1) $7 \times 7 = 49$
$10 \times 7 = 70$

let x represent the total area of one of one of the non-overlapping regions.

$x = 70 - 49$
$x = 21$
$2x = 2(21)$
$\quad = 42 \text{ units}^2$

$\therefore$ the total area of the 2 non-overlapping regions is 42 units^2

2) $1 + 2 + \ldots + 98 = x$
$-1 + -2 + \ldots + -98 = -x$

$x + -x = 0$

$0 + -99 + -100 = -199$

$\therefore$ the sum of all the integers from -100 to 98 is -199

3) $7 - \frac{2}{x} = \sqrt{\frac{7}{x}}$

$\left(7 - \frac{2}{x}\right)^2 = \sqrt{\frac{7}{x}}^2$

$49 - \frac{28}{x} + \frac{4}{x^2} = \frac{7}{x}$

$-\frac{7}{x} - \frac{28}{x} + \frac{4}{x^2} = -49$

$-7 - 28 + \frac{4}{x} = -49x$

$$\frac{4}{x} + 49x = 35$$

$$\frac{4 + 49x^2}{x} = 35$$

$$4 + 49x^2 = 35x$$

$$49x^2 - 35x + 4 = 0$$

Quadratic Formula:
$$x = \frac{--35 \pm \sqrt{(-35)^2 - 4(49)(4)}}{2(49)}$$

$$x = \frac{35 \pm \sqrt{1225 - 784}}{98}$$

$$x = \frac{35 \pm \sqrt{441}}{98}$$

$$x = \frac{35 \pm 21}{98}$$

$$x = \frac{56}{98} \text{ OR } \frac{14}{98}$$

$$x = \frac{4}{7} \text{ OR } \frac{1}{7}$$

∴ the two possible values of x which satisfy the equa
are $\frac{4}{7}$ and $\frac{1}{7}$

4) Husband: $30 \times 3 \times 3 \times 3 \times 3 = 2430$ 4 hours
   Wife : $2430 \div 3 \div 3 \div 3 = 90$ 3 hours

∴ the wife started with $90

5) $\overline{AB} = 6(3\sqrt{2}) = 18\sqrt{2}$ cm $6 \div \sqrt{2} = 3\sqrt{2}$
   $\overline{BC} = 8(3\sqrt{2}) = 24\sqrt{2}$ cm

Pythagorean Theorum
$18\sqrt{2}^2 + 24\sqrt{2}^2 = \overline{AC}^2$
$= 1800$

$\sqrt{1800} = 30\sqrt{2}$

$\therefore$ the line $\overline{AC}$ is 60cm long.

6) $2^{512} = 2^{2 \cdot 256}$
   $= 4^{256}$
   $= 4^{4^4}$
   $= \sqrt{16}^{\sqrt{16}^{\sqrt{16}}}$
   $= \sqrt{16}$

7) $3^5 - 3^4 = 162$
   $3^4 + 162 = 3^5$

$2a^b = 162$
$a^b = 81$

$a = 3, b = 4$
$a = 9, b = 2$
$a = 81, b = 1$

8) $1332 = 2^2 \cdot 3^2 \cdot 37$

$444 = 2^2 \cdot 3 \cdot 37$

$$\frac{2^{18} \cdot 3^{18} \cdot 37^9}{2^{18} \cdot 3^9 \cdot 37^9}$$

$$= \frac{3^{18}}{3^9}$$

$$= 19683$$