1. Convert as instructed below, if possible; show work. If not possible, say so.

(a) \(\frac{5\frac{8}{11}}{11}\) to a fraction

\[
\frac{11 \cdot 5 + 8}{11} = \frac{\underline{63}}{11}
\]

(b) \(\frac{5\frac{8}{11}}{11}\) to a decimal

\[
11 \overline{.72}...
\]

\[
\begin{array}{c}
8.00 \\
-7.7 \\
\hline
0.30 \\
-2.2 \\
\hline
0.80
\end{array}
\]

\(5.7\overline{2}\)

or \(5.7272\ldots\)

(c) \(\pi\) to a fraction

not possible

(d) \(\pi\) to a decimal

(calculator, so no work needed)

\(3.14159265359\ldots\)

(e) 3.40844084408... to a fraction

not possible

(it has a "growing pattern")
(f) $3.408408408...$ to a fraction

\[
3 \frac{408}{999} = \frac{3405}{999}
\]

(g) $3.408\overline{4}$ to a fraction

\[
3.408\overline{4} \times \frac{1000}{1000} = \frac{3408.4}{9}
\]

\[
\frac{3067.4}{9} = 340.8\overline{4}
\]

2. Which kind of decimal will a fraction whose denominator is $1638400000$ create: a terminating decimal or a repeating one? **TERMINATING**

\[
\frac{1638400000}{2^8 \cdot 5^8} = \frac{2^8 \cdot 5^8}{2^8 \cdot 5^8} \cdot \frac{2\cdot 2\cdot 2\cdot 2\cdot 2\cdot 2\cdot 2\cdot 2}{2\cdot 2\cdot 2\cdot 2\cdot 2\cdot 2\cdot 2\cdot 2}
\]

has $2s$ and $5s$ only: $2, 2, 2, 2, 2, 2, 5, 5, 5, 5, 5$

3. If a fraction has a denominator of $49$ and you convert that fraction to a decimal, what is the longest the repetend could possibly be (i.e., how many digits long), and why?

48 digits because you might have to cycle through all remainders from $1$ up to 48 before you start repeating.

4. Discuss why long division convinces us that fractions can only correspond to decimals that terminate or that repeat, and never to "growing pattern" decimals or others that never stop and never repeat.

"Straight from notes":

Fractions can only create **terminating decimals** when you encounter a remainder of 0 while dividing numerator by denominator — or repeating decimals when you don't get a 0 remainder but rather have the limited number of other remainders start recycling as the division goes on + on forever.