

## HW L2.8

NAME \_\_\_\_\_

1. What is the remainder when  $x^2 - 3x - 28$  is divided by  $x - 7$ ?
2. Find the quotient:  $(x^3 - 9x^2 + 5x + 3) \div (x - 1)$
3. Find the quotient:  $(3x^3 + 5x^2 - 16x + 2) \div (x + 4)$
4. For a polynomial function  $p$ , the value of  $p(-4)$  is 11. Which of the following statements is guaranteed to be true?
- A)  $x - 4$  is not a factor of  $p(x)$ .
  - B)  $x - 4$  is a factor of  $p(x)$ .
  - C)  $x + 4$  is a factor of  $p(x)$ .
  - D) None of the above
5. Find the slant asymptote of  $g(x) = \frac{x^3 + 2x^2 - 4x + 8}{x^2 - 7x + 1}$ .

6. Use division to rewrite the rational function  $f(x) = \frac{8x^3 - 24x^2 + 16x + 2}{2x - 5}$  as the sum of a polynomial and a rational function.

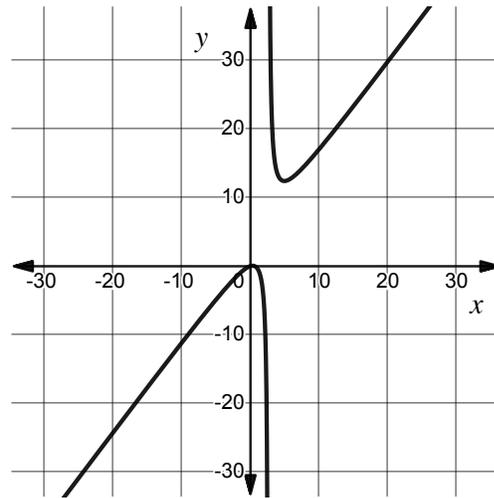
7. The graph of a rational function,  $h$ , is shown. Which of the following statements is true?

A) The degree of the numerator of  $h$  is less than the degree of the denominator of  $h$ .

B) The degree of the numerator of  $h$  is equal to the degree of the denominator of  $h$ .

C) The degree of the numerator of  $h$  is exactly one more than the degree of the denominator of  $h$ .

D) The numerator of  $h$  is quadratic and the denominator of  $h$  is cubic.



8. The polynomial  $g(x) = -2x^3 - x^2 + 6x + 5$  can be written as  $-2x^3 - x^2 + 6x + 5 = (x - 4)(m(x)) + k$  where  $k$  is a constant and  $m(x)$  is a polynomial expression.
- What is the degree of  $m(x)$ ? How do you know?
  - Find  $m(x)$ .
  - Find the value of  $k$ .
  - Find  $g(4)$ .
  - What is the remainder when dividing  $g(x)$  by  $(x - 4)$ ?
9. Rewrite  $\frac{x^4 + 9x^3 - 4x + 15}{x^2 + 1}$  as the sum of a polynomial expression and a rational expression.

 10. Let  $f(x) = (x - a)(x - b)(x - c) + d$  for some constants  $a, b, c$ , and  $d$  where  $d \neq 0$ . Decide if each statement is true or false.

a.  $x - a$  is a factor of  $f$ .

b.  $f(c) = d$

c.  $\frac{f(x)}{x - c}$  gives a remainder of  $d$ .

d.  $\frac{f(x)}{x - a} = (x - b)(x - c) + d$