MATH 101: (Wed).

Professor A. Dawson

Section: 5:1

2) True

4) False (2 is prime)

6) True

8) True

10) 20 - Natural Factors.
1, 2, 4, 5, 10

12) 172 - Natural Factors.
1, 2, 4, 43, 86, 172

14) 540 is divisible by:
2, 3, 4, 5, 6, 9, 10, 12

16) 123,456,789 is divisible by:
3, 9

18) a.

101	102	103	104	105	106	107	108	109	110
~~111~~	112	113	114	115	116	~~117~~	118	~~119~~	120
~~121~~	122	~~123~~	124	125	126	127	128	~~129~~	130
131	132	~~133~~	134	135	136	137	138	139	140
~~141~~	142	~~143~~	~~144~~	~~145~~	146	~~147~~	148	149	150
151	152	~~153~~	154	155	156	157	158	~~159~~	160
~~161~~	162	163	164	~~165~~	166	167	168	~~169~~	170
~~171~~	172	173	174	~~175~~	176	~~177~~	178	179	180
181	182	~~183~~	184	185	186	~~187~~	188	~~189~~	190
191	192	193	194	195	196	197	198	199	200

(used prime #s: 2, 3, 5, 7, 11, 13)

a) Total = 21 prime #s

b) Both 197 and 199 are Prime!

Prime Factorization of

20) 35,657

197 · 181

$= 197 \cdot 181$

22) There cannot be three consecutive prime numbers. Every other number counting number is even, therefore is divisible by 2, and considered composite - except 2, 3 which are consecutive primes

24) Since the divisibility test for 2, 4, 8 incorporates an addition digit to the end of the numbers consecutively, then divisibility test for 16 will be - last 4 digits to form a number divisible by 16.

- 456,882,320 — $\frac{2320}{16} = 145$

26. The fundamental Theorem of Arithmetic -

28). 825

3 · 275

5 · 55

5 · 11

$825 = 3 \cdot 5^2 \cdot 11$

30 340

2 · 170

2 · 85

5 · 17

$340 = 2^2 \cdot 5 \cdot 3^2$

3 · 9

3 · 3

32) 548,184

54818 ×2
8
54810
0
5481
7
546
12
42
4
0 → is divisible by 7.

34) 368,597

36859
79
36845
10
3674
8
359
18
11 7
14
07 → Not divisible by 7.

36) 108,410,313

1+8+1+3+3 = 16
0+4+0+1 = 5
11

is divisible by 11.

38) 29,630,419,088

2+6+0+1+0+8 = 17
9+3+4+9+8 = 34
34 − 17 = 17
is NOT divisible by 11.

40) Factorizations of 75:

1 · 75 & 3 · 25

42) $2,45x,765 ; 3$

$x = 1, 4, 7,$

(#'s added together is divisibly by 3).

44) $2,143,89x ; 5$

$x = 0, 5$

(# ends in 0, or 5)

46) $23,x54,470 ; 10$

$x = 0, 1, 2, 3, 4 \ldots 9$

(# end in 0)

48) 156

2 | 78

2 | 39

3 | 13

$156 = 2^2 \cdot 3 \cdot 13$ (+1, +1, +1)

3, 2, 2

$= 12$

50) $2^4 \cdot 7^2 \cdot 13^3$

4+1, 2+1, 3+1

$5 \cdot 3 \cdot 4 = 60$

52) 1990

$\frac{1990}{4} = 497.5$ = not leap year

54) $\frac{2400}{6}$

2400 = leap year

56) $3, 4, 5 = \frac{60}{6} = 10$

$7 \cdot 8 \cdot 9 = \frac{504}{6} = 84$

$4 \cdot 5 \cdot 6 = \frac{120}{6} = 20$

* 6 is a divisor of any three consecutive numbers multiplied together.