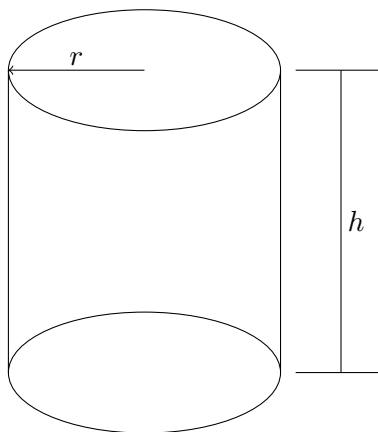


Math 29
PAL Worksheet 11

1. A manufacturer needs to construct a cylindrical can that will have a volume of 58 cubic inches (approximately one quart). For convenient handling, it must be at least 1 inch high and 2 inches in diameter. Write a function that will give the amount of material A (that is, the surface area) as a function of the radius r of the base circle of the cylinder.



2. For each polynomial, first list the possible rational roots of the function using the Rational Zero Test. Then determine if any of the possible rational roots really are roots of the polynomial.

a. $f(x) = x^3 - 5x^2 + 10x - 12$

b. $g(x) = 2x^4 - 9x^3 + 8x^2 - 18x + 8$

3. Find all the roots, both real and complex, for each function. (Graphing the function will help in finding the real root(s), and hence finding the factors of the form $x - r$ where $r \in \mathbb{R}$. Use long division to find the other factors, and then use the quadratic formula to find the remaining nonreal roots.)

a. $f(x) = x^3 + 13x^2 + 57x + 85$

b. $g(x) = x^4 + 2x^3 + 22x^2 + 50x - 75$

4. Use long division to determine whether the first polynomial f is a factor of the second polynomial g .
- $f(x) = 2x - 3$ and $g(x) = 6x^3 - 7x^2 + 7x - 15$
 - $f(x) = 3x^2 - 3$ and $g(x) = 6x^5 - 9x^3 + 9x^2 + 3x - 9$
 - $f(x) = x^2 - x - 5$ and $g(x) = 2x^5 - 5x^4 - 7x^3 + 16x^2 + x + 5$
5. Does the graph of the rational function $f(x) = \frac{4x^2 + 3x + 5}{x + 2}$ have an oblique asymptote? If so, what is its equation (in the form $y = mx + b$). If not, explain how you know.
6. Give a formula for a rational function f (putting your answer in the form $f(x) = \frac{p(x)}{q(x)}$ with p and q being polynomials) which has the line $y = 3x + 2$ as an oblique asymptote.