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BLM 3–3

Section 3.1 Extra Practice

1. For each polynomial function, state the degree. If the function is not a polynomial, explain why.

   a) $h(x) = 5 - \frac{1}{x}$

   b) $y = 4x^2 - 3x + 8$

   c) $g(x) = -9x^6$

   d) $f(x) = \sqrt[3]{x}$

2. What is the leading coefficient and constant term of each polynomial function?

   a) $f(x) = -x^3 + 2x + 3$

   b) $y = 5 + 9x^4$

   c) $g(x) = 3x^4 + 3x^2 - 2x + 1$

   d) $k(x) = 9 - 3x - 2x^2$

3. State whether the polynomial function is odd or even. Then, state whether the function has a maximum value, a minimum value, or neither.

   a) $g(x) = -x^3 + 8x^2 + 7x - 1$

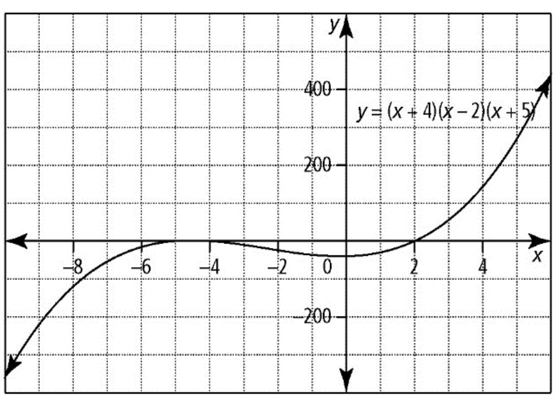
   b) $f(x) = x^4 + x^2 - x + 10$

   c) $p(x) = -2x^5 + 5x^3 - 11x$

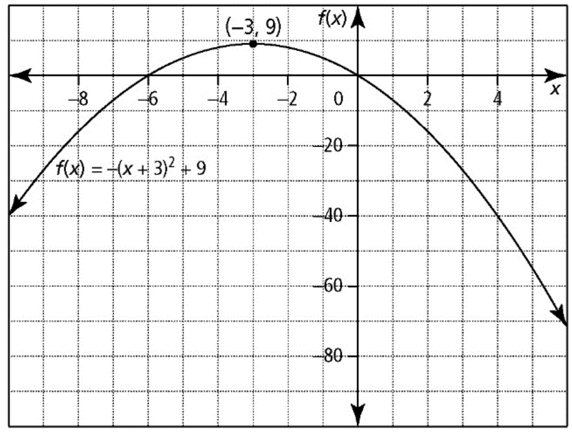
   d) $h(x) = -3x^2 - 6x - 2$

4. State the number of real x-intercepts, domain, and range for each polynomial function.

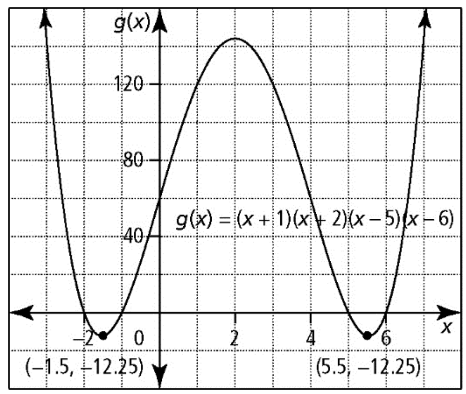
   a)



   b)



   c)



   d) $-2x^2(x + 3)(x + 5)(x - 7)$

5. State the possible number of x-intercepts and the value of the y-intercept for each polynomial function.

   a) $f(x) = -x^3 + 2x + 3$

   b) $y = 5 + 9x^4$

   c) $g(x) = 3x^4 + 3x^2 - 2x + 1$

   d) $k(x) = -3x - 2x^2$

6. Identify the following characteristics for each polynomial function:
   - the type of function and whether it is of even or odd degree
   - the end behaviour of the graph of the function
   - the number of possible x-intercepts
   - whether the function will have a maximum or minimum value
   - the y-intercept

   a) $g(x) = -x^4 + 2x^2 + 7x - 5$
   b) $f(x) = 2x^5 + 7x^3 + 12$

7. Given the polynomial $y = -2(x + 1)^2(x - 2)(x - 3)^2$, determine the following without graphing.

   a) Describe the end behaviour of the graph of the function.
   b) Determine the possible number of x-intercepts of the function.
   c) Determine the y-intercept of the function.
   d) Now, use graphing technology to create a sketch of the graph.

8. Identify each function as quadratic, cubic, quartic, or quintic.

   a) $y = -x^4 + 2x^2 + 7x - 5$
   b) $f(x) = 2x^5 + 7x^3 + 12$
   c) $g(x) = -x^3 + 2x + 3$
   d) $k(x) = 9 - 3x - 2x^2$

9. The height, h, in metres, above the ground of an object dropped from a height of 60 m is related to the length of time, t, in seconds, that the object has been falling. The formula is $h = -4.9t^2 + 60$.

   a) What is the degree of this function?
   b) What are the leading coefficient and constant of this function? What does the constant represent?
   c) What are the restrictions on the domain of the function? Explain why you selected those restrictions.
   d) Describe the end behaviour of the graph of this function.

10. Using the formula in #9, determine how long an object will take to hit the ground if it is dropped from a height of 60 m. Write your answer to the nearest tenth of a second.

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BLM 3–4

Section 3.2 Extra Practice

1. Use long division to divide
$x^2 - x - 15$ by $x - 4$.

a) Express the result in the form
$\frac{P(x)}{x-a} = Q(x) + \frac{R}{x-a}$.

b) Identify any restrictions on the variable.

c) Write the corresponding statement that can be used to check the division.

d) Verify your answer.

2. Divide the polynomial
$P(x) = x^4 - 3x^3 + 2x^2 + 55x - 11$ by $x + 3$.

a) Express the result in the form $\frac{P(x)}{x-a} = Q(x) + \frac{R}{x-a}$.

b) Identify any restrictions on the variable.

c) Verify your answer.

3. Determine each quotient using long division.

a) $(3x^2 - 13x - 2) \div (x - 4)$

b) $\frac{2x^3 - 10x^2 - 15x - 20}{x + 5}$

c) $(2w^4 + 3w^3 - 5w^2 + 2w - 27) \div (w + 3)$

4. Determine each remainder using long division.

a) $(3w^3 - 5w^2 + 2w - 27) \div (w - 5)$

b) $\frac{2x^3 - 8x^2 - 5x - 2}{x + 1}$

c) $(3x^2 - 13x - 2) \div (x + 2)$

5. Determine each quotient using synthetic division.

a) $(4w^4 + 3\text{w}^3 - 7w^2 + 2w - 1) \div (w + 2)$

b) $\frac{x^4 + 2x^3 - 8x^2 - 5x - 2}{x - 2}$

c) $(5y^4 + 2y^2 - y + 4) \div (y + 1)$

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6. Determine each remainder using synthetic division.

a) $(3x^2 - 16x + 5) \div (x - 5)$

b) $(2x^4 - 3x^3 - 5x^2 + 6x - 1) \div (x + 3)$

c) $(4x^3 + 5x^2 - 7) \div (x - 2)$

7. Use the remainder theorem to determine the remainder when each polynomial is divided by $x + 2$.

a) $-4x^4 - 3x^3 + 2x^2 - x + 5$

b) $7x^5 + 5x^4 + 23x^2 + 8$

c) $8x^3 - 1$

8. Determine the remainder resulting from each division.

a) $(3x^3 - 4x^2 + 6x - 9) \div (x + 1)$

b) $(3x^2 - 8x + 4) \div (x - 2)$

c) $(6x^3 - 5x^2 - 7x + 9) \div (x + 5)$

9. For $(2x^3 + 5x^2 - kx + 9) \div (x + 3)$, determine the value of k if the remainder is 6.

10. When $4x^2 - 8x - 20$ is divided by $x + k$, the remainder is 12. Determine the value(s) of k.