Name: ________________________ Class: ___________________ Date: __________ ID: A

POlynomials

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Write $4x^2(-2x^2 + 5x^3)$ in standard form. Then classify it by degree and number of terms.
a. $2x + 9x^4$; quintic binomial
b. $20x^5 - 8x^4$; quintic binomial
c. $2x^5 - 8x^4$; quintic trinomial
d. $20x^5 - 10x^4$; quartic binomial

____ 2. Write $-2x^2(-x^2 - 2x^3)$ in standard form. Then classify it by degree and number of terms.
a. $-3x - 4x^4$; quintic binomial
b. $-3x^5 + 2x^4$; quintic trinomial
c. $4x^5 + 2x^4$; quartic binomial
d. $4x^5 + 2x^4$; quintic binomial

____ 3. Zach wrote the formula $w(w - 1)(4w + 5)$ for the volume of a rectangular prism he is designing, with width w, which is always has a positive value greater than 1. Find the product and then classify this polynomial by degree and by number of terms.
a. $4w^4 + w^3 - 5w^2$; quartic trinomial
b. $4w^5 + w^4 - 5w^3$; quintic trinomial
c. $4w^3 + w^2 - 5w$; cubic trinomial
d. $20w^2$; quadratic monomial

____ 4. Write the polynomial $\dfrac{6x^2 - 9x^3 + 3}{3}$ in standard form.
a. $-3x^3 + 2x^2 + 1$
b. $2x^2 - 3x^3 + 1$
c. $-3x^3 + 2x^2$
d. $2x^2 - 3x^3$

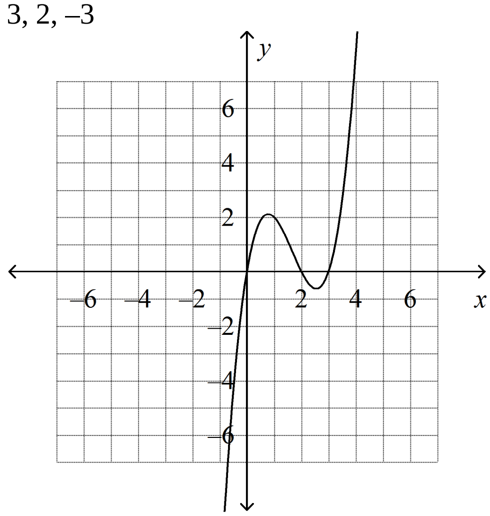
____ 5. Write the expression $(x + 6)(x - 4)$ as a polynomial in standard form.
a. $x^2 - 10x + 2$
b. $x^2 + 10x - 24$
c. $x^2 + 2x - 24$
d. $x^2 + 10x - 10$

____ 6. Write $6x^3 - 54x^2 + 108x$ in factored form.
a. $6x(x - 6)(x - 3)$
b. $6x(x - 3)(x + 6)$
c. $-3x(x + 6)(x - 6)$
d. $-6x(x - 3)(x + 6)$

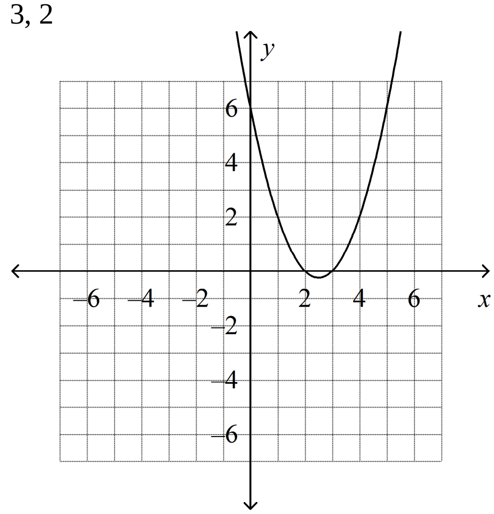
____ 7. Use a graphing calculator to find the relative minimum, relative maximum, and zeros of $y = 3x^3 + 15x^2 - 12x - 60$. If necessary, round to the nearest hundredth.
a. relative minimum: (–62.24, 0.36), relative maximum: (37.79, –3.69), zeros: $x = 5, -2, 2$
b. relative minimum: (0.36, –62.24), relative maximum: (–3.69, 37.79), zeros: $x = -5, -2, 2$
c. relative minimum: (0.36, –62.24), relative maximum: (–3.69, 37.79), zeros: $x = 5, -2$
d. relative minimum: (–62.24, 0.36), relative maximum: (37.79, –3.69), zeros: $x = -5, -2$

____ 8. Find the zeros of $y = x(x - 3)(x - 2)$. Then graph the equation.

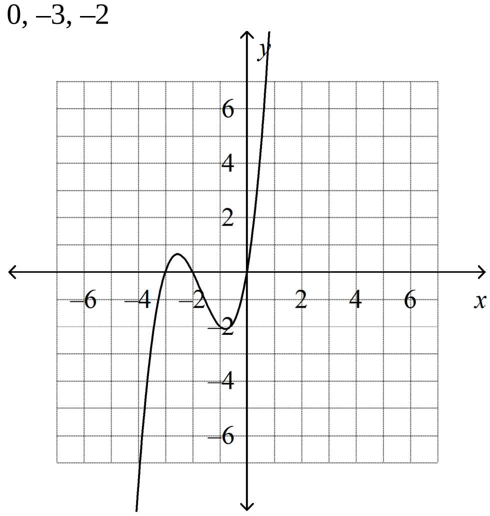
a. 3, 2, –3



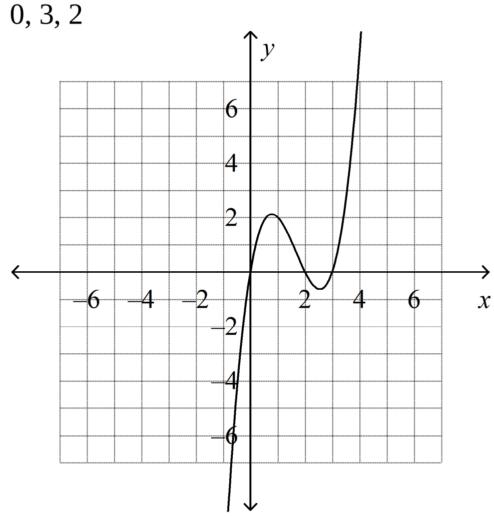
c. 3, 2



b. 0, –3, –2



d. 0, 3, 2



____ 9. Divide $3x^3 - 3x^2 - 4x + 3$ by $x + 3$.

a. $3x^2 - 12x + 32$
c. $3x^2 + 6x - 40$
b. $3x^2 - 12x + 32$, R –93
d. $3x^2 + 6x - 40$, R 99

____ 10. Determine which binomial is *not* a factor of $4x^4 - 21x^3 - 46x^2 + 219x + 180$.

a. $x + 4$
c. $x - 5$
b. $x + 3$
d. $4x + 3$

____ 11. Determine which binomial is a factor of $-2x^3 + 14x^2 - 24x + 20$.

a. $x + 5$
b. $x + 20$
c. $x - 24$
d. $x - 5$

Divide using synthetic division.

____ 12. $(x^4 + 15x^3 - 77x^2 + 13x - 36) \div (x - 4)$

a. $x^3 - 23x^2 - 75x - 5$
c. $x^3 - x^2 + 9x + 19$
b. $x^3 + 15x^2 - 23x - 5$
d. $x^3 + 19x^2 - x + 9$

____ 13. $(x^3 + 4 - 11x + 3x^2) \div (6 + x)$

a. $x^2 - 5x$, R 70
c. $x^2 - 3x + 7$, R 46
b. $x^2 - 5x$, R –62
d. $x^2 - 3x + 7$, R –38

____ 14. Use synthetic division to find $P(2)$ for $P(x) = x^4 + 3x^3 - 6x^2 - 10x + 8$.

a. 2 b. 28 c. 4 d. –16

Solve the equation by graphing.

____ 15. $x^2 + 7x + 19 = 0$

a. $x = 49$ b. no solution c. $x = 19$ d. $x = 12$

____ 16. $-8x^3 - 13x^2 + 6x = 0$

a. no solution
c. 0, 2, –0.38
b. –2, 0.38
d. 0, –2, 0.38

____ 17. $6x = 9 + x^2$

a. 3 b. –3 c. –3, 3 d. no solution

Factor the expression.

____ 18. $x^3 + 216$

a. $(x - 6)(x^2 + 6x + 36)$
c. $(x - 6)(x^2 - 6x + 36)$
b. $(x + 6)(x^2 - 6x + 36)$
d. $(x + 6)(x^2 + 6x + 72)$

____ 19. $c^3 - 512$

a. $-(c - 8)(c^2 + 8c + 64)$
c. $(c + 8)(c^2 + 8c + 64)$
b. $(c - 8)(c^2 + 8c + 64)$
d. $(c - 8)(c^2 - 8c - 64)$

____ 20. $x^4 - 20x^2 + 64$

a. $(x - 2)(x - 2)(x + 4)(x + 4)$
c. $(x - 2)(x + 2)(x - 4)(x + 4)$
b. $(x - 2)(x - 4)(x^2)$
d. no solution

____ 21. Use the Rational Root Theorem to list all possible rational roots of the polynomial equation $x^3 + x^2 - 7x - 4 = 0$. Do not find the actual roots.

a. –4, –2, –1, 1, 2, 4
c. 1, 2, 4
b. no roots
d. –4, –1, 1, 4

____ 22. Find the rational roots of $x^4 + 8x^3 + 7x^2 - 40x - 60 = 0$.

a. 2, 6 b. –6, –2 c. –2, 6 d. –6, 2

Find the roots of the polynomial equation.

____ 23. $x^3 - 2x^2 + 10x + 136 = 0$

a. $-3 \pm 5i$, –4
c. $-3 \pm i$, 4
b. $3 \pm 5i$, –4
d. $3 \pm i$, 4

____ 24. Find all zeros of $2x^4 - 5x^3 + 53x^2 - 125x + 75 = 0$.

a. $-1, -\frac{3}{2}, \pm 5i$

b. $1, \frac{3}{2}, \pm 5i$

c. $1, \frac{3}{2}, \pm 5$

d. $-1, -\frac{3}{2}, \pm 5$

Essay

25. Find the rational roots of $4x^3 - 3x - 1 = 0$. Explain the process you use and show your work.

Other

26. What are multiple zeros? Explain how you can tell if a function has multiple zeros.

27. Use division to prove that $x = 3$ is a real zero of $y = -x^3 + 9x^2 - 38x + 60$.

POlynomials
Answer Section

MULTIPLE CHOICE

1. ANS: B PTS: 1 DIF: L3 REF: 6-1 Polynomial Functions
OBJ: 6-1.1 Exploring Polynomial Functions
NAT: NAEP A2g | CAT5.LV21/22.50 | CAT5.LV21/22.53 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.DI | S9.TSK3.DSP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.DSP | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.16 | TV.LV21/22.18 | TV.LVALG.53 | ADP I.4.2
STA: KY-MA-HS-4.2.3a | KY-MA-HS-5.1.1 TOP: 6-1 Example 1
KEY: degree of a polynomial | polynomial | standard form of a polynomial
2. ANS: D PTS: 1 DIF: L3 REF: 6-1 Polynomial Functions
OBJ: 6-1.1 Exploring Polynomial Functions
NAT: NAEP A2g | CAT5.LV21/22.50 | CAT5.LV21/22.53 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.DI | S9.TSK3.DSP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.DSP | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.16 | TV.LV21/22.18 | TV.LVALG.53 | ADP I.4.2
STA: KY-MA-HS-4.2.3a | KY-MA-HS-5.1.1 TOP: 6-1 Example 1
KEY: degree of a polynomial | polynomial | standard form of a polynomial
3. ANS: C PTS: 1 DIF: L3 REF: 6-1 Polynomial Functions
OBJ: 6-1.1 Exploring Polynomial Functions
NAT: NAEP A2g | CAT5.LV21/22.50 | CAT5.LV21/22.53 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.DI | S9.TSK3.DSP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.DSP | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.16 | TV.LV21/22.18 | TV.LVALG.53 | ADP I.4.2
STA: KY-MA-HS-4.2.3a | KY-MA-HS-5.1.1 TOP: 6-1 Example 1
KEY: degree of a polynomial | polynomial
4. ANS: A PTS: 1 DIF: L2 REF: 6-1 Polynomial Functions
OBJ: 6-1.1 Exploring Polynomial Functions
NAT: NAEP A2g | CAT5.LV21/22.50 | CAT5.LV21/22.53 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.DI | S9.TSK3.DSP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.DSP | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.16 | TV.LV21/22.18 | TV.LVALG.53 | ADP I.4.2
STA: KY-MA-HS-4.2.3a | KY-MA-HS-5.1.1 TOP: 6-1 Example 1
KEY: polynomial | standard form of a polynomial
5. ANS: C PTS: 1 DIF: L2 REF: 6-2 Polynomials and Linear Factors
OBJ: 6-2.1 The Factored Form of a Polynomial
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP I.1.4 | ADP J.1.3 | ADP J.1.4 | ADP J.2.2 | ADP K.1.1 STA: KY-MA-HS-5.2.3a | KY-MA-HS-5.2.3b
TOP: 6-2 Example 1 KEY: polynomial | standard form of a polynomial
6. ANS: A PTS: 1 DIF: L2 REF: 6-2 Polynomials and Linear Factors
OBJ: 6-2.1 The Factored Form of a Polynomial
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP I.1.4 | ADP J.1.3 | ADP J.1.4 | ADP J.2.2 | ADP K.1.1 STA: KY-MA-HS-5.2.3a | KY-MA-HS-5.2.3b
TOP: 6-2 Example 2 KEY: factoring a polynomial | polynomial

7. ANS: B PTS: 1 DIF: L3 REF: 6-2 Polynomials and Linear Factors
OBJ: 6-2.1 The Factored Form of a Polynomial
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP I.1.4 | ADP J.1.3 | ADP J.1.4 | ADP J.2.2 | ADP K.1.1 STA: KY-MA-HS-5.2.3a | KY-MA-HS-5.2.3b
TOP: 6-2 Example 3
KEY: factoring a polynomial | graphing calculator | polynomial function | problem solving | x-intercept | relative maximum | relative minimum | zeros of a polynomial function
8. ANS: D PTS: 1 DIF: L2 REF: 6-2 Polynomials and Linear Factors
OBJ: 6-2.2 Factors and Zeros of a Polynomial Function
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP I.1.4 | ADP J.1.3 | ADP J.1.4 | ADP J.2.2 | ADP K.1.1 STA: KY-MA-HS-5.2.3a | KY-MA-HS-5.2.3b
TOP: 6-2 Example 4
KEY: Zero Product Property | polynomial function | zeros of a polynomial function | graphing
9. ANS: B PTS: 1 DIF: L2 REF: 6-3 Dividing Polynomials
OBJ: 6-3.1 Using Long Division
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP J.1.3 | ADP J.1.6 | ADP K.1.1
STA: KY-MA-HS-5.1.5e TOP: 6-3 Example 1
KEY: polynomial | division of polynomials
10. ANS: A PTS: 1 DIF: L4 REF: 6-3 Dividing Polynomials
OBJ: 6-3.1 Using Long Division
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP J.1.3 | ADP J.1.6 | ADP K.1.1
STA: KY-MA-HS-5.1.5e TOP: 6-3 Example 2
KEY: division of polynomials | polynomial | factoring a polynomial
11. ANS: D PTS: 1 DIF: L2 REF: 6-3 Dividing Polynomials
OBJ: 6-3.1 Using Long Division
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP J.1.3 | ADP J.1.6 | ADP K.1.1
STA: KY-MA-HS-5.1.5e TOP: 6-3 Example 2
KEY: division of polynomials | factoring a polynomial | polynomial
12. ANS: D PTS: 1 DIF: L3 REF: 6-3 Dividing Polynomials
OBJ: 6-3.2 Using Synthetic Division
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP J.1.3 | ADP J.1.6 | ADP K.1.1
STA: KY-MA-HS-5.1.5e TOP: 6-3 Example 3
KEY: division of polynomials | polynomial | synthetic division

13. ANS: D PTS: 1 DIF: L3 REF: 6-3 Dividing Polynomials
OBJ: 6-3.2 Using Synthetic Division
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP J.1.3 | ADP J.1.6 | ADP K.1.1
STA: KY-MA-HS-5.1.5e TOP: 6-3 Example 3
KEY: division of polynomials | polynomial | synthetic division
14. ANS: C PTS: 1 DIF: L2 REF: 6-3 Dividing Polynomials
OBJ: 6-3.2 Using Synthetic Division
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP J.1.3 | ADP J.1.6 | ADP K.1.1
STA: KY-MA-HS-5.1.5e TOP: 6-3 Example 5
KEY: division of polynomials | polynomial | synthetic division
15. ANS: B PTS: 1 DIF: L4 REF: 6-4 Solving Polynomial Equations
OBJ: 6-4.1 Solving Equations by Graphing
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.55 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | TV.LVALG.56 | ADP J.1.4
TOP: 6-4 Example 1
KEY: graphing | graphing calculator | solving equations | no solutions | polynomial function
16. ANS: D PTS: 1 DIF: L2 REF: 6-4 Solving Polynomial Equations
OBJ: 6-4.1 Solving Equations by Graphing
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.55 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | TV.LVALG.56 | ADP J.1.4
TOP: 6-4 Example 1
KEY: graphing | graphing calculator | solving equations | polynomial
17. ANS: A PTS: 1 DIF: L2 REF: 6-4 Solving Polynomial Equations
OBJ: 6-4.1 Solving Equations by Graphing
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.55 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | TV.LVALG.56 | ADP J.1.4
TOP: 6-4 Example 1
KEY: graphing | graphing calculator | solving equations | polynomial function
18. ANS: B PTS: 1 DIF: L2 REF: 6-4 Solving Polynomial Equations
OBJ: 6-4.2 Solving Equations by Factoring
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.55 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | TV.LVALG.56 | ADP J.1.4
TOP: 6-4 Example 3 KEY: polynomial | factoring a polynomial
19. ANS: B PTS: 1 DIF: L2 REF: 6-4 Solving Polynomial Equations
OBJ: 6-4.2 Solving Equations by Factoring
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.55 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | TV.LVALG.56 | ADP J.1.4
TOP: 6-4 Example 3 KEY: factoring a polynomial | polynomial

20. ANS: C PTS: 1 DIF: L2 REF: 6-4 Solving Polynomial Equations
OBJ: 6-4.2 Solving Equations by Factoring
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.55 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | TV.LVALG.56 | ADP J.1.4
TOP: 6-4 Example 5 KEY: factoring a polynomial | polynomial
21. ANS: A PTS: 1 DIF: L2
REF: 6-5 Theorems About Roots of Polynomial Equations OBJ: 6-5.1 The Rational Root Theorem
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.52 | TV.LVALG.53 | ADP K.1.1 TOP: 6-5 Example 1
KEY: polynomial function | root of a function | solving equations | Rational Root Theorem
22. ANS: B PTS: 1 DIF: L2
REF: 6-5 Theorems About Roots of Polynomial Equations OBJ: 6-5.1 The Rational Root Theorem
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.52 | TV.LVALG.53 | ADP K.1.1 TOP: 6-5 Example 1
KEY: polynomial function | Rational Root Theorem | root of a function | solving equations
23. ANS: B PTS: 1 DIF: L2
REF: 6-5 Theorems About Roots of Polynomial Equations OBJ: 6-5.1 The Rational Root Theorem
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.52 | TV.LVALG.53 | ADP K.1.1 TOP: 6-5 Example 2
KEY: polynomial function | Rational Root Theorem | solving equations | root of a function
24. ANS: B PTS: 1 DIF: L2
REF: 6-6 The Fundamental Theorem of Algebra
OBJ: 6-6.1 The Fundamental Theorem of Algebra
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.52 | TV.LVALG.53 | ADP K.1.1 TOP: 6-6 Example 2
KEY: Fundamental Theorem of Algebra | Rational Root Theorem | polynomial function | root of a function | zeros of a polynomial function

ESSAY

25. ANS:

[4] **Step 1:**
List the possible rational roots by using the Rational Root Theorem. The leading coefficient is 4 with factors of ±1, ±2, and ±4. The constant term is –1 with factors of –1 and 1. The only possible roots of the equation have the form $\frac{\text{factor of } -1}{\text{factor of } 4}$. Those roots would be ±1, $\pm\frac{1}{2}$, and $\pm\frac{1}{4}$.

Step 2:
Test each possible rational root in the equation. The only roots that satisfy the equation are $-\frac{1}{2}$ and 1.

[3] an error in computation or missing part of the explanation

[2] several errors in computation or in the explanation

[1] one root given with no explanation

PTS: 1 DIF: L4 REF: 6-5 Theorems About Roots of Polynomial Equations
OBJ: 6-5.1 The Rational Root Theorem
NAT: NAEP A4a | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.52 | TV.LVALG.53 | ADP K.1.1 TOP: 6-5 Example 1
KEY: extended response | polynomial function | Rational Root Theorem | root of a function | rubric-based question | writing in math

OTHER

26. ANS:

If a linear factor of a polynomial is repeated, then the zero is repeated and the function has multiple zeros. To determine whether a function has a multiple zero, factor the polynomial. If a factor is repeated in the factored expression, then it is a multiple zero.

PTS: 1 DIF: L3 REF: 6-2 Polynomials and Linear Factors
OBJ: 6-2.2 Factors and Zeros of a Polynomial Function
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | CAT5.LV21/22.56 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.GM | S9.TSK3.PRA | S10.TSK3.GM | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP I.1.4 | ADP J.1.3 | ADP J.1.4 | ADP J.2.2 | ADP K.1.1 STA: KY-MA-HS-5.2.3a | KY-MA-HS-5.2.3b
TOP: 6-2 Example 6
KEY: reasoning | factoring a polynomial | multiple zero | polynomial function | zeros of a polynomial function | writing in math

27. ANS:
$-x^3 + 9x^2 - 38x + 60 \div (x - 3) = -x^2 + 6x - 20$ with no remainder, so $x = 3$ is a real zero of the function.

PTS: 1 DIF: L3 REF: 6-3 Dividing Polynomials
OBJ: 6-3.2 Using Synthetic Division
NAT: NAEP A3b | NAEP A3c | CAT5.LV21/22.50 | CAT5.LV21/22.52 | IT.LV17/18.AM | IT.LV17/18.CP | S9.TSK3.NS | S9.TSK3.PRA | S10.TSK3.NS | S10.TSK3.PRA | TV.LV21/22.10 | TV.LV21/22.13 | TV.LV21/22.52 | TV.LVALG.53 | ADP J.1.3 | ADP J.1.6 | ADP K.1.1
STA: KY-MA-HS-5.1.5e TOP: 6-3 Example 5
KEY: division of polynomials | polynomial | polynomial function | root of a function | writing in math