

ALGEBRA ONE INDIVIDUAL ROUND

2000

MARCH REGIONAL COMPETITION

ANSWER SHEET

1 A

11 A

21 D

2 C

12 C

22 C

3 B

13 C

23 C

4 C

14 C

24 B

5 B

15 B

25 B

6 D

16 C

26 A

7 B

17 A

27 C

8 D

18 E

28 D

9 D

19 A

29 D

10 C

20 B

30 D

1. $2x^0 + 2x^{-1}$
 $2(1) + \frac{2}{x}$
 $\left(\frac{x}{x}\right)\frac{2}{1} + \frac{2}{x}$
 $\frac{2x+2}{x}$ (A)

2. $5(2A^2+4A-2) = 10A^2+20A-10$
 $-2(-3A^2-A+12) = 6A^2+2A-24$
 $-2(A^2+3A-5) = -2A^2-6A+10$
 $14A^2+16A-24$ (C)

3. $x = \frac{y}{z} \cdot \frac{T}{z}$
 $\frac{z^2}{T} \cdot \frac{x}{1} = \frac{yT}{z^2} \left(\frac{z^2}{T}\right)$
 $\frac{z^2 x}{T} = y$ (B)

4. $x+1=0$
 $x=-1$
 $6(-1)^6 - 17(-1)^4 + 12(-1) + 26$
 $6 - 17 - 12 + 26$
 $32 - 29 = 3$ (C)

5. (B)
 6. $\sqrt{\left(\frac{x}{1-x^2}\right)^2} + 1$
 $\sqrt{\frac{x^2}{1-x^2} + \frac{1-x^2}{1-x^2}}$
 $\sqrt{\frac{1}{1-x^2}} \sqrt{\frac{1-x^2}{1-x^2}}$
 $\frac{\sqrt{1-x^2}}{1-x^2}$ (D)

7. $x=2$
 $2(3)(4)(5)+1=121$
 $x=5$
 $5(6)(7)(8)+1=1681$
 (B)

8. $\frac{[-3(-2)-3+1][-1-3(-3)+2]}{[-3-(-2)(-3)][-3+3][-3-2]}$
 $\frac{2 \cdot 6}{-9 \cdot 6 \cdot -1} = \frac{2}{-9}$
 $= -\frac{2}{9}$ (D)

9. $P = L + \frac{M}{F} + M$
 $PF = LF + M + MF$
 $PF - LF = M(1+F)$
 $M = \frac{PF-LF}{1+F} = \frac{F(P-L)}{F+1}$ (D)

11.
 $5-3(2+1) = -2-3^0$
 $5-3(3) = -4-1$
 $5-9 = -4-1$
 $5-14 = -9$
 (A)

10. $7x\sqrt{12xy^2} - 9y\sqrt{27x^3} + 5\sqrt{300x^3y^2}$
 $7x\sqrt{4y^2}\sqrt{3x} - 9y\sqrt{9x^2}\sqrt{3x} + 5\sqrt{100x^2y^2}\sqrt{3x}$
 $(7x \cdot 2y - 9y \cdot 3x + 5 \cdot 10xy)\sqrt{3x}$
 $(14 - 27 + 50)xy\sqrt{3x}$
 $37xy\sqrt{3x}$ (C)

12. $2y = x^2 - 3$
 $x^2 = 2y + 3$
 $x = \sqrt{2y+3}$
 $2y+3 \geq 0$
 $2y \geq -3$
 $\text{Range: } y \geq -\frac{3}{2}$ (C)

13. $\frac{x-1}{3} + 4x = \frac{3}{2} + \frac{13x-2}{3}$

$2x-2+24x=9+26x-4$

$26x-2=5+26x$

$-2=5$ FALSE

\emptyset (C)

14. $.254 = \frac{254-2}{990} = \frac{252}{990} = \frac{14}{55}$

$14+55=69$

(C)

15. $\frac{-3P^3Q^{-12} \cdot 15P^{-2}Q^8 \cdot 2P^8Q^{-6}}{4P^5Q^{-2}}$

$\frac{-P^{-4}Q^9}{4 \cdot 27 \cdot 4 P^5 Q^{-2}}$
 $\frac{-Q^{11}}{432 P^9}$ (B)

(16) (C)

17. $2x^3 + x^2 - 8x - 4 = 0$

$x^2(2x+1) - 4(2x+1) = 0$

$(2x+1)(x^2-4) = 0$

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

$x = -\frac{1}{2}, -2, 2$

$-\frac{1}{2} - 2 + 2 = -\frac{1}{2}$ (A)

(18) LET X = TIME OF JASPER
 "TT" = TIME TOGETHER

$\frac{TT}{T_J} + \frac{TT}{T_K} = 1$ JOB

$2x \frac{4}{x} + 2x \frac{4}{2x} = 1$

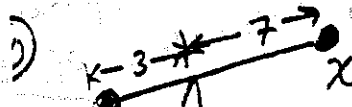
$8 + 4 = 2x$

$12 = 2x$

$x = 6$ hr (E)

19. THE TRINOMIAL IS FACTORABLE IF $b^2 - 4ac$ IS A PERFECT SQUARE.

$(-12360)^2 - 4(3072)(-4725)$
 210830400 YES (A)



$w_1 D_1 = w_2 D_2$

$\frac{420(3)}{7} = \frac{x(7)}{7}$

$60 \cdot 3 = 180 = x$
 180 LBS (B)

(21) $x = 3$ (D)

WORK CAREFULLY

(22) $3+5=8$ NO
 $3-5=-2$ NO
 $3 \cdot 5 = 15$ ODD YES
 $3 \div 5 = .6$ NO (C)

(23) $972 + 114 + G = 2011$
 $G = 925$

$\$ \frac{925}{7400} = \$.125$
 $\times 100$

(C) 12.5¢ per mile

24. $3x+1=5x+7$
 $-6=2x$
 $x=-3$ CHECK

OR $3x+1=-5x-7$
 $8x=-8$
 $x=-1$

ONLY ROOT -1 (B)

(25) 4 pieces = 3 CUTS

TAKES 12 MIN FOR 3 CUTS.

1 CUT TAKES 4 min

8 pieces = 7 CUTS

(B) $4 \times 7 = 28 \text{ min}$

(26) COMMUTATIVE

$3 @ 2 = 2(3) + 2 = 8$ NO

$2 @ 3 = 2(2) + 3 = 7$

ASSOCIATIVE

$3 @ (2 @ 1) = 3 @ [2(2) + 1] = 3 @ 5 = 2(3) + 5 = 11$

$(3 @ 2) @ 1 = [2(3) + 2] @ 1 = 8 @ 1 = 2(8) + 1 = 17$ NO

NO, NO (A)

(27) $\begin{cases} 150x + 85y = 163750 \\ x + y = 1525 \end{cases}$

$\begin{cases} 150x + 85y = 163750 \\ -85x - 85y = -129625 \end{cases}$

$65x = 34125$

$x = 525$

$525 + y = 1525$

$y = 1000$

$x + y = 525 + 1000 = 1525$

(C)

(28) $6(x-8)^2 + 7(x-8) - 5 = 0$

Let $m = x - 8$

$6m^2 + 7m - 5 = 0$

$(3m + 5)(2m - 1)$

$[3(x-8) + 5][2(x-8) - 1]$

$(3x - 24 + 5)(2x - 16 - 1)$

$(3x - 19)(2x - 17)$

(D)

30. $\sqrt{x\sqrt{x\sqrt{x}}} = \sqrt{x\sqrt{x \cdot x^{1/2}}} =$

$\sqrt{x\sqrt{x^{3/2}}} = \sqrt{x(x^{3/2})^{1/2}} =$

$\sqrt{x \cdot x^{3/4}} = \sqrt{x^{7/4}} =$

$(x^{7/4})^{1/2} = x^{7/8}$ (D)

(29) $4 + \sqrt{10-x} = 6 + \sqrt{4-x}$

$(\sqrt{10-x})^2 = (2 + \sqrt{4-x})^2$

$10-x = 4 + 4\sqrt{4-x} + 4-x$

$2 = 4\sqrt{4-x}$

$\frac{4x}{4} = \frac{15}{4}$

$1^2 = (2\sqrt{4-x})^2$

$1 = 4(4-x)$

$x = \frac{15}{4}$ CHECKS

$1 = 16 - 4x$

$15 + 4 = 19$ (D)