

ALGEBRA I TEAM ANSWERS**MARCH 20, 1993**

1) 2, 4, 4, and 6

2) $1 \frac{1}{8}$

3) 8

4) 9960

5) 28

6) 7

7) 25

8) 0

9) $x - 3$

10) 848

11) $30 \frac{1}{4}$

12) 117

13) $\frac{11}{3}$ or $3 \frac{2}{3}$

14) 10 miles

15) \$307.06

MU ALPHA THETA REGIONAL COMPETITION
MARCH 20, 1993

ALGEBRA I TEAM TEST

① $2^2 + 4^2 + 4^2 = 6^2$
 $4 + 16 + 16 = 36$

Ages of the children are

$\boxed{2, 4, 4, \text{ and } 6}$

② (a) $m = -\frac{1}{8}$

(b) $m = 3$

(c) $m = \frac{1}{4}$

(d) $m = -2$

Sum = $\boxed{1 \frac{1}{8}}$

③ $x+2 = \pm 1$ $x+2 = \pm 6$
 $x = -1$ $x = 4$
 $x = -3$ $x = -8$

$x+2 = \pm 2$ $x+2 = \pm 5$
 $x = 0$ $x = 1$
 $x = -4$ $x = -5$

integers are 0, ± 1 , -3 ,
 ± 4 , -5 , -8 ,
of integer values $\boxed{8}$

④ ~~9980~~ ~~9955~~ (9960) ~~9965~~ ~~9970~~
~~9975~~ ~~9980~~ ~~9985~~ ~~9990~~ ~~9995~~

⑤ $\boxed{28} = 1 + 2 + 4 + 7 + 14$

⑥ use \$100 as example

$\begin{array}{r} 100 \\ -10 \rightarrow 1^{\text{st}} \\ \hline 90 \\ -9 \rightarrow 2^{\text{nd}} \\ \hline 81 \\ -8 \rightarrow 3^{\text{rd}} \\ \hline 73 \\ -7 \rightarrow 4^{\text{th}} \\ \hline 66 \end{array}$	$\begin{array}{r} 66 \\ -7 \rightarrow 5^{\text{th}} \\ \hline 59 \\ -6 \rightarrow 6^{\text{th}} \\ \hline 53 \\ -5 \rightarrow 7^{\text{th}} \\ \hline \$48 \end{array}$
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There are $\boxed{7}$ discounts.

⑦

	Now	in 2yr.	in 4yr.
Mike	$x+4$	$x+6$	$x+8$
Sue	$x-2$	x	$x+2$
Bill	x	$x+2$	$x+4$
Jane	x	$x+2$	$x+4$

$4x + 2 = 82$

$4x = 80$

$x = 20$

$x + 4 = 24$ (mike)

$24 + 1 = \boxed{25}$ on next birthday

$$(8) (x^2 - 25)(x^2 - 4) = 0$$

$$(x+5)(x-5)(x+2)(x-2) = 0$$

$$x = \pm 5 \quad x = \pm 2$$

sum of roots is zero

$$(9) (a) (x-3)(x+8)(x-8)$$

$$(b) (x+12)(x-3)$$

$$(c) (x-3)(2x^2 + 10x + 5)$$

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

common factor is x-3

$$(10) A = 2 \times 3 \times 5 \times 13 = 390$$

$$B = 2 \times 3 \times 3 \times 5 \times 5 = 450$$

$$C = 2 \times 2 \times 2 = 8$$

$$A+B+C = \span style="border: 1px solid black; padding: 2px;">848$$

$$(11) \begin{array}{r|rrrr} \frac{3}{2} & 2 & -8 & 1 & 10 \\ & & 3 & -\frac{15}{2} & -\frac{39}{4} \\ \hline & 2 & -5 & -\frac{13}{2} & \span style="border: 1px solid black; padding: 2px;">\frac{1}{4} = Remainder \end{array}$$

$$-1 \begin{array}{r|rrrr} & 1 & 1 & -7 & -9 \\ & & -1 & 0 & 7 \\ \hline & 1 & 0 & -7 & \span style="border: 1px solid black; padding: 2px;">-2 = Remainder \end{array}$$

$$8 \begin{array}{r|rrrr} & 9 & -69 & -22 & 16 \\ & & 72 & 24 & 16 \\ \hline & 9 & 3 & 2 & \span style="border: 1px solid black; padding: 2px;">32 = Remainder \end{array}$$

$$32 + (-2) + \frac{1}{4} = \span style="border: 1px solid black; padding: 2px;">30\frac{1}{4}$$

$$(12) \begin{array}{r} x^2 + 2xy + y^2 = 144 \\ x^2 - 2xy + y^2 = 36 \\ \hline \end{array}$$

$$2x^2 + 2y^2 = 180$$

$$x^2 + y^2 = 90$$

$$(x^2 + y^2) + 2xy = 144$$

$$90 + 2xy = 144$$

$$2xy = 54$$

$$xy = 27$$

$$x^2 + xy + y^2 = \span style="border: 1px solid black; padding: 2px;">117$$

$$(13) \begin{array}{r} 2x-5 = 5x+5 \\ 3 = 3 \end{array} \quad \begin{array}{r} 4(5y-8) = 3y+ \\ 5y-8 = 3y+ \\ 2y = 14 \\ y = 7 \end{array}$$

$$2x-5 = 5x+5$$

$$-10 = 3x$$

$$x = -\frac{10}{3}$$

$$-\frac{10}{3} + \frac{21}{3} = \span style="border: 1px solid black; padding: 2px;">\frac{11}{3}$$

$$(14) 12(t + \frac{38}{60}) = 50t$$

$$12t + \frac{38}{5} = 50t$$

$$t = \frac{1}{5} \text{ hr.}$$

$$\frac{1}{5}(50) = \span style="border: 1px solid black; padding: 2px;">10 \text{ miles}$$

$$(15) \frac{75}{500} = 15\% \text{ decrease}$$

$$\frac{63.75}{425} = 15\% \text{ decrease}$$

$$(361.25)(.85) = \span style="border: 1px solid black; padding: 2px;">307.06$$