3.2. CRC

[1 2 3 4 5 6 7 8 9 10]

3.2.1.

Calc remainder of x^7+x^5+1 divided by x^3+1

~~1010000~~ 1001 | 10100001

```
10100001 | 1001
1001
-----
00110
 1001
 ----
 0100
  1001
  ----
  0011
```

$R = x^2+x+1$

3.22.

Bit stream 10011101 is transmitted with CRC, polynomial x^3+1

a) Show the bit string transmitted

b) Suppose the third bit from the left is inverted in transmission. Show that the receiver detects it.

c) Give an example of ~~error~~ bit errors not detected.

a) 1001 | 10011101000

```
10011101000 | 1001
1001
-----
 0110
 0000
 ----
  1100
  1001
  ----
  0101
  0000
  ----
   1010
   1001
   ----
    0110
    0000
    ----
     1100
     1001
     ----
      0100
      0000
      ----
       1000
       1001
       ----
        0001
        0000
        ----
         0001
         0000
         ----
          0000
```

The string transmitted is 10011101100

b) R_x = 10111101100

```
10111101100 | 1001
1001
-----
 0101
 0000
 ----
  1011
  1001
  ----
  0010
  0000
  ----
   0100
   0000
   ----
    1001
    1001
    ----
    0000
```

The remainder at receiver is 100 ≠ 000

c) Undetected: multiples of $G(x)$. $G(x)(x^5+x) = (x^3+1)(x^5+x) = x^8+x^5+x^4+x$

E_x = 001001100110

T_x = 100111011100

R_x = 101110111110

```
10111011110 | 1001
1001
-----
 0101
 0000
 ----
  1010
  1001
  ----
  0111
  0000
  ----
   1110
   1001
   ----
    1111
    1001
    ----
     1101
     1001
     ----
      1001
      1001
      ----
      0000
```

← Undetected