# Reasoning and Problem Solving
## Step 6: Parallel and Perpendicular

## National Curriculum Objectives:

Mathematics Year 3: (3G2) <u>Identify horizontal and vertical lines and pairs of perpendicular and parallel lines</u>

## Differentiation:

Questions 1, 4 and 7 (Problem Solving)
<span style="color:red">Developing</span> Complete a table showing the relationship between two out of five horizontal or vertical lines. Parallel or perpendicular.
<span style="color:blue">Expected</span> Complete a table showing the relationship between two out of five diagonal lines. Parallel, perpendicular or neither.
<span style="color:orange">Greater Depth</span> Complete a table showing the relationship between groups of diagonal lines. Parallel, perpendicular or neither.

Questions 2, 5 and 8 (Reasoning)
<span style="color:red">Developing</span> Find the odd one out between 3 simple shapes. One side horizontal or vertical.
<span style="color:blue">Expected</span> Find the odd one out between 3 simple shapes. Shapes in various orientations.
<span style="color:orange">Greater Depth</span> Find the odd one out between 3 simple or complex shapes. Shapes in various orientations.

Questions 3, 6 and 9 (Problem Solving)
<span style="color:red">Developing</span> Identify all of the sets of two parallel or perpendicular lines that can be made by joining dots. Horizontal or vertical lines only.
<span style="color:blue">Expected</span> Identify all of the sets of two parallel or perpendicular lines that can be made by joining dots.
<span style="color:orange">Greater Depth</span> Identify all of the groups of parallel or perpendicular lines that can be made by joining dots.

<u>More resources</u> which follow the same small steps as White Rose.

Did you like this resource? Don't forget to <u>review</u> it on our website.

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# Reasoning and Problem Solving – Parallel and Perpendicular

## 1a. Complete the table.

| Line 1 | Relationship | Line 2 |
|--------|-------------|--------|
| Green | | Yellow |
| Green | Parallel | |
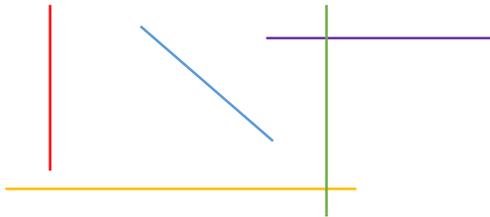
PS

## 1b. Complete the table.

| Line 1 | Relationship | Line 2 |
|--------|-------------|--------|
| Yellow | Perpendicular | |
| | Parallel | Green |

PS

## 2a. Which shape is the odd one out? Consider parallel and perpendicular lines.

A

B

C
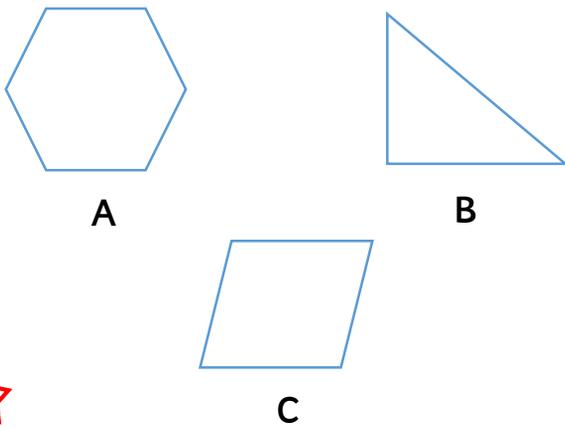
R

## 2b. Which shape is the odd one out? Consider parallel and perpendicular lines.

A

B

C
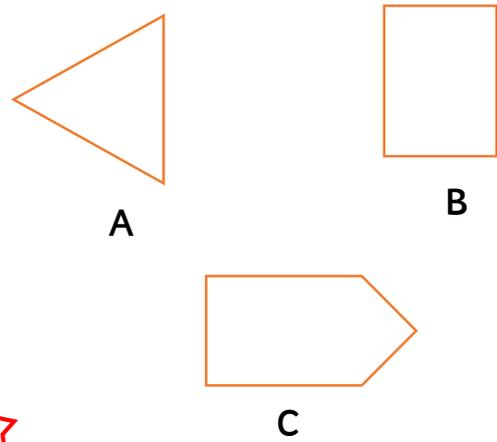
R

## 3a. Hank is doing this puzzle. He wants to describe the lines. How many different ways could he join the dots to make a set of two parallel lines?

A

D

E

C

G

B

F

H
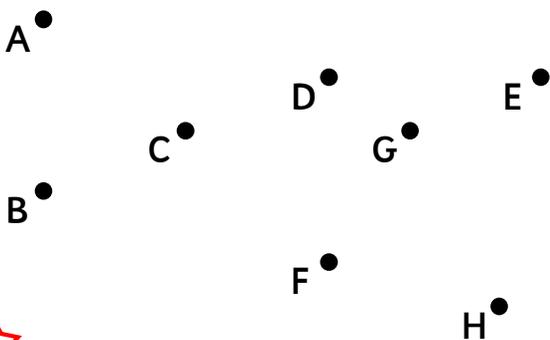
PS

## 3b. Hafsah is doing this puzzle. She wants to describe the lines. How many different ways could she join the dots to make a set of two perpendicular lines?

A

D

G

F

B

E

C

PS

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Reasoning and Problem Solving – Parallel and Perpendicular – Year 3 Developing
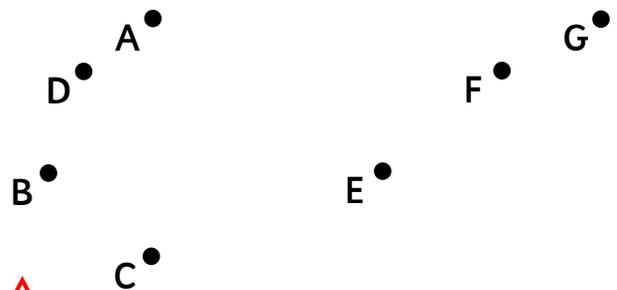
# Reasoning and Problem Solving – Parallel and Perpendicular

## 4a. Complete the table.

| Line 1 | Relationship | Line 2 |
|--------|--------------|--------|
| Blue | | Red |
| | Perpendicular | Green |
| Yellow | Neither | |
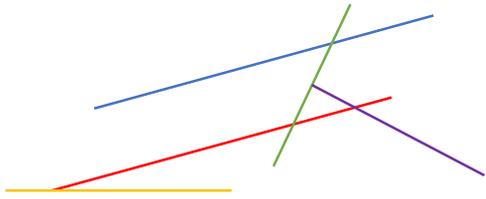
PS

## 4b. Complete the table.

| Line 1 | Relationship | Line 2 |
|--------|--------------|--------|
| Blue | | Red |
| | Neither | Red |
| Yellow | Parallel | |

PS

## 5a. Which shape is the odd one out? Consider parallel and perpendicular lines.

A

B

C
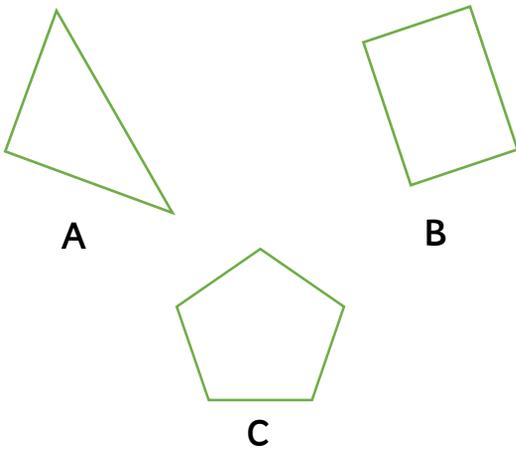
R

## 5b. Which shape is the odd one out? Consider parallel and perpendicular lines.

A

B

C
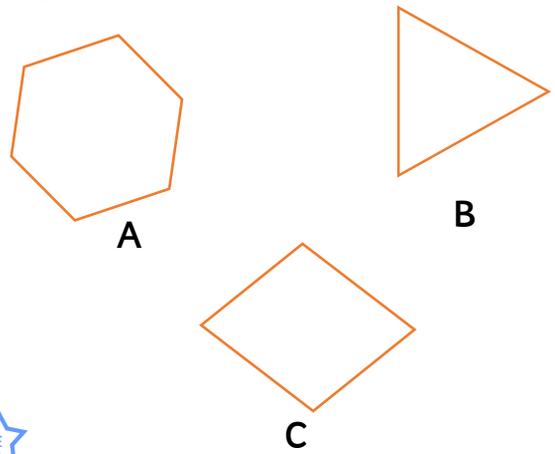
R

## 6a. Julian is doing this puzzle. He wants to describe the lines. How many different ways could he join the dots to make a set of two parallel lines?

A
B
E
H
G
D
C
F
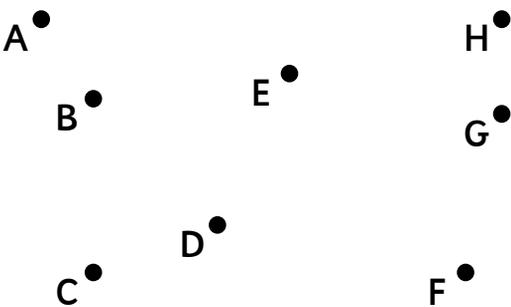
PS

## 6b. Sally is doing this puzzle. She wants to describe the lines. How many different ways could she join the dots to make a set of two parallel lines?

A
B
H
E
G
C
F
D

PS

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Reasoning and Problem Solving – Parallel and Perpendicular – Year 3 Expected
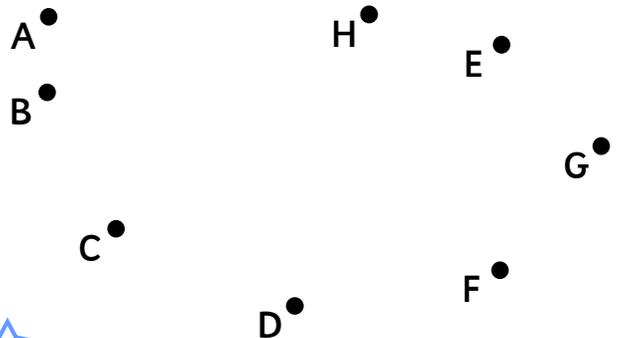
# Reasoning and Problem Solving – Parallel and Perpendicular

## 7a. Complete the table.

| Line 1 | Relationship | Line 2 | Line 3 |
|--------|--------------|--------|--------|
| Green | Parallel | | |
| Purple | | Blue | Red |
| Red | | Pink | |



PS
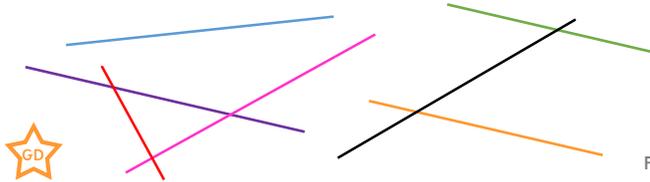
## 7b. Complete the table.

| Line 1 | Relationship | Line 2 | Line 3 |
|--------|--------------|--------|--------|
| Purple | | Yellow | |
| Yellow | | | Pink |
| Purple | Neither | | |



PS
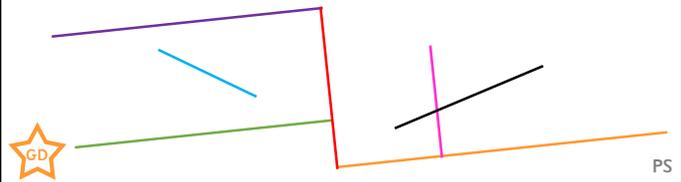
## 8a. Which shape is the odd one out? Consider parallel and perpendicular lines.



A

B

C

R
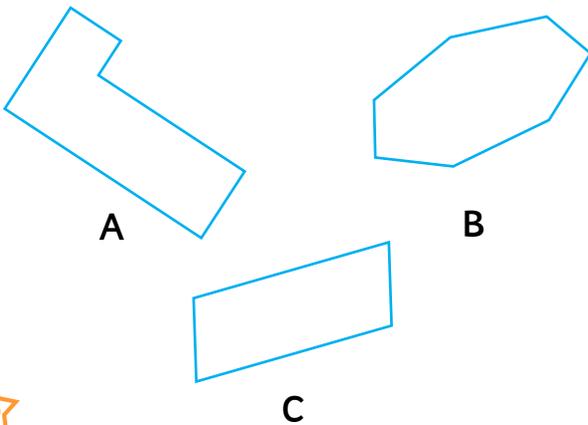
## 8b. Which shape is the odd one out? Consider parallel and perpendicular lines.



A

B

C

R
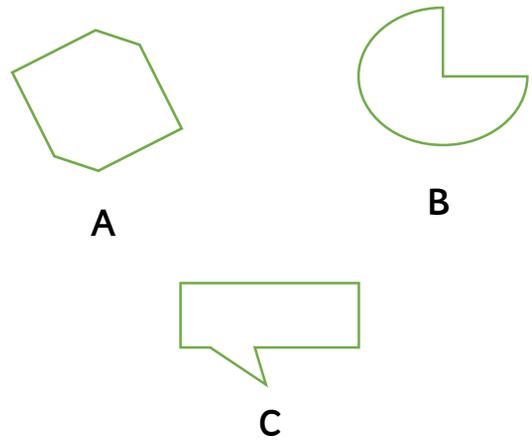
## 9a. Henry is doing this puzzle. He wants to describe the lines. How many different ways could he join the dots to make a set of two parallel lines?



C     D

B           H

E     F

A

G

PS
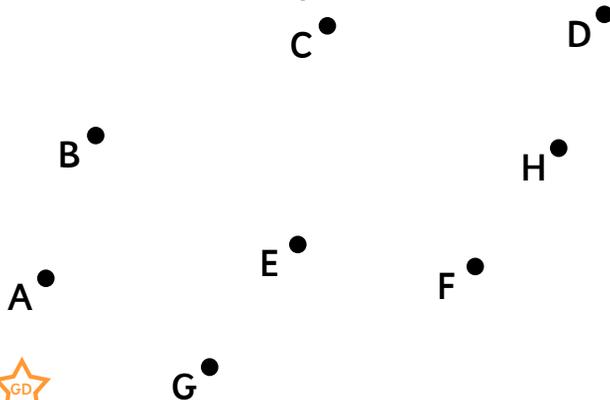
## 9b. Chiara is doing this puzzle. She wants to describe the lines. How many different ways could she join the dots to make a set of two perpendicular lines?



F           H

A

D

B           E

C

G

PS

Reasoning and Problem Solving – Parallel and Perpendicular – Year 3 Greater Depth
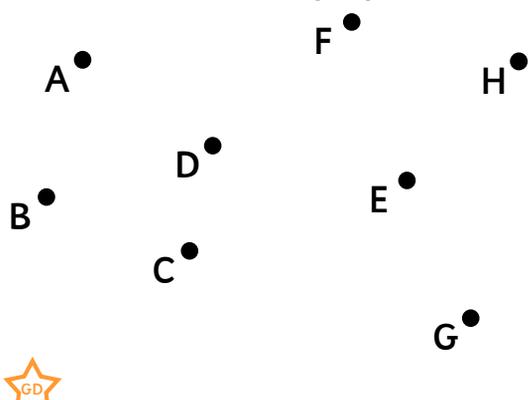
# Reasoning and Problem Solving – Parallel and Perpendicular

## Developing

1a.

| Line 1 | Relationship | Line 2 |
|--------|--------------|--------|
| Green | Perpendicular | Yellow |
| Green | Parallel | Red |

1b.

| Line 1 | Relationship | Line 2 |
|--------|--------------|--------|
| Yellow | Perpendicular | Purple |
| Yellow | Parallel | Green |

2a. B is the odd one out because it doesn't have any parallel lines.

2b. A is the odd one out because it doesn't have any parallel or perpendicular lines.

3a. Hank could join:

A→B and D→F

C→G and D→E

3b. Hafsah could join:

A→C and A→G

A→C and D→F

A→C and B→E

## Expected

4a.

| Line 1 | Relationship | Line 2 |
|--------|--------------|--------|
| Blue | Parallel | Red |
| Purple | Perpendicular | Green |
| Yellow | Neither | Purple, red or blue |

4b.

| Line 1 | Relationship | Line 2 |
|--------|--------------|--------|
| Blue | Perpendicular | Red |
| Purple | Neither | Red |
| Yellow | Parallel | Blue |

5a. C is the odd one out because it does not have any perpendicular lines.

5b. B is the odd one out because it does not have any parallel lines.

6a. Julian could join:

A→H and C→F

B→C and 7→H

A→D and E→F

D→F and E→G

6b. Sally could join:

A→B and E→F

F→7 and D→E

B→C and F→H

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Reasoning and Problem Solving – Parallel and Perpendicular  ANSWERS

## Greater Depth

**7a.**

| Line 1 | Relationship | Line 2 | Line 3 |
|--------|--------------|--------|--------|
| Green | Parallel | Orange | Purple |
| Purple | Neither | Blue | Red |
| Red | Perpendicular | Pink | Black |

**7b.**

| Line 1 | Relationship | Line 2 | Line 3 |
|--------|--------------|--------|--------|
| Purple | Parallel | Yellow | Green |
| Yellow | Perpendicular | Red | Pink |
| Purple | Neither | Black | Blue |

**8a.** B is the odd one out because it does not have any parallel lines.

**8b.** B is the odd one out because it does not have any parallel lines.

**9a.** Henry could join:

A→B and C→G and D→H

A→G and B→E and C→H

E→G and F→H

**9b.** Chiara could join:

A→C to B→F and C→H

C→G to C→D

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