Asn 6

$\boxed{3.5}$

5) $2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot3\cdot3\cdot3\cdot3\cdot5\cdot5\cdot7$

$2^8\cdot3^4\cdot5^2\cdot7$

8) $\underbrace{(n+1)!+2}_{\text{divisible by } 2}, \underbrace{(n+1)!+3}_{\text{divisible by } 3}, \ldots, \underbrace{(n+1)!+n}_{\text{divisible by } n}, \underbrace{(n+1)!+n+1}_{\text{divisible by } n+1}$

So, there are n consecutive composite integers

9) 2, 3, 5, 7, 11, 13, 17

$p=3$
$p+2=5$
$p+4=7$

3, 5, 7 are consecutive primes that meet the form

21) a) $3^5\cdot5^3$
b) 1
c) 23^{17}
d) $41\cdot43\cdot53$
e) 1
f) 1111

24) $1000=2^3\cdot5^3$ $\quad 625=5^4$

$\gcd(1000,625)=5^3 \quad \operatorname{lcm}(1000,625)=2^3\cdot5^4$

$\gcd(1000,625)\cdot\operatorname{lcm}(1000,625)=125\cdot5000$

So, $\gcd(1000,625)\cdot\operatorname{lcm}(1000,625)\neq1000\cdot625$

34) $(2\cdot3\cdot5\cdot7\cdot11\cdot13)+1=30{,}031=59\cdot509$ (Not Prime)

So, $p_1p_2\ldots p_n+1$ is NOT Prime for every positive integer n

$\boxed{3.6}$

4) a) 27 b) $2^9+2^7+2^5+2^4+2^2+1=\boxed{693}$

c) $2^9+2^8+2^7+2^5+2^4+2^3+2^2+2^1=\boxed{958}$

d) $2^{14}+2^{13}+2^{12}+2^{11}+2^{10}+2^4+2^3+2^2+2^1+2^0=\boxed{31,775}$

5) a) 1000 0000 1110 b) 1 0011 0101 1010 1011

c) 1010 1011 1011 1010

d) 1101 1110 1111 1010 1100 1110 1101

16) Convert the hexadecimal number to binary by grouping the binary digits into blocks of four (adding zeros at the start of the leftmost block if necessary) then each block represents a single hexadecimal digit. [Hexadecimal to binary: Example 6]

Now convert the binary number to octal by grouping the binary digits into blocks of three (adding zeros at start of leftmost block if necessary) then each block translates into a single octal digit.

26) $55 = 34 \cdot 1 + 21$
$34 = 21 \cdot 1 + 13$
$21 = 13 \cdot 1 + 8$
$13 = 8 \cdot 1 + 5$
$8 = 5 \cdot 1 + 3$
$5 = 3 \cdot 1 + 2$
$3 = 2 \cdot 1 + 1$
$2 = 1 \cdot 2$

$\boxed{\text{8 divisions}}$

32) a) 01 0110 b) 01 1111 c) 11 1000 d) 10 1100

36) Simply complement the number that is doing the subtraction, then proceed to add in one's complement.
(ie. $1-(-1) = 1+1$, $1-1 = 1+(-1)$)
So, you are changing the sign and representation of the number that is doing the subtraction, so that you can use addition.

38) a) 01 0110 b) 01 1111 c) 11 1001 d) 10 1101