Number sequences

1 **a)** Complete the sequence as mixed numbers.

$\dfrac{1}{4}$ $\dfrac{2}{4}$ or $\dfrac{1}{2}$ $\dfrac{3}{4}$ 1 $1\dfrac{1}{4}$ $1\dfrac{2}{4}$ or $1\dfrac{1}{2}$
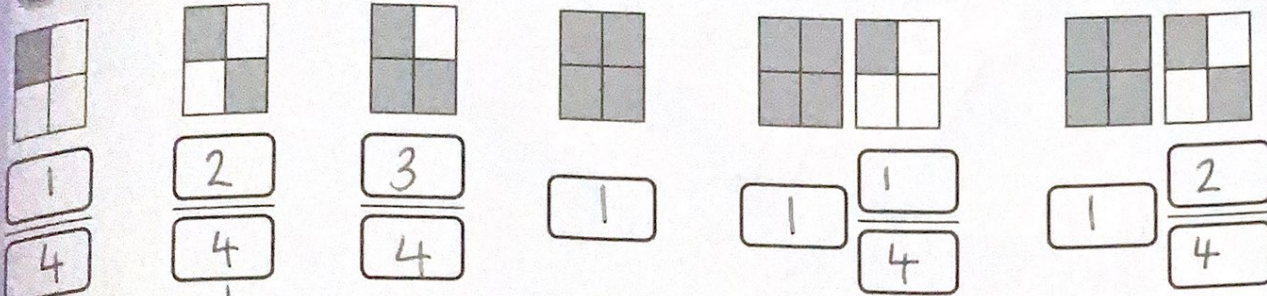
b) Complete the sequence as improper fractions.

$\dfrac{4}{3}$ $\dfrac{5}{3}$ $\dfrac{6}{3}$ $\dfrac{7}{3}$ $\dfrac{8}{3}$
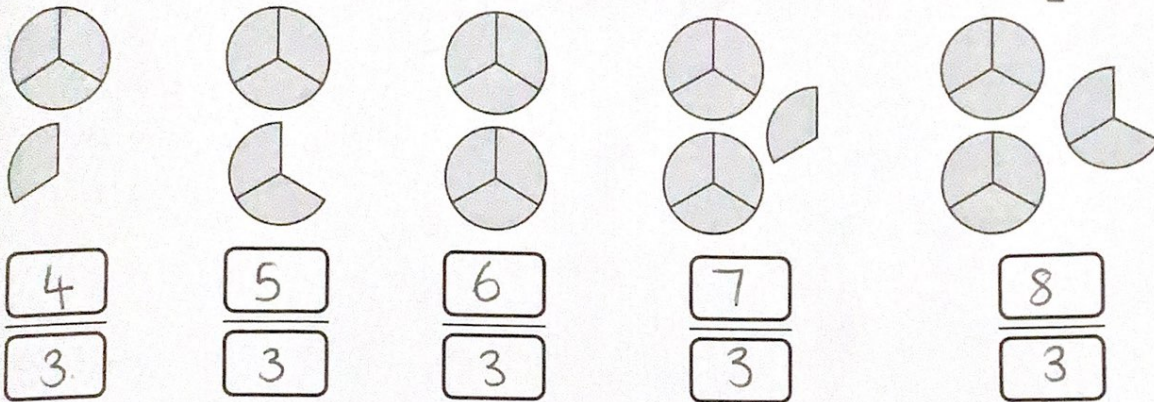
c) Draw diagrams to match this sequence.

$3\dfrac{1}{2}$ $3\dfrac{1}{4}$ 3 $2\dfrac{3}{4}$ $2\dfrac{1}{2}$ $2\dfrac{1}{4}$ 2

Describe the rule for this sequence.

We are counting back in quarters.

2 Match each sequence with the correct descriptions.

$2 \; 2\frac{1}{4} \; 2\frac{1}{2} \; 2\frac{3}{4} \; 3$
$\frac{8}{4}, \frac{9}{4}, \frac{10}{4}, \frac{11}{4}, \frac{12}{4}, \ldots$

$4\frac{1}{2} \quad 3\frac{1}{2}$
$5, \frac{9}{2}, 4, \frac{7}{2}, 3, \frac{5}{2}, \ldots$

$2, 2\frac{1}{8}, 2\frac{1}{4}, 2\frac{3}{8}, 2\frac{1}{2}, 2\frac{5}{8}, 2\frac{3}{4}, \ldots$

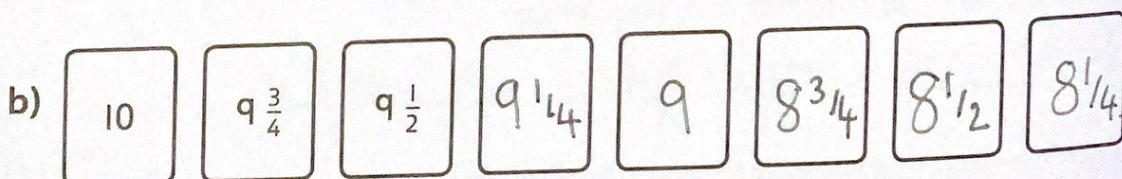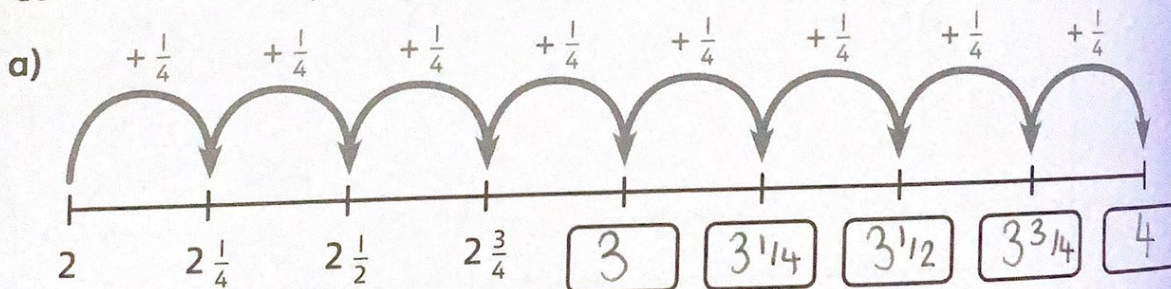$\frac{15}{3}, \frac{14}{3}, \frac{13}{3}, \frac{12}{3}, \frac{11}{3}, \ldots$
$5 \; 4\frac{2}{3} \; 4\frac{1}{3} \; 4 \cdot 3\frac{2}{3}$

> counts down in thirds

> begins on 5

> counts up in eighths

> counts down in halves

> begins on 2

> counts up in quarters

3 Continue each sequence.

a)

$+\frac{1}{4}$ $+\frac{1}{4}$ $+\frac{1}{4}$ $+\frac{1}{4}$ $+\frac{1}{4}$ $+\frac{1}{4}$ $+\frac{1}{4}$ $+\frac{1}{4}$

$2 \quad 2\frac{1}{4} \quad 2\frac{1}{2} \quad 2\frac{3}{4} \quad \boxed{3} \quad \boxed{3\frac{1}{4}} \quad \boxed{3\frac{1}{2}} \quad \boxed{3\frac{3}{4}} \quad \boxed{4}$

b)

$\boxed{10} \quad \boxed{9\frac{3}{4}} \quad \boxed{9\frac{1}{2}} \quad \boxed{9\frac{1}{4}} \quad \boxed{9} \quad \boxed{8\frac{3}{4}} \quad \boxed{8\frac{1}{2}} \quad \boxed{8\frac{1}{4}}$

4 **a)** Reena is investigating the different ways to write a sequence increasing in sixths between 0 and 1.

CHALLENGE

$$\frac{1}{6} \quad \frac{2}{6} \quad \frac{3}{6} \quad \frac{4}{6} \quad \frac{5}{6}$$

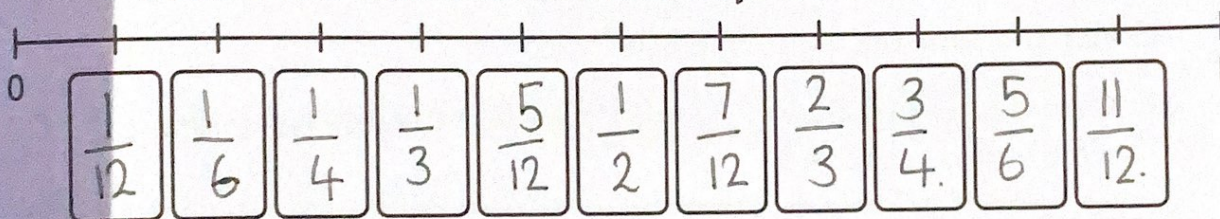0 $\quad \frac{1}{6} \quad \frac{1}{3} \quad \frac{1}{2} \quad \frac{2}{3} \quad \frac{5}{6} \quad$ 1
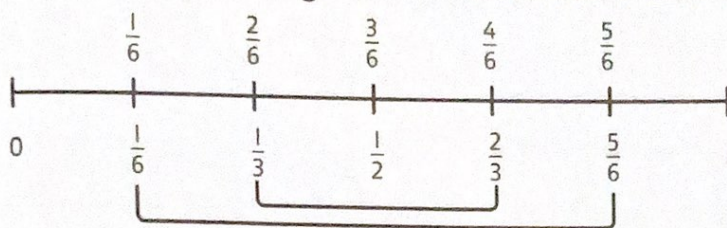
She notices that she can use three different denominators and that there is a pattern.

Explain why the denominators 2 and 3 appear in this number sequence, but the denominator 4 does not.

2 and 3 are factors of 6 so appear as denominators in the sequence. 4 isn't a factor of 6 so won't appear as a denominator.

b) Label the fractions on this number line. What patterns do you notice in the denominators in this sequence?

0 $\quad \frac{1}{12} \quad \frac{1}{6} \quad \frac{1}{4} \quad \frac{1}{3} \quad \frac{5}{12} \quad \frac{1}{2} \quad \frac{7}{12} \quad \frac{2}{3} \quad \frac{3}{4} \quad \frac{5}{6} \quad \frac{11}{12} \quad$ 1

All denominators in the sequence are factors of 12.

Reflect

Create a sequence counting down in quarters. Write the sequence in different ways.

1, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, 0 $\qquad$ 1, $\frac{3}{4}$, $\frac{2}{4}$, $\frac{1}{4}$, 0.