

# Key

## Unit 2 – Polynomials Review

1. Use long division to divide  $6x^4 + 7x^3 - 9x^2 - 7x + 8$  by  $x - 1$ . Write your answer using the division statement.  $6x^4 + 7x^3 - 9x^2 - 7x + 8 = (x-1)(6x^3 + 13x^2 + 4x - 3) + 5$

2. Use synthetic division to divide each of the following. Write each answer using the division statement.

a.  $(-3x^4 + x^3 + 2x^2 - 2x + 5) \div (x - 1)$   $-3x^4 + x^3 + 2x^2 - 2x + 5 = (x-1)(-3x^3 - 2x^2 - 2) + 3$

b.  $(4x^5 - x^4 - 4x - 16) \div (x + 1)$   $4x^5 - x^4 - 4x - 16 = (x+1)(4x^4 - 5x^3 + 5x^2 - 5x + 1) - 17$

3. Determine the remainder when  $x^4 - x^3 - 11x^2 + 9x + 18$  is divided by each of the following binomials. Which binomials are factors of the polynomial? How do you know?

a.  $x + 2$   $r = -20$

b.  $x + 3$   $r = 0$   $x + 3$  is a factor since  $r = 0$

4. For each polynomial, determine one factor of the form:  $x - a$ , where  $a$  is an integer.

a.  $4x^3 - 5x^2 - 23x + 6$   $(x+2)$  or  $(x-3)$

b.  $9x^4 - 37x^2 + 4$   $(x-2)$  or  $(x+2)$

5. Factor:  $x^3 - 5x^2 - 2x + 24 = (x+2)(x-3)(x-4)$

6. For each polynomial function below, predict the end behavior of the graph. Explain your prediction.

a.  $g(x) = -2x^3 + 5x^2 - 8$  up, down  $\ominus$ /ODD

b.  $h(x) = -x^4 + 2x^3 - 5x^2 + 9$  down, down  $\ominus$ /EVEN

c.  $k(x) = x^4 - 2x^3 + 5x^2 - 9$  up, up  $\oplus$ /EVEN

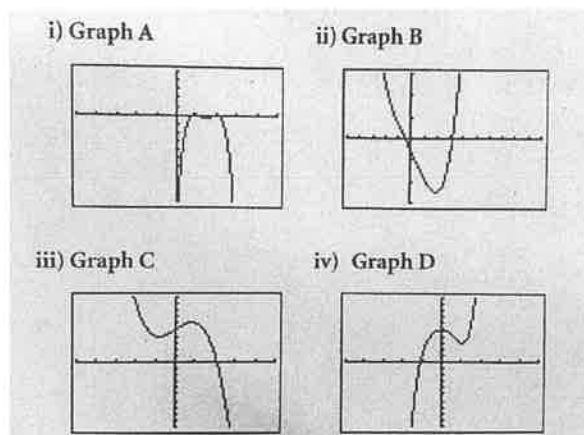
7. Match each function to its graph.

a.  $y = x^4 - x^2 - 25x - 12$  B

b.  $y = -x^4 + 8x^3 - 23x^2 + 28x - 12$  A

c.  $y = x^5 - 3x^2 + 5$  D

d.  $y = -x^3 + 2x + 5$  C



8. Sketch the graph of each polynomial function:

a.  $y = -x^4 - 3x^3 + 11x^2 + 3x - 10$

b.  $f(x) = (x - 3)(x - 1)(x + 2)^2$

c.  $g(x) = 4x^4 + 11x^3 - 7x^2 - 11x + 3$

} see attached

9. Which statement is true?

☒ a. When  $2x^3 + 4x^2 - 2x - 1$  is divided by  $x - 2$ , the remainder is 3.

☒ b. The binomial  $x + 1$  is a factor of  $4x^4 - x^3 - 3x + 2$ .

☒ c. When  $2x^4 - 7x^3 + 6x^2 - 14x + 20$  is divided by  $x - 3$ , the remainder is -5.

☐ d. The binomial  $x + 2$  is a factor of  $5x^3 + 7x^2 + 12$ .

10. Which statement about the graph of a quartic function is false?

a. The graph may open up.

b. The graph may have a zero with a multiplicity of 3.

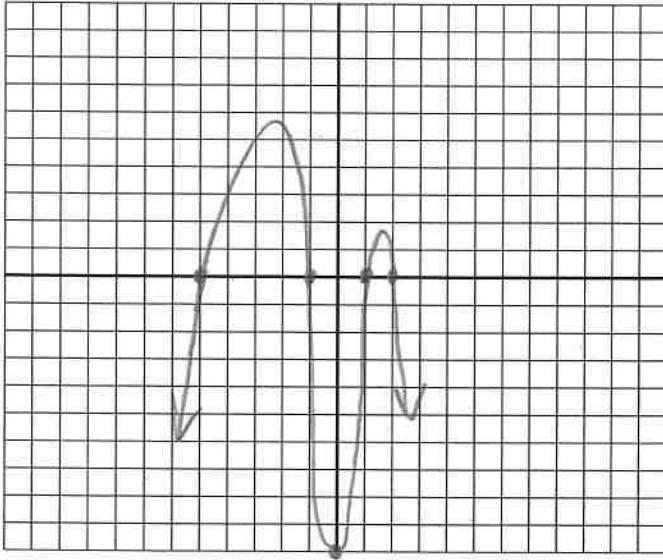
☒ c. The graph may start down and end up.

d. The graph may have a zero with a multiplicity of 2.

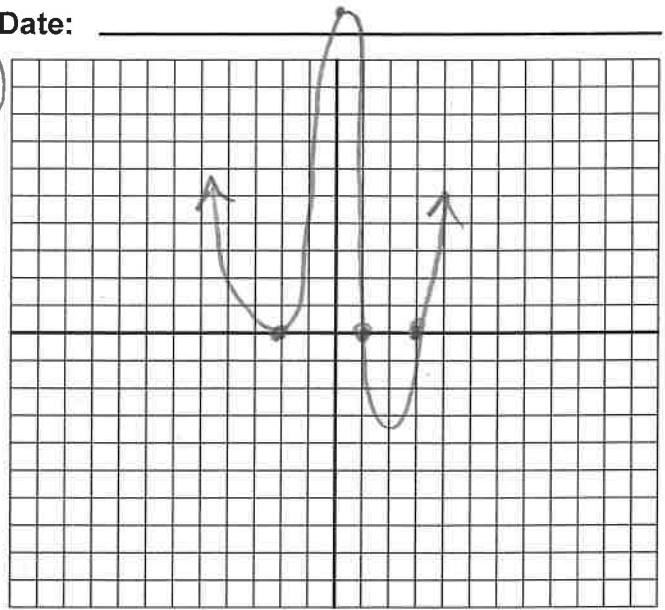
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8a)



b)



c)

