Measuring Angles in Degrees

1a. These mice are facing west. They need to turn to face north to find the cheese.

Sally: We need to turn through a right angle.

Fahad: We need to make a 270° turn clockwise.

Who do you agree with? Explain.

D   R

1b. These pirates are facing north. Their captain tells them they need to turn to face south.

Jake: We need to turn 90°.
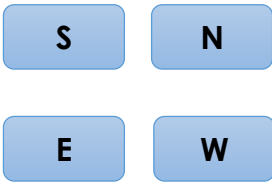
Tara: We need to make a $\frac{1}{2}$ turn.

Who do you agree with? Explain.

D   R

2a. Which of the following cards could be used to complete the statement? Give all of the possible answers.

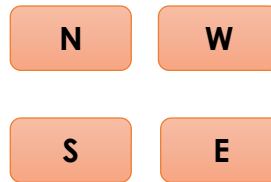| S	N
E	W

Turning from E to ___ > a 180° turn

D   PS

2b. Which of the following cards could be used to complete the statement? Give all of the possible answers.
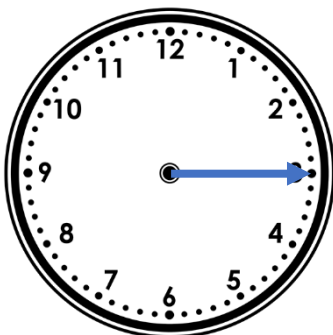
N	W
S	E

Turning from ___ to N < a 180° turn

D   PS

3a. Starting at 12:15, the minute hand makes more than 4 but fewer than 7 quarter turns clockwise.
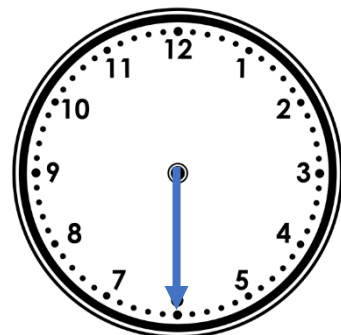
What times could the clock show after the turns?

D   PS

3b. Starting at 18:30, the minute hand makes more than 3 but fewer than 6 quarter turns clockwise.

What times could the clock show after the turns?

D   PS

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Reasoning and Problem Solving – Measuring Angles in Degrees   Developing

4a. These pirates are facing north west and their captain tells them that they need to turn to face south.

Peter

We need to turn through a reflex angle.

We need to make a $\frac{3}{8}$ turn clockwise.

Polly

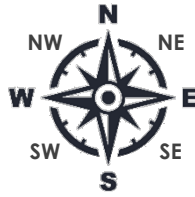Who do you agree with? Explain.

R

4b. These mice are facing south west. They need to turn to face east to find the cheese.

Mitch

We need to turn through an obtuse angle anti-clockwise.

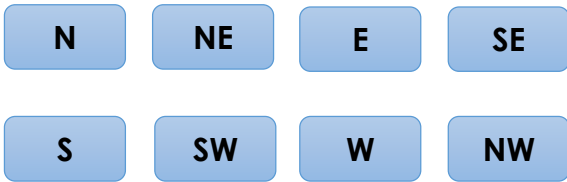We need to make a $\frac{1}{2}$ turn.

Yasmin

Who do you agree with? Explain.

R

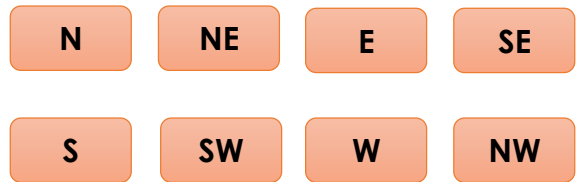**5a.** Which of the following cards could be used to complete the statement? Give all of the possible answers.

N	NE	E	SE
S	SW	W	NW

A 360° turn $>$ turning from SE to ____ anti-clockwise $>$ a 45° turn

PS

5b. Which of the following cards could be used to complete the statement? Give all of the possible answers.

N	NE	E	SE
S	SW	W	NW

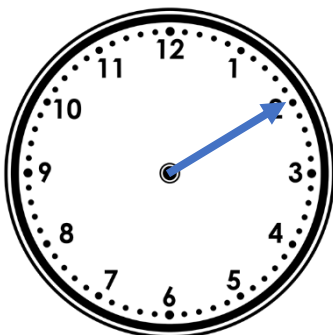A 45° turn $<$ turning from NW to ____ clockwise $>$ a 270° turn

PS

6a. Starting at 09:10, the minute hand makes more than 5 but fewer than 8 quarter turns clockwise.
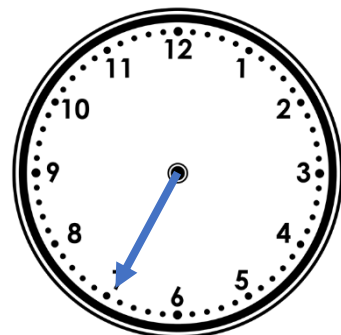
What times could the clock show after the turns?

PS

6b. Starting at 15:35, the minute hand makes more than 4 but fewer than 7 quarter turns anti-clockwise.

What times could the clock show after the turns?

PS

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Reasoning and Problem Solving – Measuring Angles in Degrees   Expected

7a. These children are facing SW and their teacher has told them to turn clockwise and then a greater turn anti-clockwise to face W.

Daniel

We need to make a $\frac{3}{8}$ turn and then a right angle.

We need to make a 45° turn and then a whole turn.

Hafash

Who do you agree with? Explain.

GD ☆

R

7b. These children are facing NE and their teacher has told them to turn clockwise and then a greater turn anti-clockwise to face W.

Kyle

We need to turn 135° and then an acute angle anti-clockwise.

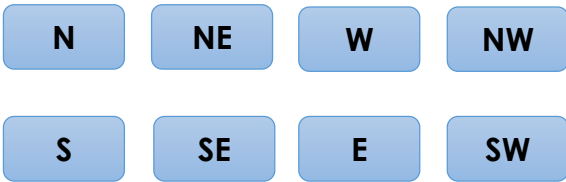We need to make a $\frac{3}{8}$ turn and then a reflex angle.

Hattie

Who do you agree with? Explain.

GD ☆

R

8a. Which of the following cards could be used to complete the statement? Give all of the possible answers.
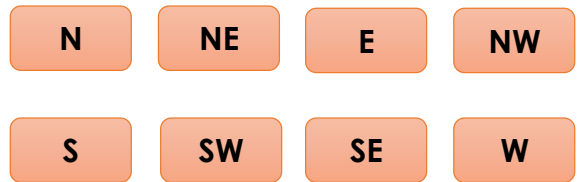
| N | NE | W | NW |

| S | SE | E | SW |

A 405° turn $>$ turning from ____ to NE anti-clockwise $>$ a $\frac{3}{8}$ turn

GD ☆

PS

8b. Which of the following cards could be used to complete the statement? Give all of the possible answers.

| N | NE | E | NW |

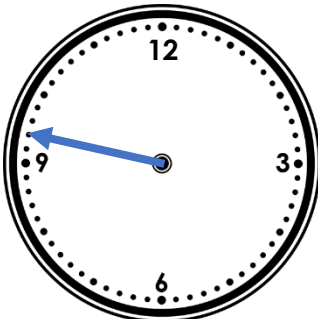| S | SW | SE | W |

A 135° turn $<$ turning from ____ to SW clockwise $>$ a $\frac{1}{8}$ turn

GD ☆

PS

9a. Starting at 18:47, the minute hand makes more than 6 but fewer than 9 twelfth turns.

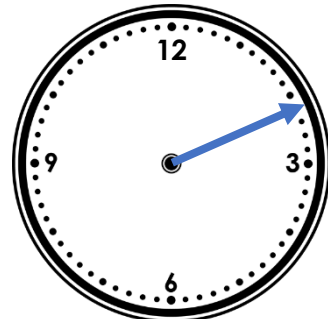**What times could the clock show after the turns?**

GD ☆

PS

9b. Starting at 05:11, the minute hand makes more than 5 but fewer than 8 twelfth turns.

What times could the clock show after the turns?

GD ☆

PS

Reasoning and Problem Solving Measuring Angles in Degrees

Reasoning and Problem Solving Measuring Angles in Degrees

Developing

1a. Sally is correct because a right angle (90°) turn clockwise will reach North. Fahad is also correct as a 270° turn anti-clockwise will also reach North.

2a. N and E clockwise or S and E if anti-clockwise.

3a. 5 quarter turns clockwise – 13:30 or 6 quarter turns clockwise – 13:45

Expected

4a. Peter is correct if they turn clockwise because the turn is more than 180° to face South.

5a. NE, N, NW, W, SW and S.

6a. 6 quarter turns clockwise – 10:40 or 7 quarter turns clockwise – 10:55

Greater Depth

7a. Hafash is correct because after the 45° turn she will be facing W. Then a whole turn is 360° which is greater than 45° and she will be facing W again.

8a. NE, N, NW, W and SW.

9a. 7 twelfth turns clockwise – 19:22; 8 twelfth turns clockwise – 19:27; 7 twelfth turns anti-clockwise – 18:12; 8 twelfth turns anti-clockwise – 18:07

Developing

1b. Tara is correct because a $\frac{1}{2}$ turn in either direction will have them facing South.

2b. W clockwise or E anti-clockwise.

3b. 4 quarter turns clockwise – 19:30 or 5 quarter turns clockwise – 19:45

Expected

4b. Mitch is correct because if they turn 135° anti-clockwise they will be facing E and 135° is an obtuse angle.

5b. NE, E, SE and S.

6b. 5 quarter turns anti-clockwise – 14:20 or 6 quarter turns anti-clockwise – 14:05

Greater Depth

7b. Hattie is correct because if she turns clockwise $\frac{3}{8}$, this will be a 135° turn and she will be facing S. Then if she turns a reflex angle of 270° anti-clockwise she will be facing W.

8b. N, NE, NW, SW, W

9b. 6 twelfth turns clockwise – 05:41, 7 twelfth turns clockwise – 05:46; 6 twelfth turns anti-clockwise – 04:41; 7 twelfth turns anti-clockwise – 04:36

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