

Synthetic Division of Polynomials - Notes

Divide, using synthetic division. After writing your answer use the Remainder Theorem to state whether the binomial is a factor of the polynomial.

1) $(3k^4 - 12k^3 + 7k - 31) \div (k - 4)$

$k-4=0$
 $k=4$
 $3k^4 - 12k^3 + 0k^2 + 7k - 31$
 $4 \mid 3 \quad -12 \quad 0 \quad 7 \quad -31$
 $\quad \quad 12 \quad 0 \quad 0 \quad 28$
 $\hline 3 \quad 0 \quad 0 \quad 7 \mid -3/k-4$
 $3k^3$

$$3k^3 + 7 - \frac{3}{k-4}$$

2) $(16n^4 - 48n^3 - 28n^2 - 4) \div (8n + 4)$

$8n+4=0$
 $8n=-4$
 $n=-\frac{1}{2}$
 $-\frac{1}{2} \mid 16 \quad -48 \quad -28 \quad 0 \quad -4$
 $\quad \quad -8 \quad 28 \quad 0 \quad 0$
 $\hline 16 \quad -56 \quad 0 \quad 0 \mid -4/k+4$
 $\div 8 \quad 2 \quad -7 \quad 0 \quad 0$

$$2n^3 - 7n^2 - \frac{1}{2n+1}$$