Name: ______________________________ **Date:** ________________ **Period:** ____________________

SM3H - Ch 5 & 6 Test Review

1. Consider the given functions.

- $f(x) = x + 2$
- $g(x) = x^2 - 3.5x + 2.5$
- $h(x) = f(x) \cdot g(x) = (x + 2)(x^2 - 3.5x + 2.5)$

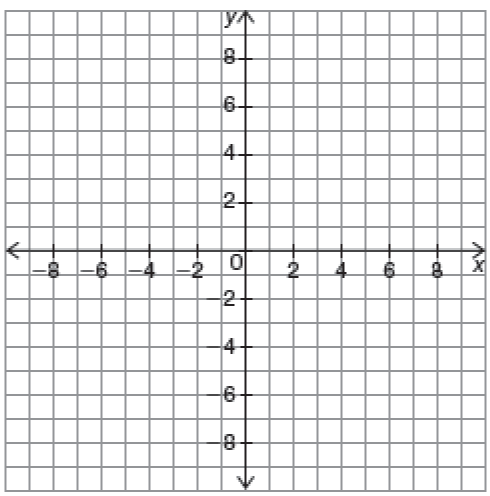
a. Determine the zeros of $f(x)$, $g(x)$, and $h(x)$.

b. How are the zeros of $h(x)$ related to the zeros of $f(x)$ and $g(x)$. Explain why this is true.

c. Write a function $m(x)$ that has the same zeros as $h(x)$ plus an additional zero of 5. Verify your answer graphically

2. Consider the function $f(x) = x^4 + x^2 - 5$.

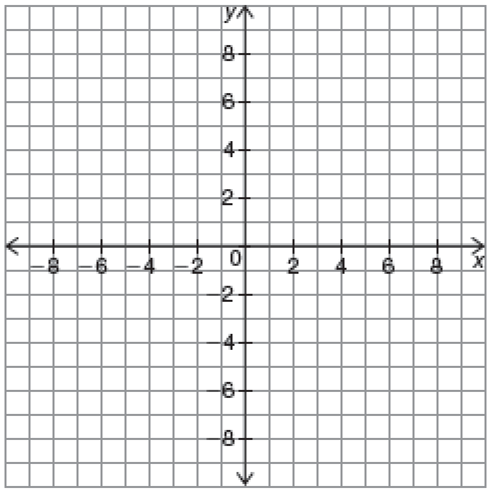
a. Graph the function. Verify that the function is even, odd, or neither by comparing 3 pairs of symmetric points and by describing the end behavior of the graph.



b. Verify algebraically that the function is even, odd, or neither.

3. Consider the function $f(x) = x^3 + x^2 - 6x$.

a. Graph the function. Verify that the function is even, odd, or neither by comparing 3 pairs of symmetric points and by describing the end behavior of the graph.



b. Verify algebraically that the function is even, odd, or neither.

4. Determine whether $2x - 4$ is a factor of $m(x) = 2x^4 - 8x^2 + 4$.

5. Determine whether $3x + 3$ is a factor of $p(x) = 3x^4 + 3x^3 - 6x^2 - 6x$.

6. Given: $\dfrac{f(x)}{(x-3)} = x^2 - 7x - 13 \, R \, 25$.

a. Determine $f(3)$ using the Remainder Theorem. Explain your reasoning.

b. Determine $f(x)$.

c. Determine whether $x - 8$ is a factor of $f(x)$. Explain your reasoning.

d. Determine $f(8)$ using the Factor Theorem. Explain your reasoning.

e. Completely factor $f(x)$.

7. Use the Rational Root Theorem to solve $2x^4 - 9x^3 + 11x^2 - 9x + 9 = 0$.

8. Consider $(v + w)^8$.

a. Use Pascal's Triangle to expand $(v + w)^8$.

b. Determine the coefficient of v^5w^3 in the expansion of $(v + w)^8$.

c. Determine the coefficient of v^5w^3 in the expansion of $(2v + w)^8$.

d. Determine the coefficient of v^4w^4 in the expansion of $(2v + 3w)^8$.

9. Expand $(3m-n)^6$.

10. Determine the coefficient of c^5d^4 in the expansion of $(2c+3d)^9$.

11. Determine the coefficient of j^7k^3 in the expansion of $(2j-k)^{10}$

Determine the product of three linear factors.

12. $(2x-1)(2x+1)(x+4)$

13. $0.25x(12x-1)(8-3x)$

Determine the product of linear and quadratic factors.

14. $(-2.3+1.1x+0.9x^2)(4.5x-3.8)$

15. $\left(-\frac{3}{4}x^2+\frac{1}{8}\right)\left(\frac{1}{4}-\frac{7}{8}x\right)$

Determine algebraically whether each function is even, odd, or neither.

16. $f(x)=x^3-4x+3$

17. $f(x)=5x^2+13$

18. $f(x)=3x^5-x$

Determine each quotient using polynomial long division. Write the dividend as the product of the divisor and the quotient plus the remainder.

19. $x-4\,\overline{)\,2x^3-7x^2-19x+60}$

20. $x+3\,\overline{)\,x^3+8x^2+7x+5}$

Determine each quotient using synthetic division. Write the dividend as the product of the divisor and the quotient plus the remainder.

21. $(x^4+8x^3-3x^2-24x)\div(x-3)$

22. $(x^4-3x^3+6x^2-12x+8)\div(x-1)$

Factor each expression completely.

23. $x^2+12x-13$

24. $x^2 + 6x + 8$

Factor each expression by factoring out the greatest common factor.

25. $2x^5 - 8x^4 + 10x^3$

26. $-9x^4 + 45x^3 - 9x^2$

27. $8x^4 - 16x^3 + 56x^2 - 24x$

Factor each expression completely using the chunking method.

28. $4x^2 + 8x + 3$

29. $25x^2 - 35x + 12$

Factor each expression completely using the factor by grouping method.

30. $x^3 - 2x^2 + 3x - 6$

31. $x^3 + x^2 - 4x - 4$

Factor each quartic expression completely using the quadratic form method.

32. $x^4 - 13x^2 + 36$

33. $x^4 - 50x^2 + 49$

Factor each binomial using the sum or difference of perfect cubes formula.

34. $x^3 + 27$

35. $8x^3 - 125$

Factor each binomial completely over the set of real numbers using the difference of squares method.

36. $x^2 - 100$

37. $x^4 - 36$

Factor each perfect square trinomial.

38. $4x^2 + 12x + 9$

39. $x^2 - 12xy + 36y^2$

SM3 - Ch 5 & 6 Test Review
Answer Section

1. ANS:

a. By graphing each function, I can determine that $f(x)$ has a zero of -2, $g(x)$ has zeros of 1 and 2.5, and $h(x)$ has zeros of -2, 1, and 2.5.

b. The zeros of $h(x)$ are the combined zeros of $f(x)$ and $g(x)$. This is true because the factors of $h(x)$ are the single factor of $f(x)$ and the two factors of $g(x)$. The factors of a function are directly related to the zeros.

c. Answers will vary.

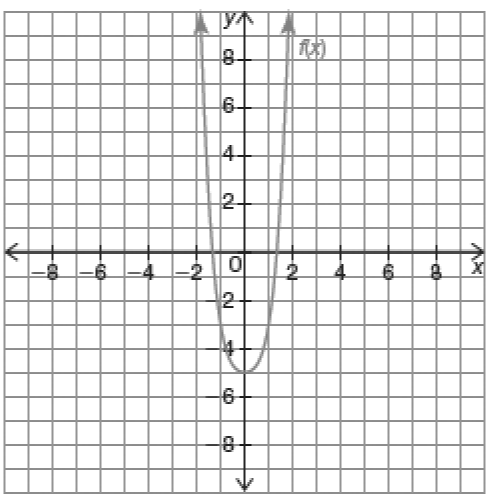
$$m(x) = (x-5)(x+2)(x^2 - 3.5x + 2.5)$$

By graphing, I see that the function $m(x)$ has the same zeros as $h(x)$ plus an additional zero of 5, because it crosses the x-axis at $(-2, 0)$, (1, 0), (2.5, 0), and (5, 0).

PTS: 1 REF: 5.1 NAT: A.SSE.1.a | A.SSE.1.b | A.APR.1 | F.IF.7.c
TOP: Assignment KEY: relative maximum | relative minimum | cubic function | multiplicity

2. ANS:

a.



The graph is symmetric about the y-axis. The point (1, 7) is symmetric to the point $(-1, 7)$. The point (2, 25) is symmetric to the point $(-2, 25)$. The point (3, 95) is symmetric to the point $(-3, 95)$. As $x \to \infty$, $f(x) \to \infty$. As $x \to -\infty$, $f(x) \to \infty$ The end behavior is indicative of an even function.

b.

$$f(-x) = (-x)^4 + (-x)^2 + 5$$
$$= x^4 + x^2 + 5$$

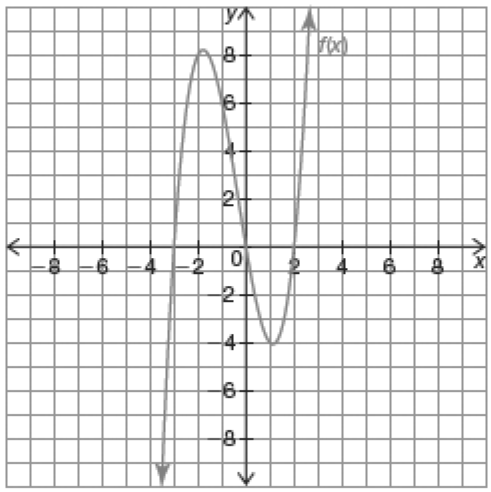
The function is even because $f(x) = f(-x)$.

PTS: 1 REF: 5.2 NAT: F.IF.4 | F.IF.7.a | F.IF.7.c
TOP: Assignment
KEY: power function | end behavior | symmetric about a line | symmetric about a point | even function | odd

function

3. ANS:

a.



The graph is not symmetric about the *y*-axis. As $x \to \infty$, $f(x) \to \infty$. As $x \to -\infty$, $f(x) \to -\infty$. The end behavior is indicative of an odd function. However, the graph is not symmetric about the origin. So, this function is neither even nor odd.

b. $f(-x) = (-x)^3 + (-x)^2 - 6(-x)$

$= -x^3 + x^2 + 6x$

The function is not even because $f(x) \neq f(-x)$.

$-f(-x) = x^3 - x^2 - 6x$

The function is not odd because $f(x) \neq -f(-x)$.

The function is neither even nor odd.

PTS: 1 REF: 5.2 NAT: F.IF.4 | F.IF.7.a | F.IF.7.c

TOP: Assignment

KEY: power function | end behavior | symmetric about a line | symmetric about a point | even function | odd function

4. ANS:

The expression $2x - 4$ can be factored as $2(x - 2)$. I can determine whether $x - 2$ is a factor of $m(x) = 2x^4 - 8x^2 + 4$ using synthetic division.

2	2	0	−8	0	4
		4	8	0	0
	2	4	0	0	4

The expression $x - 2$ is not a factor of $m(x) = 2x^4 - 8x^2 + 4$, because the quotient has a remainder. Therefore, $2x - 4$ is not a factor of $m(x) = 2x^4 - 8x^2 + 4$.

PTS: 1 REF: 6.2 NAT: A.SSE.1.a | A.SSE.3.a | A.APR.1

TOP: Assignment KEY: polynomial long division | synthetic division

5. ANS:

The expression $3x + 3$ can be factored as $3(x + 1)$. I can determine whether $x + 1$ is a factor of $p(x) = 3x^4 + 3x^3 - 6x^2 - 6x$ using synthetic division.

-1	3	3	-6	-6	0
		-3	0	6	0
	3	0	-6	0	0

The expression $x + 1$ is a factor of $p(x) = 3x^4 + 3x^3 - 6x^2 - 6x$ because the quotient has no remainder. Therefore, $3x + 3$ is a factor of $p(x) = 3x^4 + 3x^3 - 6x^2 - 6x$. The function may be rewritten as $p(x) = (x + 1)(3x^3 - 6x)$ or as $p(x) = (3x + 3)(x^3 - 2x)$.

PTS: 1 REF: 6.2 NAT: A.SSE.1.a | A.SSE.3.a | A.APR.1
TOP: Assignment KEY: polynomial long division | synthetic division

6. ANS:

a. According to the Remainder Theorem, the value of the function at $x = 3$ is equal to the remainder when *f*(*x*) is divided by the factor $x - 3$. Therefore, $f(3) = 25$.

b. $f(x) = (x - 3)(x^2 - 7x - 13) + 25$

$f(x) = x^3 - 7x^2 - 13x - 3x^2 + 21x + 39 + 25$

$f(x) = x^3 - 10x^2 + 8x + 64$

c.

8	1	-10	8	64
		8	-16	-64
	1	-2	-8	0

According to the Factor Theorem, $x - 8$ is a factor of *f*(*x*) if and only if $f(8) = 0$ and $\frac{f(x)}{x-8}$ has a remainder of zero. Therefore, $x - 8$ is a factor of *f*(*x*).

d. According to the Factor Theorem, $x - 8$ is a factor of *f*(*x*) if and only if $f(8) = 0$ and $\frac{f(x)}{x-8}$ has a remainder of zero. Therefore, $f(8) = 0$ because $x - 8$ is a factor of *f*(*x*).

e. $f(x) = (x - 8)(x^2 - 2x - 8)$

$f(x) = (x - 8)(x + 2)(x - 4)$

PTS: 1 REF: 6.3 NAT: A.APR.2 TOP: Assignment
KEY: Remainder Theorem | Factor Theorem

7. ANS:

Factors of *p*: $\pm 1, \pm 3, \pm 9$

Factors of q: $\pm 1, \pm 2$

Possible rational roots $\left(\frac{p}{q}\right)$: $\pm\frac{1}{2}, \pm\frac{3}{2}, \pm\frac{9}{2}, \pm 1, \pm 3, \pm 9$

$$\begin{array}{r|rrrrr} 3 & 2 & -9 & 11 & -9 & 9 \\ & & 6 & -9 & 6 & -9 \\ \hline & 2 & -3 & 2 & -3 & 0 \end{array}$$

I can rewrite the original polynomial equation as $(x-3)(2x^3-3x^2+2x-3)=0$. I can factor the equation $2x^3-3x^2+2x-3=0$ by grouping.

$$\begin{aligned} 2x^3-3x^2+2x-3 &= x^2(2x-3)+1(2x-3) \\ &= (x^2+1)(2x-3) \end{aligned}$$

Now, I can rewrite the original polynomial equation as $(x-3)(x^2+1)(2x-3)=0$. I can factor the expression x^2+1 by solving the equation $x^2+1=0$.

$$\begin{aligned} x^2+1 &= 0 \\ x^2 &= -1 \\ x &= \pm\sqrt{-1} \\ x &= \pm i \end{aligned}$$

Lastly, I can rewrite the original polynomial equation as $(x-3)(x+i)(x-i)(2x-3)=0$.

The solutions are $x=3$, $x=-i$, $x=i$, and $x=\frac{3}{2}$.

PTS: 1 REF: 6.5 NAT: A.APR.2 | F.IF.8.a
TOP: Assignment KEY: Rational Root Theorem

8. ANS:

a. $(v+w)^8 = v^8+8v^7w+28v^6w^2+56v^5w^3+70v^4w^4+56v^3w^5+28v^2w^6+8vw^7+w^8$

b. The coefficient of v^5w^3 in the expansion of $(v+w)^8$ is 56.

c. The coefficient of v^5w^3 in the expansion of $(v+w)^8$ is 56. The coefficient of v^5w^3 in the expansion of $(2v+w)^8$ is $2^5\cdot 1^3\cdot 56$ or 1792.

d. The coefficient of v^4w^4 in the expansion of $(v+w)^8$ is 70. The coefficient of v^4w^4 in the expansion of $(2v+3w)^8$ is $2^4\cdot 3^4\cdot 70$ or 90,720.

PTS: 1 REF: 6.7 NAT: A.APR.5 TOP: Assignment

KEY: Binomial Theorem

9. ANS:

$$(a+b)^6 = \binom{6}{0}a^6b^0 + \binom{6}{1}a^5b^1 + \binom{6}{2}a^4b^2 + \binom{6}{3}a^3b^3 + \binom{6}{4}a^2b^4 + \binom{6}{5}a^1b^5 + \binom{6}{6}a^0b^6$$

$$= a^6b^0 + 6a^5b^1 + 15a^4b^2 + 20a^3b^3 + 15a^2b^4 + 6a^1b^5 + a^0b^6$$

Let $a = 3m$ and $b = -n$.

$$(3m-n)^6 = (3m)^6 + 6(4m)^5(-n) + 15(3m)^4(-n)^2 + 20(3m)^3(-n)^3 + 15(3m)^2(-n)^4 + 6(3m)(-n)^5 + (-n)^6$$

$$= 729m^6 = 6(243m^5)(-n) + 15(81m^4)(n^2) + 20(27m^3)(-n^3) + 15(9m)^2(n^4) + 6(3m)(-n)^5 + n^6$$

$$= 729m^6 - 1458m^5n + 1215m^4n^2 - 540m^3n^3 + 135m^2n^4 - 18mn^5 + n^6$$

PTS: 1 REF: 6.7 NAT: A.APR.5 TOP: Assignment
KEY: Binomial Theorem

10. ANS:

The coefficient of c^5d^4 in the expansion of $(c+d)^9$ is ${}_9C_5$.

$${}_9C_5 = \frac{9!}{5!(4!)}$$

$$= 126$$

The coefficient of c^5d^4 in the expansion of $(2c+3d)^9$ is $25 \cdot 34 \cdot 126$ or 326,592.

PTS: 1 REF: 6.7 NAT: A.APR.5 TOP: Assignment
KEY: Binomial Theorem

11. ANS:

The coefficient of j^7k^3 in the expansion of $(j+k)^{10}$ is ${}_{10}C_7$.

$${}_{10}C_7 = \frac{10!}{7!(3!)}$$

$$= 120$$

The coefficient of j^7k^3 in the expansion of $(2j-k)^{10}$ is $2^7 \cdot (-1)^3 \cdot 120$ or $-15,360$.

PTS: 1 REF: 6.7 NAT: A.APR.5 TOP: Assignment
KEY: Binomial Theorem

12. ANS:

$$(2x-1)(2x+1)(x+4) = (4x^2 + 2x - 2x - 1)(x+4)$$

$$= (4x^2 - 1)(x+4)$$

$$= 4x^3 + 16x^2 - x - 4$$

The graph of the original expression and the graph of the final expression are the same. So the expressions are equivalent.

PTS: 1 REF: 5.1 NAT: A.SSE.1.a | A.SSE.1.b | A.APR.1 | F.IF.7.c
TOP: Skills Practice
KEY: relative maximum | relative minimum | cubic function | multiplicity

13. ANS:

$$0.25x(12x-1)(8-3x) = (3x^2-0.25x)(8-3x)$$
$$= 24x^2-9x^3-2x+0.75x^2$$
$$= -9x^3+24.75x^2-2x$$

The graph of the original expression and the graph of the final expression are the same. So the expressions are equivalent.

PTS: 1 REF: 5.1 NAT: A.SSE.1.a | A.SSE.1.b | A.APR.1 | F.IF.7.c
TOP: Skills Practice
KEY: relative maximum | relative minimum | cubic function | multiplicity

14. ANS:

$$(-2.3+1.1x+0.9x^2)(4.5x-3.8) = -10.35x+8.74+4.95x^2-4.18x+4.05x^3-3.42x^2$$
$$= 4.05x^3+1.53x^2-14.53x+8.74$$

The graph of the original expression and the graph of the final expression are the same. So the expressions are equivalent.

PTS: 1 REF: 5.1 NAT: A.SSE.1.a | A.SSE.1.b | A.APR.1 | F.IF.7.c
TOP: Skills Practice
KEY: relative maximum | relative minimum | cubic function | multiplicity

15. ANS:

$$\left(-\frac{3}{4}x^2+\frac{1}{8}\right)\left(\frac{1}{4}-\frac{7}{8}x\right) = -\frac{3}{16}x^2+\frac{21}{32}x^3+\frac{1}{32}-\frac{7}{64}x$$
$$= \frac{21}{32}x^3-\frac{3}{16}x^2-\frac{7}{64}x+\frac{1}{32}$$

The graph of the original expression and the graph of the final expression are the same. So the expressions are equivalent.

PTS: 1 REF: 5.1 NAT: A.SSE.1.a | A.SSE.1.b | A.APR.1 | F.IF.7.c
TOP: Skills Practice
KEY: relative maximum | relative minimum | cubic function | multiplicity

16. ANS:

$f(x) = x^3 - 4x + 3$

$f(-x) = (-x)^3 - 4(-x) + 3$

$f(-x) = -x^3 + 4x - 3$

$-f(x) = -(x^3 - 4x + 3)$

$-f(x) = -x^3 + 4x - 3$

$f(x) \neq f(-x)$ or $-f(x)$ thus $f(x)$ is neither even nor odd.

PTS: 1 REF: 5.2 NAT: F.IF.4 | F.IF.7.a | F.IF.7.c
TOP: Skills Practice
KEY: power function | end behavior | symmetric about a line | symmetric about a point | even function | odd function

17. ANS:

$f(x) = 5x^2 + 13$

$f(-x) = 5(-x)^2 + 13$

$f(-x) = 5x^2 + 13$

$f(x) = f(-x)$ thus $f(x)$ is even.

PTS: 1 REF: 5.2 NAT: F.IF.4 | F.IF.7.a | F.IF.7.c
TOP: Skills Practice
KEY: power function | end behavior | symmetric about a line | symmetric about a point | even function | odd function

18. ANS:

$f(x) = 3x^5 - x$

$f(-x) = 3(-x)^5 - (-x)$

$f(-x) = -3x^5 + x$

$-f(x) = -(3x^5 - x)$

$-f(x) = -3x^5 + x$

$f(-x) = -f(x)$ thus $f(x)$ is odd.

PTS: 1 REF: 5.2 NAT: F.IF.4 | F.IF.7.a | F.IF.7.c
TOP: Skills Practice
KEY: power function | end behavior | symmetric about a line | symmetric about a point | even function | odd function

19. ANS:

$$\begin{array}{r} 2x^2 + x - 15 \\ x-4 \overline{\smash{\big)}\, 2x^3 - 7x^2 - 19x + 60} \\ \underline{2x^3 - 8x^2 } \\ x^2 - 19x \\ \underline{x^2 - 4x } \\ -15x + 60 \\ \underline{-15x + 60} \\ 0 \end{array}$$

$$2x^3 - 7x^2 - 19x + 60 = (x-4)(2x^2 + x - 15)$$

PTS: 1 REF: 6.2 NAT: A.SSE.1.a | A.SSE.3.a | A.APR.1
TOP: Skills Practice KEY: polynomial long division | synthetic division

20. ANS:

$$\begin{array}{r} x^2 + 5x - 8 \\ x+3 \overline{\smash{\big)}\, x^3 + 8x^2 + 7x + 5} \\ \underline{x^3 + 3x^2 } \\ 5x^2 + 7x \\ \underline{5x^2 + 15x } \\ -8x + 5 \\ \underline{-8x - 24} \\ 29 \end{array}$$

$$x^3 + 8x^2 + 7x + 5 = (x+3)\left((x^2 + 5x - 8) + \frac{29}{x+3}\right)$$

PTS: 1 REF: 6.2 NAT: A.SSE.1.a | A.SSE.3.a | A.APR.1
TOP: Skills Practice KEY: polynomial long division | synthetic division

21. ANS:

3	1	8	−3	−24	0
		3	33	90	108
	1	11	30	66	108

$$x^4 + 8x^3 - 3x^2 - 24x = (x-3)\left((x^3 + 11x^2 + 30x + 66) + \frac{108}{x-3}\right)$$

PTS: 1 REF: 6.2 NAT: A.SSE.1.a | A.SSE.3.a | A.APR.1
TOP: Skills Practice KEY: polynomial long division | synthetic division

22. ANS:

1	1	−3	6	−12	8
		1	−2	4	−8
	1	−2	4	−8	0

$x^4 - 3x^3 + 6x^2 - 12x + 8 = (x-1)(x^3 - 2x^2 + 4x - 8)$

PTS: 1 REF: 6.2 NAT: A.SSE.1.a | A.SSE.3.a | A.APR.1
TOP: Skills Practice KEY: polynomial long division | synthetic division

23. ANS:
$x^2 + 12x - 13 = (x+13)(x-1)$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

24. ANS:
$x^2 + 6x + 8 = (x+2)(x+4)$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

25. ANS:
$2x^5 - 8x^4 + 10x^3 = 2x^3(x^2 - 4x + 10)$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

26. ANS:
$-9x^4 + 45x^3 - 9x^2 = -9x^2(x^2 + 5x + 1)$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

27. ANS:
$8x^4 - 16x^3 + 56x^2 - 24x = 8x(x^3 - 2x^2 + 7x - 3)$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

28. ANS:

$$4x^2 + 8x + 3 = (2x)^2 + 4(2x) + 3$$

Let $z = 2x$

$$= z^2 + 4z + 3$$

$$= (z + 1)(z + 3)$$

$$= (2x + 1)(2x + 3)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

29. ANS:

$$25x^2 - 35x + 12 = (5x)^2 - 7(5x) + 12$$

Let $z = 5x$

$$= z^2 - 7z + 12$$

$$= (z - 3)(z - 4)$$

$$= (5x - 3)(5x - 4)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

30. ANS:

$$x^3 - 2x^2 + 3x - 6 = x^2(x - 2) + 3(x - 2)$$

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

$$= (x + i\sqrt{3})(x - i\sqrt{3})(x - 2)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

31. ANS:

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

$$= (x^2 - 4)(x + 1)$$

$$= (x + 2)(x - 2)(x + 1)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

32. ANS:

$$x^4 - 13x^2 + 36 = (x^2 - 4)(x^2 - 9)$$

$$= (x - 2)(x + 2)(x - 3)(x + 3)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

33. ANS:

$$x^4 - 50x^2 + 49 = (x^2 - 1)(x^2 - 49)$$

$$= (x - 1)(x + 1)(x - 7)(x + 7)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

34. ANS:

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$x^3 + 27 = (x)^3 + (3)^3$$

$$= (x+3)(x^2 - 3x + 9)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

35. ANS:

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$8x^3 - 125 = (2x)^3 - (5)^3$$

$$= (2x-5)(4x^2 + 10x + 25)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

36. ANS:

$$a^2 - b^2 = (a+b)(a-b).$$

$$x^2 - 100 = (x+10)(x-10)$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

37. ANS:

$$a^2 - b^2 = (a+b)(a-b).$$

$$x^4 - 36 = (x^2)^2 - (6)^2$$

$$= (x^2+6)(x^2-6)$$

$$= (x^2+6)(x-\sqrt{6})(x+\sqrt{6})$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

38. ANS:

$$a^2 + 2ab + b^2 = (a+b)^2$$

$$4x^2 + 12x + 9 = (2x)^2 + 2(2x)(3) + (3)^2$$

$$= (2x+3)^2$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

39. ANS:

$$a^2 - 2ab + b^2 = (a - b)^2$$
$$x^2 - 12xy + 36y^2 = (x)^2 - 2(x)(6y) + (6y)^2$$
$$= (x - 6y)^2$$

PTS: 1 REF: 6.4 NAT: N.CN.8 | A.SSE.2 | A.APR.3 | F.IF.8.a
TOP: Skills Practice

40. ANS:

$$p = \pm 1,\ \pm 2,\ \pm 4,\ \pm 8$$
$$q = \pm 1$$
$$\frac{p}{q} = \pm 1, \pm 2,\ \pm 4,\ \pm 8$$

PTS: 1 REF: 6.5 NAT: A.APR.2 | F.IF.8.a
TOP: Skills Practice KEY: Rational Root Theorem