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:

[X]	**Number Sense and Operations**	[X]	**10.N.1**	[ ]	**10.N.2**				
[ ]	**Patterns, Relations, and Algebra**	[ ]	**10.P.2**	[ ]	**10.P.4 & 5**	[ ]	**10.P.7**		
[ ]	**Geometry**	[ ]	**10.G.1**	[ ]	**10.G.2**	[ ]	**10.G.3**	[ ]	**10.G.4**
		[ ]	**10.G.5**	[ ]	**10.G.6**	[ ]	**10.G.7**	[ ]	**10.G.8**
		[ ]	**10.G.9**	[ ]	**10.G.10**	[ ]	**10.G.11**		
[ ]	**Measurement**	[ ]	**10.M.1**	[ ]	**10.M.2**	[ ]	**10.M.3**		
[ ]	**Data Analysis, Statistics, and Probability**	[ ]	**10.D.1**	[ ]	**10.D.2**				

11/12

Name: **Student's Name**
Date: 4/2/03
Learning Standard: 10.N.1
Score: 92%

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

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

9 11

5+9 5+6

14 11+3=14

associative (addition)

14=14 ✓

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

30=30

associative (multiplication)

3. $4 + 5 = 5 + 4$

9=9

communative (addition)

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

4x5=20 12+8

20=20

distributive

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

12 24

48=48

associative (multiplication)

12 x 4 / 48

13+2=15

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

12+3=15

15=15

associative (addition).

97

Name: **Student's Name**
Date: 1/2/03
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:

(20)

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. $1/8$ $\frac{1}{8} \times 8 = 1$ ✓
4. $1/6 \times 6 = 1$ ✓
5. $-8 \times \frac{-1}{8} = 1$ ½
6. $-10 \times \frac{-1}{10} = 1$ ½

D. Solve

1. $3^2 = 3 \times 3 = 9$ ✓ 2. $\sqrt[2]{16} = 4$ ✓ 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:

20

1. $4^{1/2} = \sqrt[2]{4^1}$ ✓ 2. $5^{2/3} = \sqrt[3]{5^2}$ ✓

3. $6^{1/4} = \sqrt[4]{6^1}$ ✓ 4. $7^{3/4} = \sqrt[4]{7^3}$ ✓

1/29/03

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

~~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

$10+8=18 \quad 18-8=10$ ✓

7. Commutative property of Addition

$5+6=6+5$ ✓

8. The inverse of squaring is square rooting

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

$25^{1/2}=5$

9. Associative property of Multiplication

$(2\cdot3)\cdot5=2\cdot(3\cdot5)$ ✓

10. The inverse of multiplication is division

$20\div2=10 \quad 10\cdot2=20$ ✓

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

NAME _____ 1/29/03

10% 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

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

$4(6+7)$ ↗

2. Identity property of Addition

$8+0 = 8$ ✓

3. Commutative property of Multiplication

$5\cdot 2 = 2\cdot 5$ ✓

4. Associative property of Addition

$6+(4+3) = (6+4)+3$ ✓

5. Identity property of Multiplication

$5\cdot 1 = 5$ ✓

10.N.1:

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6.5
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. $4w^3 + (-w^3) =$ $3w^3$

½ 3. $-3k - 8k =$ $-5k$

✓ 4. $4p^2 + 3p^2 =$ $7p^2$

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

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

✓ $6x + 9x + 3x = 18x$

$6x^4 + 18x + 7y^2$

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

½ $3x^2 - 4x^2 + 4x + 3x + 9 - 10$

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

$4x + 3x = 7x$

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

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

½ $3x^4 + 2x^4 = 5x^4$

$3x + 4x = 7x$

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

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

7.5
8

Student's Name

Name:
Date: 4/8/03
Learning Standard: 10.P.4/10.P.5
Score: 94

A. FOIL

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

½ $x^2+4x-3x+7$

x^2+1x+7

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

✓ $2x^2-6x-8x+24$

$2x^2-14x+24$

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

✓ $x^2+8x-2x-16$

$x^2+6x-16$

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

✓ $3x^2+12x+1x+4$

$3x^2+13x+4$

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

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

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

✓ $x^2+2x+1x+2$

✓ x^2+3x+2 check

✓ $(x+1)=0$
$-1\ \ -1$

$x=-1$

✓ $x+2=0$
$-2\ -2$

$x=-2$

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

$(x-6)(x+4)$ ✓

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

$x^2 + -2x - 24$ check ✓

$(x-6)=0$

$+6 \quad +6$

$x = 6$ ✓

$(x+4)=0$

$-4 \quad -4$

$x = -4$

24

$2 \times 12 = 10$

$6 \times 4 = 2$

$8 \times 3 = 5$

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

$(2x-3)(x+2)$ ✓

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

$2x^2 + 1x - 6$ check ✓

$(2x-3)=0$

$+3 \quad +3$

$2x = 3$

$\div 2 \quad \div 2$

$x = 1\frac{1}{2}$ ✓

6

$3 \times 2 = 4$

$6 \times 1 = 11$

$2 \times 3 = 1$

$1 \times 6 = -4$

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

$(3x-1)(x+2)$ ✓

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

$3x^2 + 5x - 2$ check ✓

$(3x-1)=0$

$+1 \quad +1$

$3x = 1$

$\div 3 \quad \div 3$

$x = \frac{1}{3}$ ✓

$(x+2)=0$

$-2 \quad -2$

$x = -2$

2

$1 \times 2 = 2$

$2 \times 1 = 5$

Some For #4

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. $x^2 - 8x = 9$

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

$x^2 - 8x + 16 = 9 + 16$

$(x-4)(x-4) = \sqrt{25}$

$x - 4 = 5$

$+4 \quad +4$

$x = 9$

$x - 4 = -$

$+4$

$x =$

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

$\frac{3}{3}$

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

$+3 \quad +3$

$x^2 + 2x = 3$

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

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

$(x+1)(x+1) = \sqrt{4}$

$x + 1 = 4$

$-1 \quad -1$

$x = 3$

$x + 1 = -4$

$-1 \quad -1$

$x = -5$

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

B. Use the quadratic equation to solve the following:

1. $x^2 - 5x + 6 = 0$ (A = 1, B = −5, C = 6)

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

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

$$\frac{5+1}{2} = 3 \qquad \frac{5-1}{2} = 2$$

$x = 3, 2$

2. $3x^2 + 8x + 4 = 0$ (A = 3, B = 8, C = 4)

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

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

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

$x = -2, -\frac{2}{3}$

3. $6x^2 + 21x - 12 = 0$ (A = 6, B = 21, C = −12)

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

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

$$\frac{21+27}{12} = \frac{48}{12} = 4 \qquad \frac{21-27}{12} = \frac{-6}{12} = -\frac{1}{2}$$

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

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

✓ $x+2=0$
$-2\ \ -2$

$x=-2$

Completeing the square

$x^2+4x=-4$

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

✓ $x^2+4x+4=-4+4$

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

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

$x=-2$

Quadratic

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

✓

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

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

$$-4 = -2$$

C2. $x^2+3x+2=0$

Factor

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

$x+2=0$ $\quad$ $x+1=0$

$-2\ -2$ $\quad$ $-1\ -1$

$x=-2$ $\quad$ $x=-1$

Completing the Square

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

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

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

$x+1.5=\sqrt{0.5}$

$x+1.5=0.5$ $\quad$ $x+1.5=0.5$

$+1.5\ -1.5$ $\quad$ $-1.5\ -1.5$

$x=-1$ $\quad$ $x=-2$

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

$$\frac{-3\pm\sqrt{1}}{2}$$

$x=-2,-1$

Name _____

Date 2/4

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

$(x-2)(x+3) = 0$

$x = +2, 3$

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.

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

$-2 \quad -2$

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

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

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

$+2 \quad +2$

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

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

$-24 \quad -24$

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

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

$x + 5 = \pm 1$

$-5 = \pm 1$

$x = -4, -6$

Name _____

Date 2/14

10.R.5

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

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

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

$x = -4$

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

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

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

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

$x = -8$

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

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

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

Same

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Name: **Student's Name**
Date: 5/6/07
Standard: 10.M.2
Score: 93

$\frac{65}{7}$

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

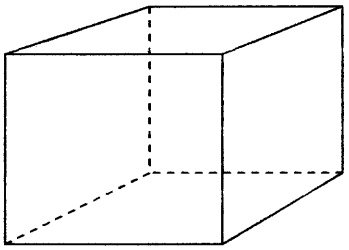
1. A plastic ball with a diameter of six inches

S.A. = $4 \pi r^2$ $4(3.14)(3^2) = 113\ in^2$ ✓

V = $4/3 \pi r^3$ 6 inches / 3 in. $r = 3in.$

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

2. A square prism:



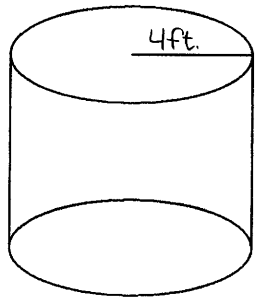
6 in.

L.A. = $4 s^2$ $4(6^2) = 144\ in^2$ ✓

S.A. = $6 s^2$ $6(6^2) = 216\ in^2$ ✓

V = s^3 $6^3 = 6 \times 6 \times 6 = 216\ in^3$ ✓

3. A cylinder:



$r = 4ft$
$h = 9ft.$

L.A. $= 2\pi rh$ $= 2(3.14)(4)(9) =$ 226ft² ✓

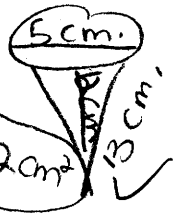
S.A. $= 2\pi r^2 + 2\pi rh$ $2(3.14)(4^2)+2(3.14)(4)(9)$ ✓

$V = \pi r^2 h$ $6.28 \times 16 =$ $100 + 226 =$ 326ft.²

$3.14(4^2)(9)$ ✓

$3.14 \times 16 \times 9 =$ 452ft³

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



L.A. $= \pi rl$ $3.14(2.5)(13) =$ 102cm² ✓

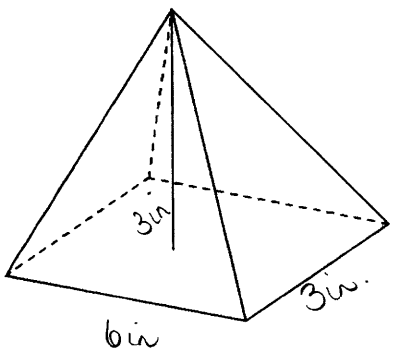
S.A. $= \pi r^2 + \pi rl$
$3.14(2.5^2)+3.14(2.5)(13)$ ✓

V = 1/3 $\pi r^2 h$ $102 + 3.14 \times 6.25 =$ 122 cm²

$\frac{1}{3}(3.14)(2.5^2)(12)$ ✓

$\frac{1}{3}(3.14)(6.25)(12) =$ 79cm³

5. A square pyramid:



L.A. = 2 s l $2(3)(6) = 36\ in^2$ ✓

S.A. = $s^2 + 2$ s l $3^2 + 2(3)(6)$

$9 + 36 = 45 in^2$ ✓

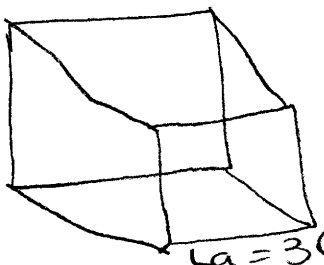
V = 1/3 s^2 h

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

$\frac{1}{3}(9)(3) = 9in^3$ ✓

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?



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

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

$s = 3$ ✓

T.SA = $6s^2$

$6(3^2) = 54cm^2$ ✓

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

½

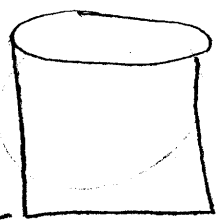
S.A = $2\pi rh$

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

$r = 1.1\ ft$

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

$42.2\ ft^2$



$V = 24ft^3$ $h = 6ft$

$\pi r^2 h = 24ft^3$

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