Math 10
3.1-3.5 Assignment

Name: Key
Block:____

1. Determine the prime factorization of each of the following:
   a) 1260

   $2^2 \cdot 3^2 \cdot 5 \cdot 7$

   b) 5400

   $2^3 \cdot 3^3 \cdot 5^2$

2. Determine the greatest common factor and least common multiple of

   a) 64 and 120

   $\boxed{2^6}$ $\boxed{2^3 \cdot 3 \cdot 5}$

   GCF= $2^3 = 8$

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

   b) 40, 48, and 56

   $\boxed{2^3 \cdot 5}$ $\boxed{2^4 \cdot 3}$ $\boxed{2^3 \cdot 7}$

   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.

   $\sqrt{1024} = 2^5 = 32$

   b) the cube root of 9261.

   $\sqrt[3]{9261} = 3 \cdot 7 = 21$

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

   $4096 = \boxed{2 \cdot 2 \cdot 2}\,\boxed{2 \cdot 2 \cdot 2}\,\boxed{2 \cdot 2 \cdot 2}\,\boxed{2 \cdot 2 \cdot 2}$

   Both because there are complete groups of two AND three.

   $\sqrt{4096} = 2^6 = 64$ AND $\sqrt[3]{4096} = 2^4 = 16$

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

$\sqrt{200} = 14.1$
$\sqrt{300} = 17.3$ > use numbers between

$15^2, 16^2, 17^2$
$225, 256, 289$

$\sqrt[3]{200} = 5.8$
$\sqrt[3]{300} = 6.7$ > use $6^3 = 216$

perfect squares: 225, 256, 289

perfect cubes: 216

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

a) $3x - 15$
$= 3(x-5)$

b) $4x - 12x^2 + 8x^3$
$= 4x(1-3x+2x^2)$

c) $15x^3y^2 - 25x^2y^4 - 30x^4y^3 = 5x^2y^2(3x - 5y^2 - 6x^2y)$

7. Expand and simplify:

a) $(x+4)(x+2)$
$= x^2 + 2x + 4x + 8$
$= x^2 + 6x + 8$

b) $(x-5)(x+7)$
$= x^2 + 7x - 5x - 35$
$= x^2 + 2x - 35$

c) $(2x-1)(x+3)$
$= 2x^2 + 6x - 1x - 3$
$= 2x^2 + 5x - 3$

d) $(3x-4)(2x-1)$
$= 6x^2 - 3x - 8x + 4$
$= 6x^2 - 11x + 4$

8. Factor:

a) $x^2 + 6x + 8$ $\quad \underline{2} \cdot \underline{4} = 8$, $\underline{2} + \underline{4} = 6$
$= (x+2)(x+4)$

b) $x^2 - 9x + 20$ $\quad \underline{-5} \cdot \underline{-4} = 20$, $\underline{-5} + \underline{-4} = -9$
$= (x-5)(x-4)$

c) $x^2 - 3x - 18$ $\quad \underline{-6} \cdot \underline{3} = -18$, $\underline{-6} + \underline{3} = -3$
$= (x-6)(x+3)$

d) $x^2 - 5x + 4$ $\quad \underline{-1} \cdot \underline{-4} = 4$, $\underline{-1} + \underline{-4} = -5$
$= (x-1)(x-4)$

9. Factor completely:

e) $5x^2 + 5x - 150$
$= 5(x^2 + x - 30)$
$= 5(x+6)(x-5)$ $\quad \underline{6} \cdot \underline{-5} = -30$, $\underline{6} + \underline{-5} = 1$

f) $-2x^2 + 10x + 48$
$= -2(x^2 - 5x - 24)$ $\quad \underline{-8} \cdot \underline{3} = -24$, $\underline{-8} + \underline{3} = -5$
$= -2(x-8)(x+3)$