**LESSON 5.1**

**Evaluate the expression. Tell which properties of exponents you used.**

3

5

4















25 • 23 (5−2)2

3

7

4

4





**Write the answer in scientific notation.**

9

6

10

4

.

2

10

4

.

8







 (2.6 × 10−7)(l.3 × 102) (4.5 × 104)2

**Simplify the expression. Tell which properties of exponents you used.**

4

8

*x*

*x*

 (40*w*2)-5 (*y*4*z*2)(*y*−3*z*−5)

5

2

4

18

8







*ef*

*f*

*e*

7

3

6

0

4

16







*r*

*q*

*r*

*q*

***LESSON 5.2***

**Decide whether the function is a polynomial function. If it is, write the function in standard form and state the degree, type, and leading coefficient.**

*f*{*x*) = 7 − 2*x g*(*x*) = 2*x* − *x*3 + 8 *h*(*x*) = *x*4 − *x*3

**Use direct substitution to evaluate the polynomial function for the given value of *x*.**

*g*(*x*) = 7*x* − *x*4 + 1; *x* = −4

**Use synthetic substitution to evaluate the polynomial function for the given value of *x*.**

*f*(*x*) = 7*x*4 − 3*x*3 + *x*2 + 5*x* − 9; *x* = 2 *g*(*x*) = *x*3 − 8*x* + 6; *x* = −3

**Describe the end behavior of the graph of the polynomial function by completing these statements: *f(x)* →\_?\_\_ as *x* → − ∞ and *f(x)* → \_\_?\_\_as *x → + ∞.***

*f*(*x*) = −5*x*3**: as *x* → − ∞ *f(x)* →\_\_\_** *f*(*x*) = 2*x*5 − 7*x*2 − 4*x***: as *x* → − ∞ *f(x)* →\_\_\_**

*f*(*x*) = 2*x*8 + 9*x*7 + 10: **as *x → + ∞ , f(x)* → \_\_\_\_** *f*(*x*) = − 12*x*6 − 2*x* + 5: **as *x → + ∞, f(x)* → \_\_\_\_**

**LESSON 5.3**

**Find the sum or difference.**

(2*y*2 − 5*y*+ l) + (*y*2 − *y* − 4) (l0*v*4 − 2*v*2 + 6*v*3 − 7) − (9 − *v* + 2*v*4)

**Find the product.**

2*x*3(5*x* − 1) (*y* − l)(*y*2 + 6*y* −2) (4*t* + 1)2 (*z* − 5)3

**LESSON 5.4**

**Factor the polynomial completely.**

*x*3 + 125 64*n*3 − 27 *r*3 − 3*r*2 + 6*r* − 18 9*m*3 + 18*m*2 − 4*m* − 8

*x*4 − 36 *c*4 + 81 *x*4 + *x*2 − 20 *x*6 − 4

*d*4 − 7*d*2 + 10 24*q*3 − 81 *a*6 + 7*a*2 + 6 −4*x*4 + 26*x*2 − 30

**Find the real-number solutions of the equation.**

*n*4 + 6*n*3 = 0 4*k*3 = 9*k*2 *x*3 + 2*x*2 − 25*x* − 50 = 0 6*w*3 + 30*w*2 − 18*w* − 90 = 0

**LESSON 5.5**

**Divide using polynomial long division.**

(*x*2 + 5*x* − 14) ÷ (*x*−2) (*x*3 + *x* + 30) ÷ (*x* + 3)

**Divide using synthetic division.**

(*x*2 + 7*x* + 12) ÷ (*x* + 4) (*x*4 − 7*x*2 + 9*x* − 10) ÷ (*x* − 2)

**A polynomial *f* and a factor of *f* are given. Factor *f* completely.**

*f*(*x*) = *x*3 − 3*x*2 − 16*x* − 12; *x* − 6 *f*(*x*) = 3*x*3 − 16*x*2 − 103*x* + 36; *x* + 4

**A polynomial *f* and one zero of *f* are given. Find the other zeros of *f***

*f*(*x*) = *x*3 + 2*x*2 ‑ 20*x* + 24; −6 *f*(*x*) = *x*3 − 9*x*2 − 5*x* + 45; 9

**LESSON 5.6**

**List the possible *rational* zeros of the function using the rational zero theorem.**

*f*(*x*) *= x*4 *−* 6*x*3 + 8*x*2 *−* 21 *h*(*x*) *=* 2*x*3 + 7*x*2 *−* 7*x* + 30

**Find *all real* zeros of the function.**

*f*(*x*)= *x*3 *−* 3*x*2 *−* 6*x* + 8 *g*(*x*) = *x*3 + 4*x*2 *− x* *−* 4

**Use the graph to shorten the list of possible rational zeros of the function. Then find all real zeros of the function.**

*f*(*x*) *=* 4*x*3 *−* 8*x*2 *−* 15*x* + 9

**Find all real zeros of the function.**

*g*(*x*) = 2*x*3 + 4*x*2 *−* 2*x* *−* 4 *f*(*x*) *=* 2*x*3 *−* 5*x*2 *−* 14*x* + 8

**LESSON 5.7**

**Identify the number of solutions or zeros.**

*f*(*x*)***=***5*x*3 − 6*x*2 + 2*x* − 3

**Find *all the zeros* of the polynomial function.**

*h*(*x*)= *x*3 − 3*x*2 − *x* + 3 *h*(*x*) *=* 2*x*4 + *x*3 + *x*2 + *x* − 1

**Write a polynomial function *f* of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.**

1,2,5 −5, 0, −2*i*, 2*i*