



2003 MCAS Alternate Assessment/MCAS Performance Appeals
**WORK DESCRIPTION for Grade 10 Competency in
 MATHEMATICS**

[THE ATTACHED STUDENT WORK SAMPLES WERE TAKEN FROM SEVERAL PORTFOLIOS THAT SCORED "NEEDS IMPROVEMENT"]

The attached pieces of evidence address the following strands and learning standards:

<input checked="" type="checkbox"/> Number Sense and Operations	<input checked="" type="checkbox"/> 10.N.1	<input type="checkbox"/> 10.N.2
<input type="checkbox"/> Patterns, Relations, and Algebra	<input type="checkbox"/> 10.P.2	<input type="checkbox"/> 10.P.4 & 5 <input type="checkbox"/> 10.P.7
<input type="checkbox"/> Geometry	<input type="checkbox"/> 10.G.1 <input type="checkbox"/> 10.G.2 <input type="checkbox"/> 10.G.3 <input type="checkbox"/> 10.G.4 <input type="checkbox"/> 10.G.5 <input type="checkbox"/> 10.G.6	<input type="checkbox"/> 10.G.7 <input type="checkbox"/> 10.G.8 <input type="checkbox"/> 10.G.9 <input type="checkbox"/> 10.G.10 <input type="checkbox"/> 10.G.11
<input type="checkbox"/> Measurement	<input type="checkbox"/> 10.M.1 <input type="checkbox"/> 10.M.2 <input type="checkbox"/> 10.M.3	
<input type="checkbox"/> Data Analysis, Statistics, and Probability	<input type="checkbox"/> 10.D.1 <input type="checkbox"/> 10.D.2	

$$\frac{11}{12}$$

Name: **Student's Name**

Date: 4/2/03

Learning Standard: 10.N.1

Score: 92%

Identify the properties of the following and demonstrate how they work:

1. $5 + (6+3) = (5+6) + 3$

✓ $5+9$
✓ 14

✓ $5+6$
✓ $11+3=14$

✓ associative
(addition)

✓ $14=14$

2. $6(5) = 5(6)$

✓ $30=30$

✗ associative
(multiplication)

3. $4+5=5+4$

✓ $9=9$

✓ commutative
(addition)

4. $4(3+2) = 4(3) + 4(2)$

✓ $4 \times 5 = 20$
✓ $12+8$
✓ 20
✓ $20=20$

✓ distributive

5. $4(6 \times 2) = (4 \times 6) \times 2$

✓ 12
✓ 24
✓ $48=48$

✓ associative
(multiplication)

6. $(10+2)+3 = (10+3)+2$

✓ $12+3=15$

✓ $15=15$

✓ associative
(addition)

$\begin{array}{r} 12 \\ \times 4 \\ \hline 48 \end{array}$

97

Name: Student's Name

Date: 7/2/03

Learning Standard: 10.N.1

Score: (97%)

A. Define additive inverse and multiplicative inverse:

(20) ✓ Additive inverse is when you add any number to get 0. Multiplicative inverse is when you multiply a number by it's fraction to get 1.

B. State the additive inverse of each of the following:

(30) 1. $-3 + 3 = 0$
✓

2. $5 + -5 = 0$
✓

3. $6 + -6 = 0$
✓

4. $-10 + 10 = 0$
✓

5. $-8 + 8 = 0$
✓

6. $7 + -7 = 0$
✓

C. State the multiplicative inverse of the following:

(17) 1. $4 \times \frac{1}{4} = 1$
✓

2. $6 \times \frac{1}{6} = 1$
✓

3. $1/8 \times \frac{1}{8} = 1$
✓

4. $1/6 \times 6 = 1$
✓

5. $-8 \times \frac{1}{8} = 1$
✓
 $\frac{1}{2}$

6. $-10 \times \frac{1}{10} = 1$
✓
 $\frac{1}{2}$

D. Solve

1. $3^2 = 3 \times 3 = 9$

2. $\sqrt{16} = 4$

3. $\sqrt[3]{8} = 2$

20

4. $2^4 = 2 \times 2 \times 2 \times 2 =$

$4 \times 2 = 8 \times 2 = 16$

5. $\sqrt{36} = 6$

E. Convert the following to radicals:

1. $4^{1/2} = \sqrt{4}$

2. $5^{2/3} = \sqrt[3]{5^2}$

3. $6^{1/4} = \sqrt[4]{6}$

4. $7^{3/4} = \sqrt[4]{7^3}$

20

1/29/03

Directions: State which property or relationship is demonstrated in each example

11. $(5+6)+7 = (6+5)+7$
 Associative prop of add Commutative prop of add.

12. $6+0=6$
 Identity prop. of add. ✓

13. $(6 \cdot 8) \cdot 9 = 6 \cdot (8 \cdot 9)$
 Associative prop of mult ✓

15. $10 + 8 = 18 \rightarrow 18 - 8 = 10$
 Inverse prop of add./sub. ✓

17. $10 \cdot 1 = 10$
 - Identity prop of mult ✓

18. $3 \cdot (4+5) = 3 \cdot 4 + 3 \cdot 5$
 Inverse prop of mult/add
 dist. prop.

20. $2 \cdot 7 = 7 \cdot 2$
 Commutative prop of mult ✓

21. $7+(9+6) = (7+9)+6$
 Associative prop of add ✓

22. $4^3 = 64 \rightarrow 64^{1/3} = 4$ ✓
 Inverse prop of powers/numbers

6. The inverse of addition is subtraction
 $10 + 8 = 18$ $18 - 8 = 10$ ✓

7. Commutative property of Addition

$$5 + 6 = 6 + 5 \quad \checkmark$$

-1 8. The inverse of Squaring is Square rooting

$$5^2 = 25 \quad \sqrt{25} = 5$$

$$= 25^{1/2} = 5$$

9. Associative property of Multiplication

$$(2 \cdot 3) \cdot 5 = 2 \cdot (3 \cdot 5) \quad \checkmark$$

10. The inverse of multiplication is division

$$20 \div 2 = 10 \quad 10 \cdot 2 = 20 \quad \checkmark$$

$$\frac{22\frac{1}{2}}{25} - 1 = 89\%$$

NAME _____

1/29/03

100% individual
No notes

Directions: Please Write an example that displays each one of the following properties or relationships.

1/2 1. Distributive Property of Multiplication over addition

$$4 \times (6+7) = 4 \cdot 6 + 4 \cdot 7$$

$4(6+7)$ ———→

2. Identity property of Addition

$$8+0 = 8 \checkmark$$

3. Commutative property of Multiplication

$$5 \cdot 2 = 2 \cdot 5 \checkmark$$

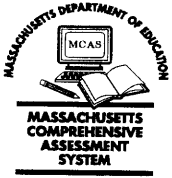
4. Associative property of Addition

$$6+(4+3) = (6+4)+3 \checkmark$$

5. Identity property of Multiplication

$$5 \cdot 1 = 5 \checkmark$$

10.N.1.



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		<input type="checkbox"/>	10.G.7	<input type="checkbox"/>	10.G.8	<input type="checkbox"/>	10.G.9
		<input type="checkbox"/>	10.G.10	<input type="checkbox"/>	10.G.11		
<input type="checkbox"/>	Measurement	<input type="checkbox"/>	10.M.1	<input type="checkbox"/>	10.M.2	<input type="checkbox"/>	10.M.3
<input type="checkbox"/>	Data Analysis, Statistics, and Probability	<input type="checkbox"/>	10.D.1	<input type="checkbox"/>	10.D.2		

$$\frac{6.8}{8}$$

Name: Student's Name

Date: 9/4/05

Learning Standard: 10.P.4

Score: 81%

Combine Like Terms:

✓ 1. $7w^4 + 9w^4 = 16w^4$

✓ 2. $4w^3 + (-w^3) = 3w^3$

✓ 3. $-3k - 8k = -5k$

✓ 4. $4p^2 + 3p^2 = 7p^2$

✓ 5. $6x^2 + 3x^1 + 9x^2 + 3^1 = 15x^2 + 3x + 3$

✓ 6. $10x^4 + 6x + 7y^2 - 4x^4 + 3x + 9x = 6x^4 + 6x + 7y^2 + 3x + 9x$

$6x + 9x + 3x = 18x$

7. $3x^2 + 4x - 3x + 9 - 4x^2 - 10 =$

$6x^2 + 18x + 7y^2$

✓ 1/2 $3x^2 = 4x^2 + 4x + 3x + 9 - 10$

$3x^2 + 4x^2 = 7x^2$

$-1 (7x^2 + 7x - 1)$

8. $2x^5 + 3x^4 + 2x^4 - 3x + 5x + 6 =$

✓ 1/2 $3x^4 + 2x^4 = 5x^4$

$3x + 4x = 7x$

$6 + 2x^5 = 8x^5$

$5x^4 + 7x + 8x^5$

$$\frac{7.5}{8}$$

Student's Name

Name:

Date: 4/8/03

Learning Standard: 10.P.4/10.P.5

Score: 94

A. FOIL

1. $(x-3)(x+4)$

$\frac{1}{2}$ $x^2 + 4x - 3x + 7$

$x^2 + 1x + 7$

2. $(2x-6)(x-4)$

\checkmark $2x^2 - 6x - 8x + 24$

$2x^2 - 14x + 24$

3. $(x-2)(x+8)$

\checkmark $x^2 + 8x - 2x - 16$

$x^2 + 6x - 16$

4. $(3x+1)(x+4)$

\checkmark $3x^2 + 12x + 1x + 4$

$3x^2 + 13x + 4$

B. Factor the following. Check using FOIL then solve for x:

1. $x^2 + 3x + 2 = 0$

$(x+1)(x+2)$

$x^2 + 2x + 1x + 2$

\checkmark $x^2 + 3x + 2$ check

$(x+1) = 0$
 $-1 -1$

$x = -1$

\checkmark $x+2 = 0$
 $-2 -2$

$x = -2$

2. $x^2 - 2x - 24 = 0$

$(x-6)(x+4)$

$x^2 + 4x - 6x - 24$

$x^2 - 2x - 24$ check

$(x-6) = 0$
+6 +6

$x = 6$

$\frac{24}{2 \times 12 = 10}$
 $6 \times 4 = 24$
 $8 \times 3 = 5$

$(x+4) = 0$
-4 -4

$x = -4$

3. $2x^2 + x - 6 = 0$

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

$2x^2 + 4x - 3x - 6$

$2x^2 + x - 6$ check

$\frac{6}{(2x-3) = 0 \quad 3 \times 2 = 6}$
 $6 \times 1 = 6$

$2x = 3 \quad 2 \times 3 = 6$
 $x = \frac{3}{2} \quad 1 \times 6 = 6$

4. $3x^2 + 5x - 2 = 0$

$\frac{2}{1 \times 2 = (3x-1)(x+2)}$
 $2 \times 1 = 2$

$3x^2 + 6x - 1x - 2$

$(3x-1) = 0$
+1 +1

$3x^2 + 5x - 2$ check

$(x+2) = 0$
-2 -2

$x = -2$

Same

For

#

4

$3x = 1$
 $x = \frac{1}{3}$

Name: Student's Name

Date: 5/2/03

Learning Standard: 10.P.5

Score: 100

Alternative Methods of Factoring

A. Solve by completing the square

1. $x^2 - 8x = 9$

$$\left(\frac{-8}{2}\right)^2 = -4^2 = 16$$

$$\begin{array}{l} x^2 - 8x + 16 = 9 + 16 \\ (x-4)(x-4) = \sqrt{25} \end{array}$$

2. $3x^2 + 6x - 9 = 0$

$$\frac{\quad}{3}$$

$$\begin{array}{l} x^2 + 2x - 3 = 0 \\ \quad +3 +3 \end{array}$$

$$\frac{\quad}{x^2 + 2x = 3}$$

$$\begin{array}{l} x-4 = 5 \\ +4 +4 \\ \hline x = 9 \end{array}$$

$$\begin{array}{l} x-4 = - \\ +4 \\ \hline x = - \end{array}$$

$$\left(\frac{2}{2}\right)^2 = 1^2 = 1$$

$$\begin{array}{l} x^2 + 2x + 1 = 3 + 1 \\ (x+1)(x+1) = \sqrt{4} \end{array}$$

$$\begin{array}{l} x+1 = 4 \\ -1 -1 \end{array}$$

$$\begin{array}{l} x+1 = -4 \\ -1 -1 \end{array}$$

$$\frac{\quad}{x = 3}$$

$$\frac{\quad}{x = -5}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

B. Use the quadratic equation to solve the following:

1. $x^2 - 5x + 6 = 0$

$$x = \frac{5 \pm \sqrt{5^2 - 4(1)(6)}}{2(1)}$$

$$x = \frac{5 \pm \sqrt{25 - 24}}{2}$$

$x = 3, 2$

2. $3x^2 + 8x + 4 = 0$

$$x = \frac{8 \pm \sqrt{8^2 - 4(3)(4)}}{2(3)}$$

$$\frac{8 \pm \sqrt{64 - 48}}{6}$$

$$\frac{8 + 4}{6} = 2$$

$$\frac{8 - 4}{6} = \frac{4}{6} = \frac{2}{3}$$

3. $6x^2 + 21x - 12 = 0$

$$x = \frac{21 \pm \sqrt{21^2 - 4(6)(-12)}}{2(6)}$$

$$\frac{21 \pm \sqrt{441 + 288}}{12}$$

$$\frac{21 + 27}{12} = \frac{48}{12} = 4$$

$$\frac{21 - 27}{12} = \frac{-6}{12} = -\frac{1}{2}$$

C. Demonstrate equivalence using factoring, completing the square and the quadratic equation to solve

1. $x^2 + 4x + 4 = 0$

$$x^2 + 3x + 2 = 0$$

2. ~~$2x^2 - 3x - 35 = 0$~~

(c1) $x^2 + 4x + 4 = 0$

Factoring

$$(x+2) (x+2) = 0$$

$$\begin{array}{r} x+2=0 \\ -2 \quad -2 \end{array}$$

$$\boxed{x = -2}$$

Completing the square

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

$$\left(\frac{4}{2}\right)^2 = 2^2 = 4$$

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

$$(x+2) (x+2) = 0$$

$$\begin{array}{r} x+2=0 \\ -2 \quad -2 \end{array}$$

$$\boxed{x = -2}$$

Quadratic

$$\frac{-4 \pm \sqrt{4^2 - 4(1)(4)}}{2(1)}$$

$$\frac{-4 \pm \sqrt{0}}{2}$$

2

$$\frac{-4+0}{2}$$

$$\frac{-4-0}{2}$$

$$-4 = -2$$

$$\text{Ca. } x^2 + 3x + 2 = 0$$

Factor

$$(x + 2)(x + 1) = 0$$

$$\begin{array}{r} \checkmark \\ x + 2 = 0 \\ -2 \quad -2 \\ \hline x = -2 \end{array}$$

$$\begin{array}{r} x + 1 = 0 \\ -1 \quad -1 \\ \hline x = -1 \end{array}$$

Completing the Square

$$x^2 + 3x = -2 \quad \frac{3}{2} = 1.5^2$$

$$x^2 + 3x + 2.25 = -2 + 2.25$$

$$(x + 1.5)(x + 1.5) = +0.25$$

$$\checkmark \quad x + 1.5 = \sqrt{0.25}$$

$$\begin{array}{r} x + 1.5 = 0.5 \\ + 1.5 \quad -1.5 \\ \hline \end{array}$$

$$x = -1$$

$$\begin{array}{r} x + 1.5 = 0.5 \\ -1.5 \quad -1.5 \\ \hline \end{array}$$

$$x = -2$$

$$-3 \pm \sqrt{3^2 - 4(1)(2)}$$

$$\checkmark \quad -3 \pm \sqrt{1}$$

2

$$x = -2, -1$$

10. P. 5

Solve by factoring

1. $x^2 + x = 0$
 $x(x+1) = 0$
 $x = -1, 0$

2. $x^2 - 3x = 0$
 $x(x-3) = 0$
 $x = 3, 0$

3. $x^2 - 5x = 0$
 $x(x-5) = 0$
 $x = 5, 0$

4. $6x + 2x^2 = 0$
 $x(6+2x) = 0$
 $x = 0, -3$

5. $x^2 + 4x + 3 = 0$
 $(x+3)(x+1) = 0$
 $x = -1, -3$

6. $x^2 + 8x + 15 = 0$
 $(x+3)(x+5) = 0$
 $x = -3, -5$

7. $x^2 + x - 6 = 0$
 $(x-2)(x+3) = 0$
 $x = -3, 2$

8. $x^2 + 10x + 25 = 0$
 $(x+5)(x+5) = 0$
 $x = -5, -5$

Solve using the quadratic formula.

9. $x^2 + 12x + 36 = 0$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-12 \pm \sqrt{144 - 144}}{2}$$

$x = -6$

10. $x^2 + 5x - 24 = 0$

$$\frac{-5 \pm \sqrt{25 - 4(1)(-24)}}{2a}$$

$$= \frac{-5 \pm 11}{2} \quad \frac{6, 16}{2}$$

$x = 3, -8$

Name - _____
Date 2/4

10. P. 5

Solve by completing the square.

$$x^2 - 4x + 2 = 0$$

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

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

$$x-2 = \pm\sqrt{2}$$

$$x = 2 \pm \sqrt{2}$$

$$x^2 + 10x + 24 = 0$$

$$x^2 + 10x + 25 = 1$$

$$\sqrt{(x+5)^2} = \sqrt{1}$$

$$x+5 = \pm 1$$

$$-5 = \pm 1$$

$$x = -4, -6$$

Name _____

Date 2/4

10.P.5

Solve the equation using both the factoring method and the quadratic formula.

$$x^2 + 8x + 16 = 0$$

$$(x+4)(x+4) = 0$$

$$x = -4$$

$$\frac{-8 \pm \sqrt{64 - 64}}{2}$$

$$2$$

$$\frac{-8}{2} = -4$$

$$x^2 + 16x + 64 = 0$$

$$(x+8)(x+8) = 0$$

$$x = -8$$

$$\frac{-16 \pm \sqrt{256 - 256}}{2}$$

$$2$$

$$\frac{-16}{2} = -8$$

Are your answers, using the two methods, the same or different?

SAME



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$\frac{6.5}{7}$ Name: **Student's Name**Date: **5/6/07**Standard: **10.M.2**Score: **93**

A. Calculate the surface area, lateral surface area and volume:

1. A plastic ball with a diameter of six inches

$$S.A. = 4\pi r^2$$

$$V = \frac{4}{3}\pi r^3$$

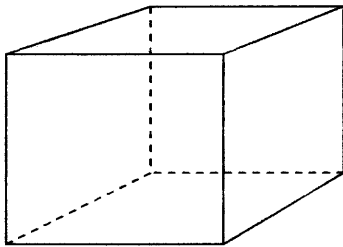
$$4(3.14)(3^2) = 113 \text{ in}^2 \checkmark$$



$$r = 3 \text{ in.}$$

$$\frac{4}{3}(3.14)(3^3) = 339 \text{ in}^3 \checkmark$$

2. A square prism:



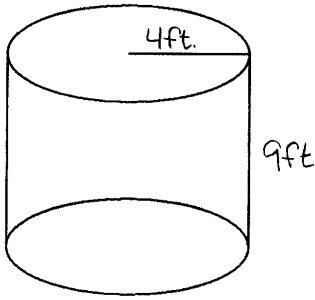
6 in.

$$L.A. = 4s^2 \quad 4(6^2) = 144 \text{ in}^2 \checkmark$$

$$S.A. = 6s^2 \quad 6(6^2) = 216 \text{ in}^2 \checkmark$$

$$V = s^3 \quad 6^3 = 6 \times 6 \times 6 = 216 \text{ in}^3 \checkmark$$

3. A cylinder:



$$r = 4 \text{ ft}$$

$$h = 9 \text{ ft}$$

$$\text{L.A.} = 2\pi r h = 2(3.14)(4)(9) = 226 \text{ ft}^2 \quad \checkmark$$

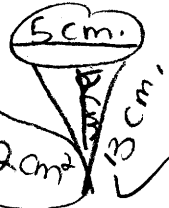
$$\text{S.A.} = 2\pi r^2 + 2\pi r h = 2(3.14)(4^2) + 2(3.14)(4)(9) \quad \checkmark$$

$$V = \pi r^2 h = 3.14 \times 16 \times 9 = 452 \text{ ft}^3$$

$$3.14(4^2)(9)$$

$$3.14 \times 16 \times 9 = 452 \text{ ft}^3 \quad \checkmark$$

4. An ice cream cone with a diameter of 5 cm, a height of 12 cm and a slant height of 13 cm.



$$\text{L.A.} = \pi r l = 3.14(2.5)(13) = 102 \text{ cm}^2 \quad \checkmark$$

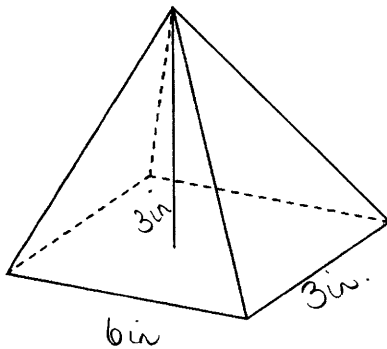
$$\text{S.A.} = \pi r^2 + \pi r l = 3.14(2.5^2) + 3.14(2.5)(13) \quad \checkmark$$

$$V = \frac{1}{3}\pi r^2 h = \frac{1}{3}(3.14)(6.25)(12) = 79 \text{ cm}^3 \quad \checkmark$$

$$\frac{1}{3}(3.14)(2.5^2)(12)$$

$$\frac{1}{3}(3.14)(6.25)(12) = 79 \text{ cm}^3 \quad \checkmark$$

5. A square pyramid:



$$\text{L.A.} = 2sl \quad 2(3)(6) = 36 \text{ in}^2 \quad \checkmark$$

$$\text{S.A.} = s^2 + 2sl \quad 3^2 + 2(3)(6)$$

$$9 + 36 = 45 \text{ in}^2 \quad \checkmark$$

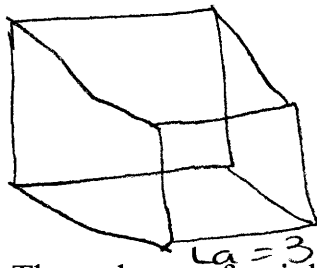
$$V = \frac{1}{3}s^2h$$

$$\frac{1}{3}(3^2)(3)$$

$$\frac{1}{3}(9)(3) = 9 \text{ in}^3 \quad \checkmark$$

B. When given one dimension find a second:

1. The lateral surface area of a cube is 36 cm^2 . What is the total surface area of the cube?



$$\frac{4s^2}{4} = \frac{36 \text{ cm}^2}{4}$$

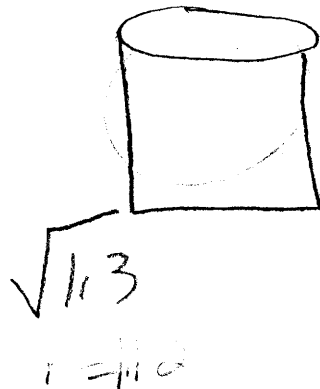
$$\sqrt{s^2} = \sqrt{9}$$

$$s = 3 \quad \checkmark$$

$$\text{T.S.A.} = 6s^2$$

$$6(3^2) = 54 \text{ cm}^2 \quad \checkmark$$

2. The volume of a right circular cylinder is $24\pi \text{ ft}^3$. What is the lateral surface area given a height of 6 ft.?



$$V = 24\pi \text{ ft}^3 \quad h = 6 \text{ ft}$$

$$\pi r^2 h = 24\pi \text{ ft}^3$$

$$\frac{3.14r^2(6)}{19} = \frac{24\pi \text{ ft}^3}{19}$$

$$\frac{1}{2} \text{S.A.} = 2\pi rh$$

$$\sqrt{r^2} = 1.3$$

$$2(3.14)(1.12)(6)$$

$$(42.24\pi)$$