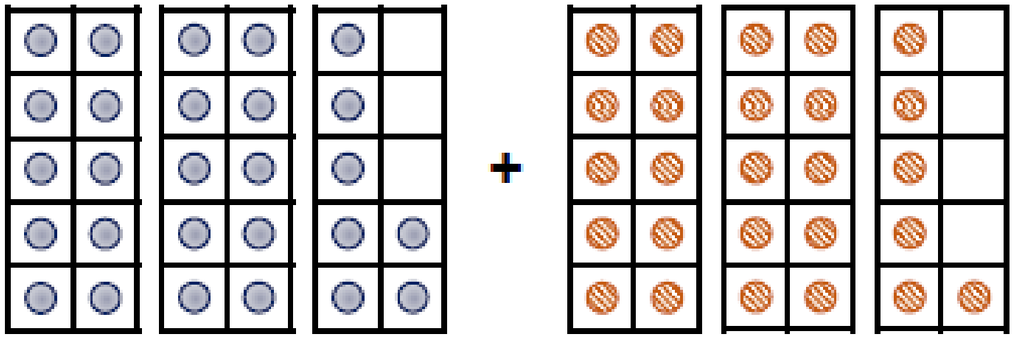
28 + 17 = ☐



24 + 19 is equal to ☐ + 20

24 + 19 = ☐

Different Methods



27 + 26 = ☐

30 + ☐

Double 20 add ☐

Double ☐ add 3

Agree or Disagree?

✓ or ✗

55 + 35 is equal to double 40

48 + 47 is equal to 100 – 5

68 + 36 is equal to 70 + 38

54 + 28 is equal to 52 + 30

Small Difference Questions

28 + 6 = ☐

26 + 8 = ☐

36 + 18 = ☐

34 + 20 = ☐

23 + 56 = ☐

53 + 26 = ☐

53 + 28 = ☐

51 + 30 = ☐

40 + 35 = ☐

39 + 35 = ☐

38 + 34 = ☐

58 + 14 = ☐

Agree or Disagree?

✓ or ✗

55 + 35 is equal to double 40

48 + 47 is equal to 100 – 5

68 + 36 is equal to 70 + 38

54 + 28 is equal to 52 + 30

Small Difference Questions

28 + 6 = ☐

26 + 8 = ☐

36 + 18 = ☐

34 + 20 = ☐

23 + 56 = 79

53 + 26 = ☐

53 + 28 = ☐

51 + 30 = ☐

40 + 35 = ☐

39 + 35 = ☐

38 + 34 = ☐

58 + 14 = ☐

Agree or Disagree?

✓ or ✗

55 + 35 is equal to double 40

48 + 47 is equal to 100 – 5

68 + 36 is equal to 70 + 38

54 + 28 is equal to 52 + 30

Small Difference Questions

28 + 6 =	23 + 56 = 79	40 + 35 =
26 + 8 =	53 + 26 = 79	39 + 35 =
36 + 18 =	53 + 28 =	38 + 34 =
34 + 20 =	51 + 30 =	58 + 14 =

Agree or Disagree?

✓ or ✗

55 + 35 is equal to double 40

48 + 47 is equal to 100 – 5

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Small Difference Questions

28 + 6 =	23 + 56 = 79	40 + 35 =
26 + 8 =	53 + 26 = 79	39 + 35 =
36 + 18 =	53 + 28 = 81	38 + 34 =
34 + 20 =	51 + 30 =	58 + 14 =

Agree or Disagree?

✓ or ✗

55 + 35 is equal to double 40

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Small Difference Questions

28 + 6 =	23 + 56 = 79	40 + 35 =
26 + 8 =	53 + 26 = 79	39 + 35 =
36 + 18 =	53 + 28 = 81	38 + 34 =
34 + 20 =	51 + 30 = 81	58 + 14 =

I know... so...

16 × 7 = 112

17 × 7 = 119

12 × 10 = 120

12 × 9 = 108

7 × 6 = 42

7 × 12 = 84

12 × 6 = 72

12 × 8 = 96

8 × 6 = 48

80 × 6 = 480

15 × 8 = 120

15 × 7 = 105

Small Difference Questions

7 × 3 = 21

3 × 7 = 21

6 × 7 = 42

12 × 7 = 84

12 × 5 = 60

...is the same as...

2 × 8 = 16

4 × 8 = 32

+2 6 × 8 = 48

12 × 4 = 48

+2 14 × 4 = 56

...is double...

5 × 7 = 35

10 × 7 = 70

7 × 10 = 70

7 × 9 = 63

14 × 9 = 126

... is 7 less than...

Small Difference Questions

12 ÷ 4 = 3

14 ÷ 4 = 3r2

28 ÷ 4 = 7

34 ÷ 4 = 8r2

34 ÷ 8 = 4r2

38 ÷ 8 = 4 r 6

17 ÷ 5 = 3r2

17 ÷ 3 = 5r2

19 ÷ 3 = 6r1

19 ÷ 5 = 3r4

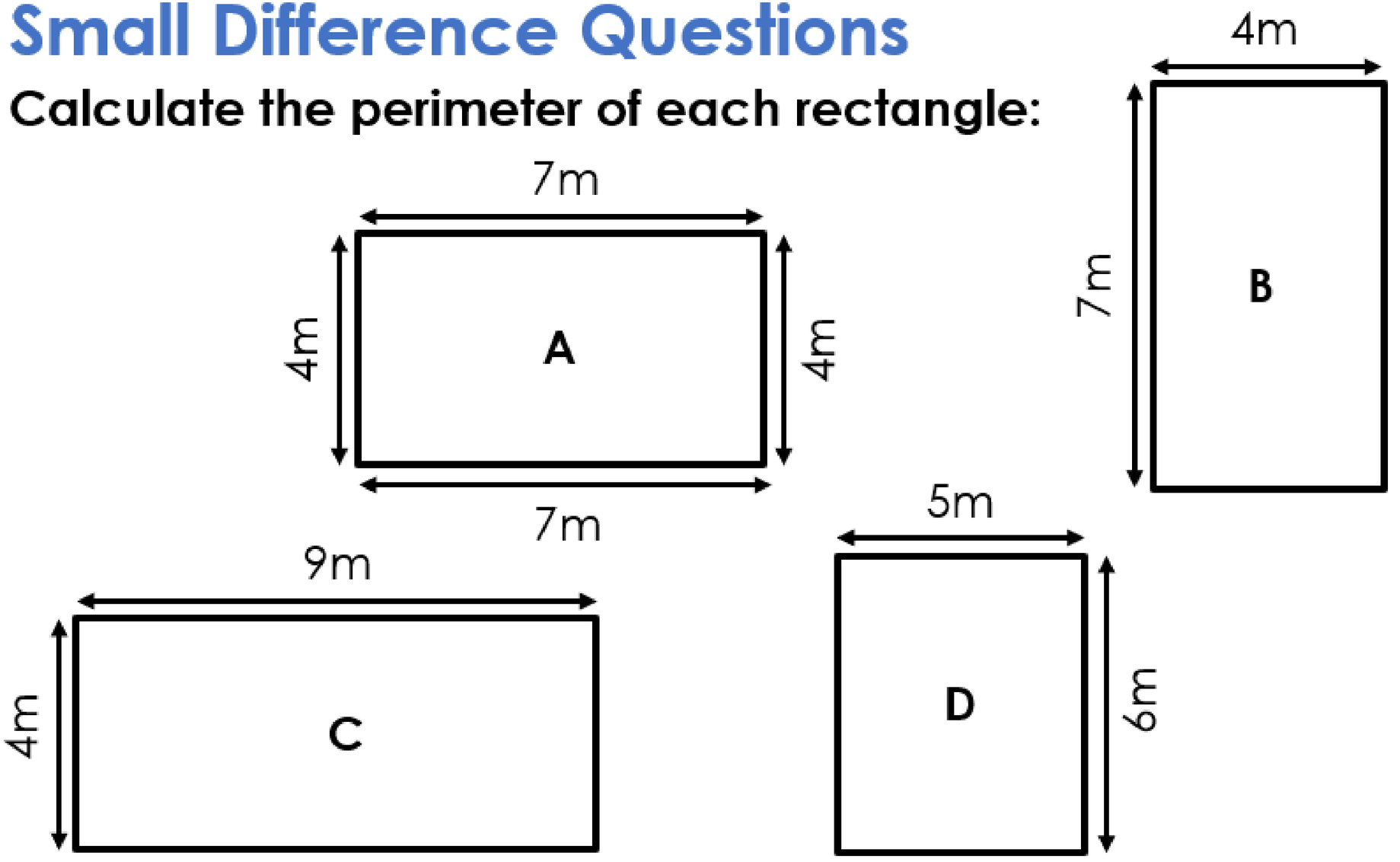
22 ÷ 5 = 4 r 2

32 ÷ 5 = 6r2

Extend: *add another two question to each*

Small Difference Questions

Calculate the perimeter of each rectangle:



The perimeter of rectangles… is the same because…

The difference between the perimeter of… is… because…

Small Difference Questions

$5 \times 6 = \boxed{30}$	$6 \times 3 = \square$	$28 \div 4 = \boxed{28}$
$5 \times 6 = \square + 3$	$6 \times 3 = \square + 2$	$28 \div 4 = \square + 1$
$5 \times 6 = \square - 3$	$6 \times 3 = \square \times 2$	$28 \div 4 = \square \times 1$
$5 \times 6 = \square \times 3$	$6 \times 3 = \square \div 2$	$28 \div 4 = \square \div 1$

Extend: *design your own sequence of 4 questions. Use the same numbers but change the symbols used.*

Small Difference Questions

$5 \times 6 = \boxed{30}$	$6 \times 3 = \boxed{}$	$28 \div 4 = \boxed{7}$
$5 \times 6 = \boxed{27} + 3$	$6 \times 3 = \boxed{} + 2$	$28 \div 4 = \boxed{} + 1$
$5 \times 6 = \boxed{33} - 3$	$6 \times 3 = \boxed{} \times 2$	$28 \div 4 = \boxed{} \times 1$
$5 \times 6 = \boxed{10} \times 3$	$6 \times 3 = \boxed{} \div 2$	$28 \div 4 = \boxed{} \div 1$

Extend: *design your own sequence of 4 questions. Use the same numbers but change the symbols used.*

Small Difference Questions

$5 \times 6 = \boxed{30}$	$6 \times 3 = \boxed{}$	$28 \div 4 = \boxed{7}$
$5 \times 6 = \boxed{27} + 3$	$6 \times 3 = \boxed{} + 2$	$28 \div 4 = \boxed{6} + 1$
$5 \times 6 = \boxed{33} - 3$	$6 \times 3 = \boxed{} \times 2$	$28 \div 4 = \boxed{7} \times 1$
$5 \times 6 = \boxed{10} \times 3$	$6 \times 3 = \boxed{} \div 2$	$28 \div 4 = \boxed{7} \div 1$

Extend: *design your own sequence of 4 questions. Use the same numbers but change the symbols used.*

Small Difference Questions

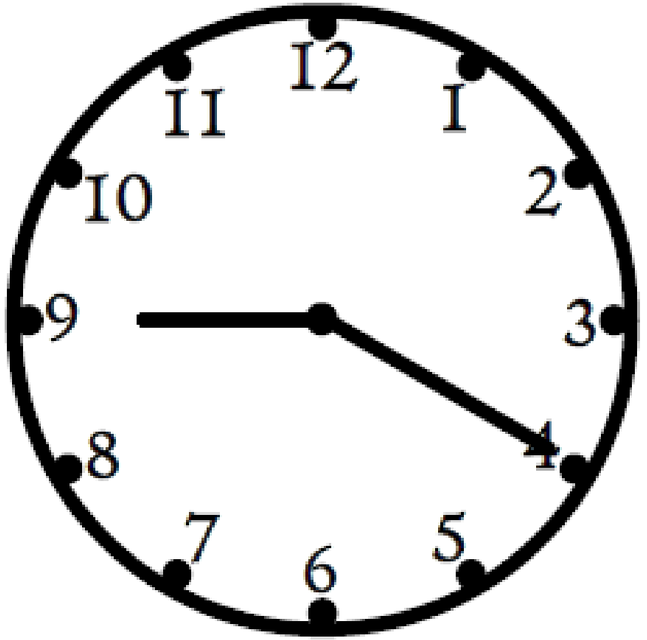
(a) There are 8 girls and 3 boys at the party.
How many children at the party?

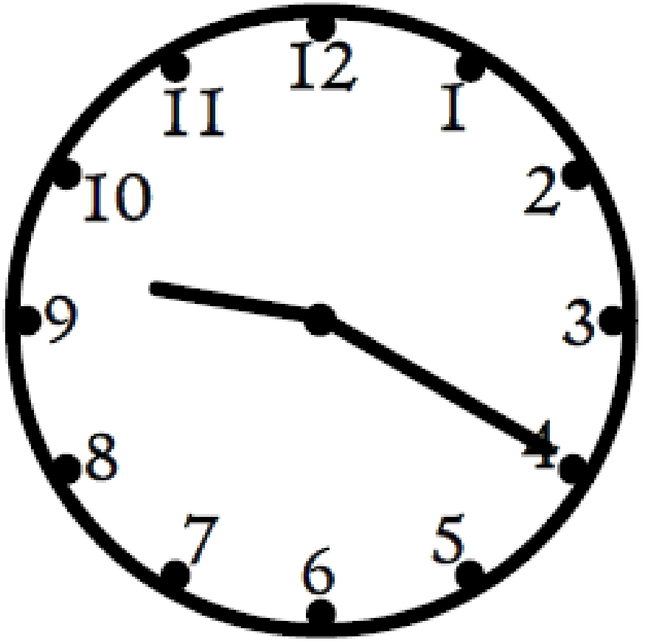
(b) There are 8 girls at the party. There are 3 times as many boys as girls at the party. **How many boys at the party?**

(c) There are 8 girls at the party. There are 3 times as many boys as girls at the party. **How many children at the party?**

Compare the questions. What's the same? What's different?

Spot the Difference





Which clock correctly shows 9:20?

Rank by Difficulty

$99 \times 4 =$ ☐

$250 \times 6 =$ ☐

$38 \times 8 =$ ☐

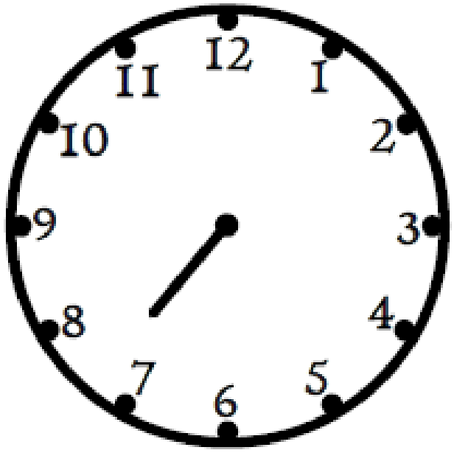
$205 \times 6 =$ ☐

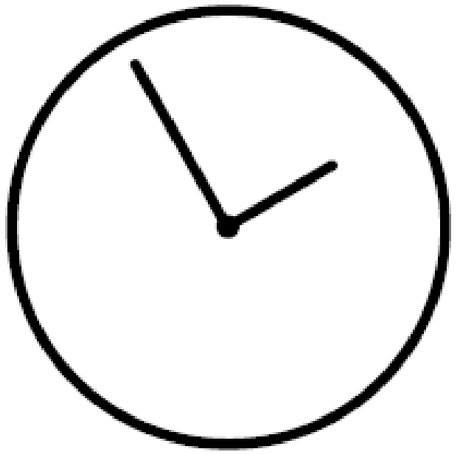
…can be answered mentally by…

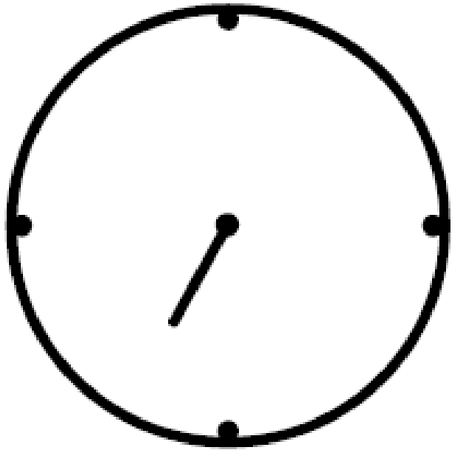
I used a written method for…

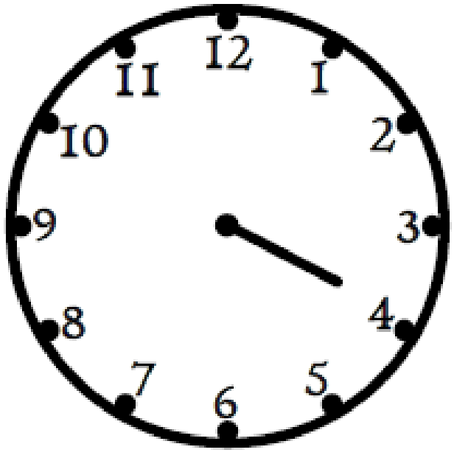
Estimate

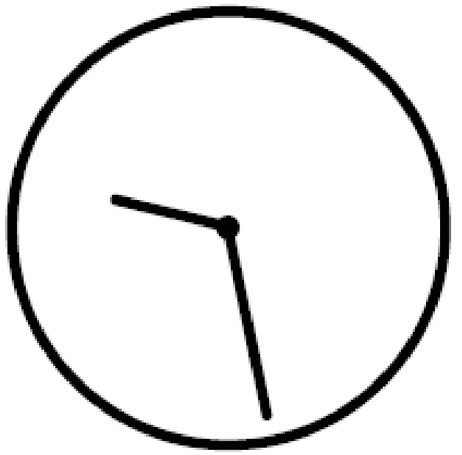
Parts of each clock are missing. **Estimate the times:**

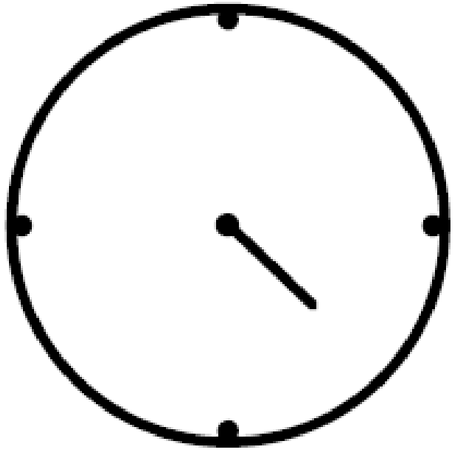












Multi-Step

(a) Rounded to the nearest 10, my number is 90.
My number is a multiple of 7. **What is my number?**

(b) Rounded to the nearest 10, my number is 170.
My number is a multiple of 8. **What is my number?**

Extend: *design your own Multi-Step rounding question.*

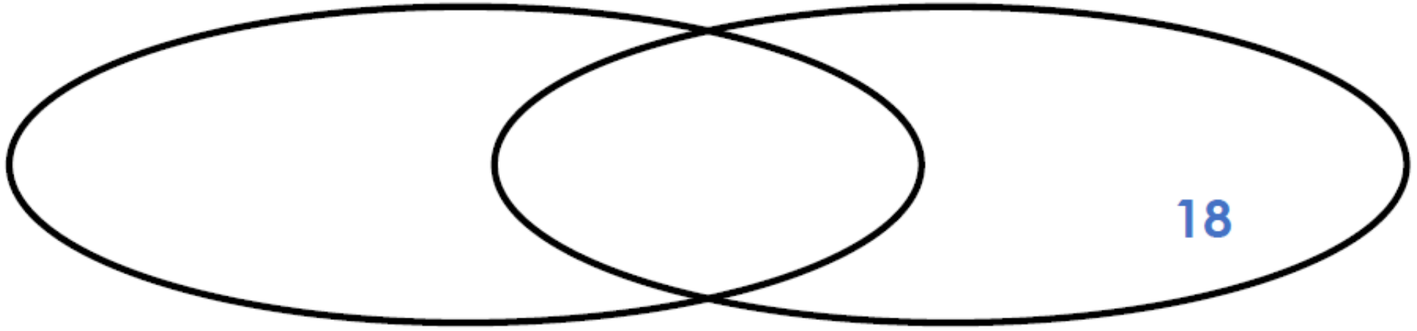
Explore

Put the numbers in the correct part of the Venn diagram:

20 **36** **42** **46** **100**

Divides by **4**, no remainder

Divides by **6**, no remainder

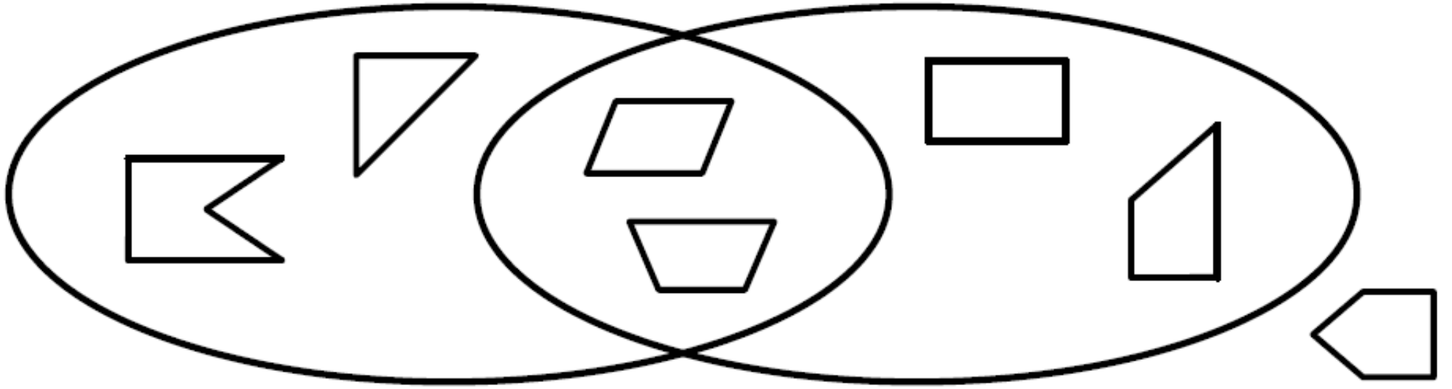


Extend: *Put another number in each section.*

Extend

What are the two headings for the Venn diagram?

Heading A **Heading B**



How Many Ways?

Fill each gap with a **single-digit number:**

$$\frac{\square}{\square} \text{ of } 24 = \square$$

Level 1: *I can find an answer*

Level 2: *I can find different answers*

Level 3: *I know how many answers there are*

How Many Ways?

The missing number is a positive whole number.

Fill the gap:

$$24 \div \square > 4$$

Level 1: *I can find an answer*

Level 2: *I can find different answers*

Level 3: *I know how many answers there are*