Chapter 3 TEST

1. Decompose 7560 in prime factors: [1]

$7560 = 2^3 \times 3^3 \times 5 \times 7$

2. Determine the Greatest Common Factor of 1260 and 3300. [2]

$1260 = 2^2 \times 3^2 \times 5 \times 7$
$3300 = 2^2 \times 3 \times 5^2 \times 11$
$\Big\} GCF = 2^2 \times 3 \times 5 = 60$

3. Determine the Least Common Multiple of 2310 and 1092. [2]

$2310 = 2 \times 3 \times 5 \times 7 \times 11$
$1092 = 2^2 \times 3 \times 7 \times 13$
$\Big\} LCM = 2^2 \times 3 \times 5 \times 7 \times 11 \times 13 = 60060$

4. The number 530__ has a missing digit. Determine the smallest digit so that the 4 digit number is divisible by: [2]

a) 2 → 0

b) 3 → 1

c) 6 → 4

5. a) Simplify $\frac{140}{728}$ using primes. [2]

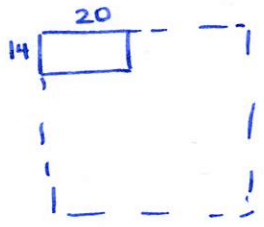
$\frac{140}{728} = \frac{2^2 \times 5 \times 7}{2^3 \times 7 \times 13} = \frac{5 \times 7}{2 \times 13} = \frac{5}{26}$

b) Add these fractions using prime factors: $\frac{1}{84} + \frac{5}{126} - \frac{7}{66}$ [2]

$\frac{1}{84} + \frac{5}{126} - \frac{7}{66} = \frac{1 \times 11 \times 3}{2^2 \times 3 \times 7 \times 11 \times 3} + \frac{5 \times 2 \times 11}{2 \times 3^2 \times 7 \times 2 \times 11} - \frac{7 \times 2 \times 7 \times 3}{2 \times 3 \times 11 \times 2 \times 7 \times 3}$

$= \frac{33}{2772} + \frac{110}{2772} - \frac{294}{2772} = -\frac{151}{2772}$

6. You just bought rectangular tiles with dimensions: 14cm by 20cm. What is the smallest square you can tile with them? [2]



$14 = 2 \times 7$
$20 = 2^2 \times 5$
$LCM(14, 20) = 2^2 \times 5 \times 7 = 140$

140 cm x 140 cm

7. Earth, Jupiter, Saturn and Uranus revolve around the Sun every 1, 12, 30 and 84 years respectively. If the four planets currently line up, how many years will pass before they would line up again? [2]

$LCM(1, 12, 30, 84) = 2^2 \times 3 \times 5 \times 7 = 420$ years

$12 = 2^2 \times 3$
$30 = 2 \times 3 \times 5$
$84 = 2^2 \times 3 \times 7$

8. Expand the following expressions: [10]

a) $(2x-3)(5x+2)-3(2x-6)$ $= 10x^2+4x-15x-6-6x+18$

2 $= \boxed{10x^2-17x+12}$

b) $(x-5)^2+3(x-5)(x+1)$ $= x^2-10x+25+3(x^2+x-5x-5)$

2 $= x^2-10x+25+3x^2-12x-15$

$= \boxed{4x^2-22x+10}$

c) $(3x-5)(3x+5)-(2x-1)(x-4)$

$= 9x^2-25-(2x^2-8x-x+4)$ $= \boxed{7x^2+9x-29}$

3 $= 9x^2-25-2x^2+9x-4$

d) $4-3(x-6)-(3x-2)^2$

$= 4-3x+18-(9x^2-12x+4)$ $= \boxed{-9x^2+9x+18}$

3 $= 4-3x+18-9x^2+12x-4$

9. Factor the following expressions: [15]

a) $3x^2-9x$ $= \boxed{3x(x-3)}$

b) x^2-1 $= \boxed{(x+1)(x-1)}$

3 c) $15x^3-25x^2+5x$ $= \boxed{5x(3x^2-5x+1)}$

⊗ 3, ⊕ -5 } impossible

2 d) x^2-x-12 $= \boxed{(x-4)(x+3)}$

e) $9x^2-6x+1$ $= \boxed{(3x-1)^2}$

2

f) $2x^2+x-1$ $= 2x^2+2x-x-1$ $= \boxed{(2x-1)(x+1)}$

⊗ -2, ⊕ 1

2 $= 2x(x+1)-1(x+1)$

g) $12x^2-75$ $= 3(4x^2-25)$

2 $= \boxed{3(2x+5)(2x-5)}$

h) $5x^2+10x-15$ $= 5(x^2+2x-3)$

2 $= \boxed{5(x+3)(x-1)}$

i) $8x^2-20x-12$ $= 4(2x^2-5x-3)$ $= 4(2x+1)(x-3)$

⊗ -6, ⊕ -5 } -6 & 1

2 $= 4(2x^2-6x+x-3)$

$= 4(2x(x-3)+1(x-3))$