4. (a) [3 pts] Draw a picture representing $3 \div \frac{1}{4}$, explaining how to see the answer from your diagram.

Draw 3 whole objects, cut into fourths, + see how many fourths there are: 12.

(b) [1 pt] Which model of division did you have to use above? grouping/repeated subtraction

5. [5 pts] Which part of a fraction can never equal zero, and why? (Note: “You can’t divide with zero.” is not an adequate answer; such a claim must be justified itself.)

The denominator.

It always tells how many parts to cut the whole into, + you can’t cut an object into 0 parts.

or

By the division meaning of a fraction, we’d be dividing by zero, but that’s impossible, for if $x \neq 0$ had an answer, that answer: $0 \div x$, not possible for $x \in \mathbb{N}$.

6. [4 pts] Perform the indicated computation entirely by hand, showing clear precancelling wherever possible.

$$\frac{45}{54} \times \frac{30}{49} \div \frac{15}{14}$$

$$\frac{5}{54} \times \frac{71^2}{\cancel{49} \times \cancel{18}} = \frac{10}{21}$$

7. [4 pts] Arrange the following fractions in decreasing order, without converting to decimals. Show clear work or else verbally explain your reasoning.

$$\frac{71}{61}, \ 7/6, \ \frac{71}{60}$$

$$\frac{71}{61} < \frac{71}{60}$$ because they both keep the same number of pieces, but 61st’s are smaller.

$$\frac{70}{60} < \frac{71}{60}$$ because they both have the same size pieces, but 70 is fewer.

$$\frac{71}{60} \times 2 \frac{7}{6}$$

$$426 < 427$$

$$\frac{71}{60} > \frac{7}{6} > \frac{71}{60}$$