

$$8b) \quad 1.\overline{037}$$

$$= \left| \frac{37}{999} \right.$$

$$= \left| \frac{1}{27} \right.$$

$$x = 1.037037037\dots$$

$$1000x = 1037.037037037\dots$$

$$999x = 1036$$

$$x = \frac{1036}{999}$$

8j7

$$\begin{aligned} & 0.11\overline{36} \\ &= \frac{1136 - 11}{9900} \\ &= \frac{1125}{9900} \\ &= \frac{5}{44} \\ &= \end{aligned}$$

OR

$$\begin{aligned} x &= 0.11363636\dots\dots \\ 100x &= 11.363636\dots\dots \\ \hline 99x &= 11.25 \\ x &= \frac{11.25}{99} \\ &= \frac{1125}{9900} \end{aligned}$$

$$\frac{1}{7} = 0.\dot{1}4285\dot{7}$$

$$\frac{2}{7} = 0.\dot{2}8571\dot{4}$$

$$\frac{3}{7} = 0.\dot{4}2857\dot{1}$$

$$\frac{4}{7} = 0.\dot{5}7142\dot{8}$$

$$\frac{5}{7} = 0.\dot{7}1428\dot{5}$$

$$\frac{6}{7} = 0.\dot{8}5714\dot{2}$$

12a) $200 \leftrightarrow 250$

$$\sqrt{200} = 14.14 \dots$$

$$\sqrt{250} = 15.87 \dots$$

biggest prime to test is 13

2, 3, 5, 7, 11, 13

b) $\sqrt{457} = 21.38 \dots$

as no primes < 21 go into 457

457 must be prime

c) $247 \quad \frac{15.7}{/13}$
 $329 \quad /7$
 $451 \quad /11$
 $503 \quad \frac{22.4}{\rightarrow}$
 $727 \quad \frac{26.9}{\rightarrow}$
 $1001 \quad /7$

13

$$a = xk$$

$$b = xl$$

where k and l are integers

$$a - b = xk - xl$$

$$= \underline{x}(k - l)$$

as $k - l$ is an integer

x must be a factor

16c) relatively prime if $\text{HCF} = 1$

$\phi(n) = \#$ of integers $\leq n$ that are relatively prime to n .

Prove $\phi(3^n) = 2 \times 3^{n-1}$

$$\phi(p^k) = p^k - p^{k-1}$$

$$\begin{aligned}\phi(3^n) &= 3^n - 3^{n-1} \\ &= 3^{n-1}(3-1) \\ &= \underline{\underline{3^{n-1} \times 2}}\end{aligned}$$