

1. Divide using long division: $\frac{18x^4+9x^2+3x+2}{3x^2+1}$

2. Divide using synthetic division: $\frac{3x^3-2x^2+35}{x+2}$

3. Is $x - 1$ a factor of $x^{345} + 3x^{172} - 2x^{11} + 7x^2 - 9$?

Q: What goes around the world but stays in a corner?

4. Divide using long division: $\frac{3x^5 - 7x^3 + 5x^2 + 6x - 6}{x^3 - x + 2}$

5. Divide using long division: $\frac{2x^4 - 7x^2 + 9x - 8}{x^2 + 2x - 1}$

6. Divide using synthetic division: $\frac{2x^3 - 3x - 5}{x + 2}$

7. Divide using synthetic division: $\frac{x^4+x^2+2}{x-2}$

8. Divide using synthetic division: $\frac{2x^3+3x^2-13x+5}{2x-3}$ (Hint: Factor out a $\frac{1}{2}$ first.)

9. Divide using synthetic division: $\frac{3x^4+2x^3-6x^2+11x+4}{3x+2}$

10. Let $P(x) = 2x^2 + 9x + 1$. Use synthetic division and the Remainder Theorem to find $P\left(\frac{1}{2}\right)$.
11. Let $P(x) = 6x^5 + 10x^3 + x + 1$. Use synthetic division and the Remainder Theorem to find $P(-2)$.
12. Use the Factor Theorem to show that $x + 3$ is a factor of $P(x) = x^4 + 3x^3 - 16x^2 - 27x + 63$.
13. Use the Factor Theorem to show that $x - 1$ is a factor of $P(x) = x^{1984} - 2x^{17} + 1$.

Optional exercises from the Sullivan book if you'd like more practice:

A.3 (p.A30, towards back of book) #61-69 odd

A.4 (p.A34, towards back of book) #7-13 odd, 19-27 odd

4.5 (p.232) #11-19 odd