

EXPONENT LAWS AND PRIME FACTORIZATION
In-Class Assignment

- [12] 1. Simplify the given expression and if the result has a negative exponent change it so it has only positive exponents.

$3x^5x^{-4}y^{-3}z^2z^1$ $= 3x^1y^{-3}z^{1+2}$ $= \boxed{\frac{3xz^3}{y^3}}$	$\frac{2^{-1}a^4b^3}{(a^2)^4}$ $= \frac{a^4b^3}{2a^8} = \frac{b^3}{2} a^{4-8}$ $= \boxed{\frac{b^3}{2a^4}}$
$\left(\frac{4x^7}{5y}\right)^{-2} = \left(\frac{5y}{4x^7}\right)^2 = \boxed{\frac{25y^2}{16x^{14}}}$	$2^5xx^{-4}\frac{y}{y^{-8}z}$ $32x^{-3}y^{1-(-8)}z^{-1}$ $= \boxed{\frac{32y^9}{x^3z}}$
$\left(\frac{x}{x^{-6}yz^5}\right)^0 = 1$	$\frac{3}{4}x^{-3}x^4yz^{-2}z$ $\frac{3}{4}x^1y^1z^{-1} = \boxed{\frac{3xy}{4z}}$

- [16] 2. Using prime factorization, determine whether the given number is a perfect square number or perfect cube number. Clearly state your conclusion.

294

```

  294
  /  \
 2    147
     /  \
    3    49
       /  \
      7    7
  
```

$\therefore 294$ is neither a square or a cube.

576

```

  576
  /  \
 2    288
     /  \
    2    144
     x   /  \
        2    72
        x   /  \
           2    36
           x   /  \
              2    18
              x   /  \
                 2    9
                 x   /  \
                    2    3
                    x   \
                       3
  
```

$576 = (2 \times 2 \times 2 \times 3)^2 \cdot 2$
 $= 24^2$ ✓

$\therefore 576$ is a square number.

287 496

```

  287 496
  /  \
 2    143 748
     /  \
    2    718 74
     x   /  \
        2    359 37
        x   /  \
           3    119 79
           x   /  \
              3    399 3
              x   /  \
                 3    133 1
                 x   /  \
                    11   12 1
                    x   /  \
                       11  11
  
```

$287\,496 = (2 \times 3 \times 11)^3$
 $= 66^3$

$\therefore 287\,496$ is a cube number.

1 000 000

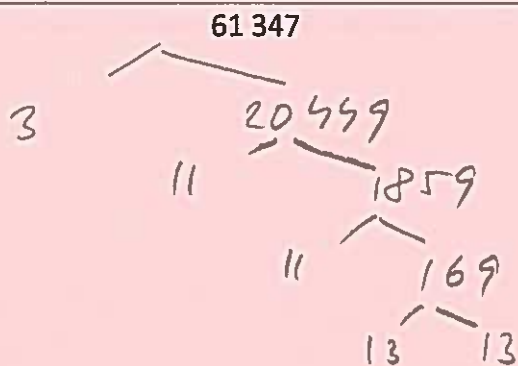
```

  1 000 000
  /  \
 2    500 000
     /  \
    2    250 000
     x   /  \
        2    125 000
        x   /  \
           2    62 500
           x   /  \
              2    31 250
              x   /  \
                 2    15 625
                 x   /  \
                    5    3 125
                    x   /  \
                       5    625
                       x   /  \
                          5    125
                          x   /  \
                             5    25
                             x   /  \
                                5    5
  
```

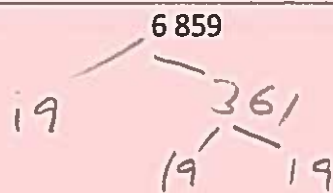
$1\,000\,000 = (2 \times 2 \times 2 \times 5 \times 5 \times 5)^2 \cdot 5$
 $= 1000^2$

$1\,000\,000 = (2 \times 2 \times 5 \times 5)^3$
 $= 100^3$

$\therefore 1\,000\,000$ is a cube and a square number.

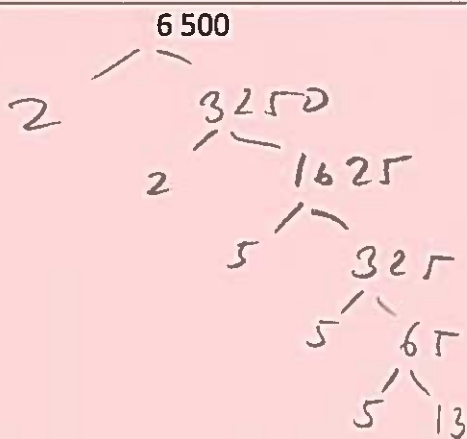


$\therefore 61347$ is not a square or cube number.

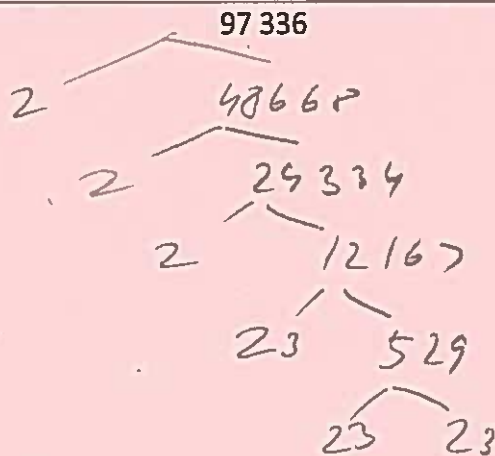


$$6859 = 19^3$$

$\therefore 6859$ is a cube number.



$\therefore 6500$ is neither a square or a cube number.



$$\begin{aligned}
 97336 &= (2 \times 23)^3 \\
 &= 46^3
 \end{aligned}$$

$\therefore 97336$ is a cube number.

