NAME _____
MESA CENTER _____
SCHOOL _____
GRADE LEVEL _____
CURRENT MATH COURSE _____

2006 Junior PRELIMINARY

Solo Math Competition

Algebra I Exam:

For students currently enrolled in an Algebra I Class

RULES AND PROCEDURES:

1. Complete the information at the top of this sheet.
2. Complete the information on the Scantron sheet.
3. Calculators are permitted.
4. Taking the examination is STRICTLY AN INDIVIDUAL EFFORT.
5. You may write in the test booklet (NO SCRATCH PAPER IS PROVIDED).
6. Record all answers on the Scantron sheet.
7. You will have 45 minutes to complete this test.

DO NOT START UNTIL YOU ARE INSTRUCTED TO DO SO.

GOOD LUCK

Algebra 1

Junior Preliminary 2006

1. If $8t - 5 + 2t = 5 + 5t -$ [redacted] t.

   a) $-\frac{5}{2}$ b) $-\frac{1}{3}$ c) $-\frac{2}{5}$ d) 3

2. In slope-intercept form, what is the equation of the line containing the points $(-1, 2)$ and $(2, -1)$?

   a) $y = -3x$ [redacted] $y = -x + 1$

   c) $y = -x$ [redacted] $y = -x - 1$

[redacted] y: $\dfrac{2y+3}{2} = \dfrac{4y-1}{5}$

a) $-\frac{17}{2}$ b) $-\frac{2}{17}$ c) $\frac{2}{17}$ d) $\frac{17}{2}$

4. The perimeter of a rectangle is given as $P = 2\ell + 2w$, where P is perimeter, ℓ is length and w is width. What is the width of a rectangle whose length is 9 inches and whose perimeter is 2 feet?

   a) -3.5 in. b) -1 in.

   c) 3 in. d) 6 in.

5. Find the equation that represents the statement, "the sum of 6 and the quotient of a number x and 4 is 15."

   a) $\dfrac{6+x}{4} = 15$ b) $6 + \dfrac{x}{4}$ [redacted]

   c) $\dfrac{x}{4} = 15 + 6$ d) $\dfrac{6}{4} + x$ [redacted]

[redacted] x: $\dfrac{2x+3}{5x} = \dfrac{2}{3}$

a) $-\frac{9}{4}$ b) $-\frac{4}{9}$ c) $\frac{3}{4}$ d) $\frac{9}{4}$

Algebra 1

Junior Preliminary 2006

7. Simplify the expression $(-2mn^4)^5$.

a) $-32m^5n^{20}$ b) $-10m^6n^9$

c) $-10m^5n^{20}$ d) $32m^5n^{20}$

8. Factor completely: $2x^3 - 8x$

a) $2x(x+2)(x-2)$ b) $2x(x+4)(x-4)$

c) $2x(x+4)(x-2)$ d) cannot be factored

9. Factor completely: $x^2 - 3x - 18$

[redacted]$(x-6)(x$ [redacted]$x-9)(x+2)$

[redacted]$(x+9)(x-2)$ d) $(x-9)(x-2)$

10. Simplify: $\dfrac{3x-15}{4} \div \dfrac{x^2-25}{2x-10}$

a) $\dfrac{3(x-5)}{2(x+5)}$ b) $\dfrac{3x-5}{4}$

c) $\dfrac{3(x-5)}{(x+5)}$ d) $\dfrac{(x-5)}{2(x+5)}$

[redacted]$x-5)(x+3)$

a) $2x^2 + x - 15$ b) $2x^2 - x$ [redacted]

c) $2x^2 + 11x - 2$ d) $2x^2 - x - 15$

12. Simplify: $\dfrac{x^2-64}{x^2+9x+8}$

a) $\dfrac{x-8}{x+1}$ b) $\dfrac{x+8}{x+1}$

c) $\dfrac{x-64}{8x+8}$ d) does not simplify

$[redacted] - 3x) = -15(x-2)$

a) $-\frac{5}{2}$ b) 5

c) 12 d) all real numbers

$[redacted]c^2 [redacted]c - [redacted]$

$[redacted]c+3)(3c [redacted]c-3)(3c-4)$

$[redacted]c-3)(3c+4)$ d) prime polynomial

[redacted]

algebraically:

$2x - 5y = 11$

$2x + 5y = 1$

$[redacted](-3, -\frac{5}{17}[redacted]$ $(\frac{17}{2}, \frac{6}{5})$

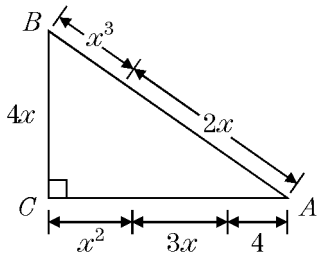
c) $(3, -1)$ d) $(3, 1)$

16. St. Louis and Portland are 2,060 miles apart. A small plane leaves Portland, traveling toward St. Louis at an average speed of 90 miles per hour. Another plane leaves St. Louis at the [redacted] 116 miles per hour. How long will it take them [redacted]

a) 10 hours b) 12 hours

c) $13\frac{1}{5}$ hours d) $14\frac{1}{2}$ hours

17. Write a polynomial expression for the area of $\triangle$**ABC.**



a) $x^2 + 4x + 6$ b) $2x^3 + 6x^2 + 8x$

c) $4x^3 + 12x^2 + 16x$ d) $2x^4 + 8x^3 + 10x^3$

[redacted]$x^2 + 3x - 4) + (x^2 - x + 3)$

a) $3x^2 + 4x$ [redacted]$x^2 + 2x + 1$

c) $3x^2 + 2x - 1$ [redacted] d) $3x^4 + 4x^2 + 7$

Algebra 1

Junior Preliminary 2006

19. Simplify: $\dfrac{12x^4y}{15xy^2} \cdot \dfrac{5x^5y^3}{8x^3y^4}$

a) $\dfrac{2x^5}{y^2}$ b) $\dfrac{x^6}{2y^3}$ c) $\dfrac{2x^6}{y^3}$ d) $\dfrac{x^5}{2y^2}$

20. Solve: $\frac{1}{4}(8y+4) - 17 < -\frac{1}{2}(4y-8)$

a) $y > -2$ b) $y < 1$ c) $y < 5$ d) $y > 8$

21. Solve: $w - 2(8-w) = -31$

a) -5 b) -3 c) 15 d) 47

22. Solve $x^2 - 8x + 2 = 0$ using the Quadratic Formula.

a) $x = -8 \pm \sqrt{14}$ b) $x = -4 \pm \sqrt{14}$

c) $x = 4 \pm \sqrt{14}$ d) $x = 8 \pm \sqrt{14}$

23. Alvin has 20 coins consisting of nickels and quarters. If the value of the coins is \$4.40, how

a) 3 b) 5 c) 12 d) 17

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

a) $\{-\frac{1}{2}, 3\}$ b) $\{\frac{1}{2}, -3\}$

c) $\{\frac{3}{2}, -1\}$ d) $\{-\frac{3}{2}, 1\}$

25. Simplify: $(2x^3 + 3x^2 - x - 5) - (x^3 - 2x^2 + 5x - 1)$

a) $x^3 + x^2 - 6x - 4$ b) $x^3 + 5x^2 + 4x - 6$

c) $x^3 - 5x^2 + 4x - 6$ d) $x^3 + 5x^2 - 6x - 4$

Answer List

1. c
2. b
3. a
4. c
5. b
6. d
7. a
8. a
9. a
10. a
11. a
12. a
13. d
14. c
15. c
16. a
17. b
18. c
19. d
20. c
21. a
22. c
23. a
24. b
25. d