

1.  $6x^2 + 1 + \frac{3x+1}{3x^2+1}$

2.  $3x^2 - 8x + 16 + \frac{3}{x+2}$

3. Yes

4.  $3x^2 - 4 + \frac{-x^2+2x+2}{x^3-x+2}$

5.  $2x^2 - 4x + 3 + \frac{-x-5}{x^2+2x-1}$  (or you can write it  $2x^2 - 4x + 3 - \frac{x+5}{x^2+2x-1}$ )

6.  $2x^2 - 4x + 5 - \frac{15}{x+2}$

7.  $x^3 + 2x^2 + 5x + 10 + \frac{22}{x-2}$

8.  $x^2 + 3x - 2 - \frac{1}{2x-3}$

9.  $x^3 - 2x + 5 - \frac{6}{3x+2}$

10. 6

11. -273

12.

$$\begin{array}{r|rrrrr}
 -3 & 1 & 3 & -16 & -27 & 63 \\
 & & -3 & 0 & 48 & -63 \\
 \hline
 & 1 & 0 & -16 & 21 & 0
 \end{array}$$

By the Remainder Theorem,

$$P(-3) = 0$$

Since  $x = -3$  is a zero of  $P(x)$ ,  
 $x + 3$  is a factor of  $P(x)$  (by  
 the Factor Theorem).  $\square$

13.

$$\begin{aligned} P(1) &= 1^{1984} - 2(1)^{17} + 1 \\ &= 1 - 2 + 1 \\ &= 0 \end{aligned}$$

Since  $x=1$  is a zero of  $P(x)$ ,  $x-1$  is a factor of  $P(x)$  (by the Factor Theorem).  $\square$