Math 10
3.1-3.5 Assignment

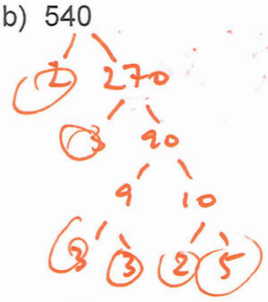
Name: Key
Block:____

1. Determine the prime factorization of each of the following:

a) 126

$2 \times 3^2 \times 7$

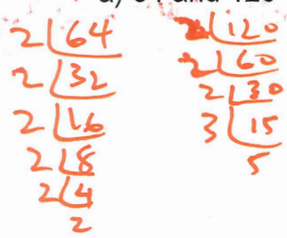
b) 540



$2^2 \times 3^3 \times 5$

2. Determine the greatest common factor and least common multiple of each of the following:

a) 64 and 120



$64 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
$120 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$ GCF
$64 = 2^6 \cdot 3^0 \cdot 5^0$
$120 = 2^3 \cdot 3^1 \cdot 5^1$ LCM

GCF= $2^3 = 8$

LCM= $2^6 \times 3 \times 5 = 960$

b) 40, 48, and 56

$40 = 2 \cdot 2 \cdot 2 \cdot 5$
$48 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$
$56 = 2 \cdot 2 \cdot 2 \cdot 7$ GCF

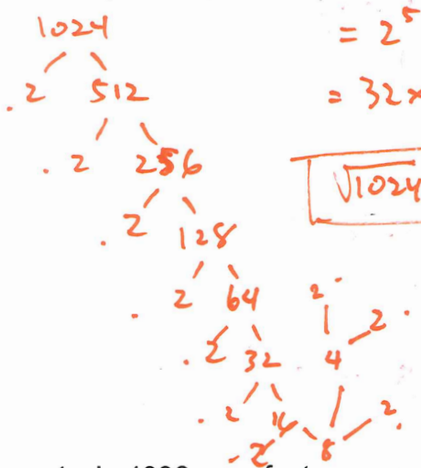
$40 = 2^3 \times 3^0 \times 5^1 \times 7^0$
$48 = 2^4 \times 3^1 \times 5^0 \times 7^0$ LCM
$56 = 2^3 \times 3^0 \times 5^0 \times 7^1$

GCF= $2^3 = 8$

LCM= $2^4 \cdot 3 \cdot 5 \cdot 7 = 1680$

3. Use prime factorization to determine

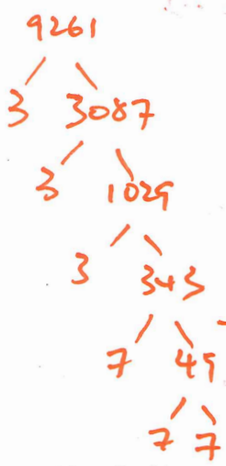
a) the square root of 1024.



$= 2^{10}$
$= 2^5 \times 2^5$
$= 32 \times 32$

$\sqrt{1024} = 32$

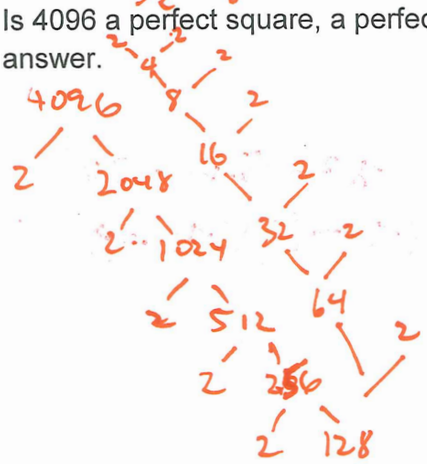
b) the cube root of 9261.



$= 3^3 \times 7^3$
$= (3 \times 7) \times (3 \times 7) \times (3 \times 7)$
$= 21 \times 21 \times 21$
$= 21^3$

$\sqrt[3]{9261} = 21$

4. Is 4096 a perfect square, a perfect cube, both, or neither? Show work to justify your answer.



$4096 = 2^{12} = 2^4 \cdot 2^4 \cdot 2^4$
$= 16 \cdot 16 \cdot 16$
$= 16^3$

$4096 = 2^6 \cdot 2^6$
$= 64 \cdot 64$
$= 64^2$

$\sqrt[3]{4096} = 16$

Both

$\sqrt{4096} = 64$

5. Determine all perfect squares and perfect cubes between 200 and 300.

$\sqrt{200}$ 225 256 289 $\sqrt{300}$

$= 14.1$ 15 16 17 $= 17.3$

$\sqrt[3]{200}$ 216 $\sqrt[3]{300}$

$= 5.8$ 6 $= 6.7$

perfect squares: 225, 256, 289

perfect cubes: 216

6. Factor each of the following by removing the GCF:

a) $3x - 15$

$3(x-5)$

↑ GCF

b) $4x - 12x^2 + 8x^3$

$4(x - 3x^2 + 2x^3)$

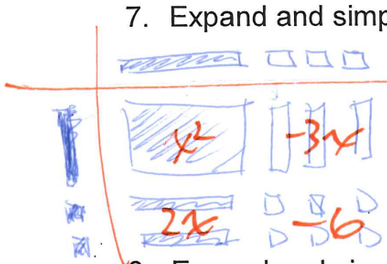
↑ GCF

c) $15x^3y^2 - 25x^2y^4 - 30x^4y^3$

$5x^2y^2(3x - 5y^2 - 6x^2y)$

↑ GCF

7. Expand and simplify using algebra tiles: $(x-3)(x+2)$



$x^2 - 3x + 2x - 6$

$= x^2 - x - 6$

8. Expand and simplify:

a) $(x+4)(x+2)$

$x^2 + 4x + 2x + 8$

$= x^2 + 6x + 8$

b) $(x-5)(x+7)$

$x^2 - 5x + 7x - 35$

$= x^2 + 2x - 35$

c) $(2x-1)(x+3)$

$2x^2 - x + 6x - 3$

$= 2x^2 + 5x - 3$

d) $(3x-4)(2x-1)$

$6x^2 - 8x + 3x + 4$

$= 6x^2 - 5x + 4$

9. Factor:

a) $x^2 + 6x + 8$

$(x+4)(x+2)$

b) $x^2 - 9x + 20$

$(x-5)(x-4)$

c) $x^2 - 3x - 18$

$(x-6)(x+3)$

d) $x^2 - 5x + 4$

$(x-4)(x-1)$

10. Factor completely:

e) $5x^2 + 5x - 150$

$5(x^2 + x - 30)$

$5(x+6)(x-5)$

f) $-2x^2 + 10x + 48$

$-2(x^2 - 5x - 24)$

$-2(x-8)(x+3)$