ALGEBRA II INDIVIDUAL TEST
PCHS INVITATIONAL—FEBRUARY 24, 1996

Answer Key:

1. D
2. B
3. D
4. A
5. B
6. E ($-22680x^4y^6$)
7. B
8. C
9. D
10. A
11. C
12. B
13. E (4)
14. D
15. A
16. B
17. D
18. C
19. C
20. B
21. A
22. D
23. D
24. B
25. B
26. E (-6)
27. B
28. A
29. C
30. D

ALGEBRA II TEAM ROUND
PCHS INVITATIONAL—FEBRUARY 24, 1996

Answer Key:

1. 400
2. $\begin{bmatrix} 0 & 2 & -1 \\ 0 & -3 & 0 \\ 1 & 1 & -4 \end{bmatrix}$
3. 18
4. 144
5. 33
6. 713
7. $x = -6, 3$
8. 42
9. 24 minutes
10. 27 meters
11. $\dfrac{2a+b+1}{a+b-1}$
12. 12
13. 10 hrs. 17 minutes
14. $\dfrac{9}{4}$
15. 42

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ALGEBRA II

TEAM ROUND

PAGE 1

SOLUTIONS

1. Sum of n-odd integers = n^2

$\boxed{400}$

2. $m^t = \begin{bmatrix} 1 & 2 & -1 \\ 0 & -2 & 0 \\ 1 & 1 & -3 \end{bmatrix}$

$m \cdot m^{-1} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

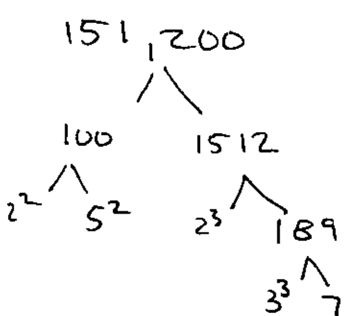
$m^t - m \cdot m^{-1} = \begin{bmatrix} 0 & 2 & -1 \\ 0 & -3 & 0 \\ 1 & 1 & -4 \end{bmatrix}$

3. $\cancel{4!}$ $\quad {}_4P_3 \quad 4 \times 3 \times 2 = \boxed{24}$

TEC	ECT	CTH	HEC
TEH	ETC	CHT	HCE
TCE	ECH	CET	HTE
THE	EHC	CTE	HET
TCH	EHT	CEH	HTC
THC	ETH	CHE	HCT

see the bottom

4. 151,200



$2^5 \cdot 3^3 \cdot 5^2 \cdot 7$

$6 \cdot 4 \cdot 3 \cdot 2 = \boxed{144}$

5.

	3 YRS AGO	NOW	IN 4 YRS
RACHEL	$9x+7$	$9x+10$	$9x+14$
JACOB	x	$x+3$	$x+7$

$4(x+7)-4 = 9x+14$

$4x+24 = 9x+14$

$x = 2$

Ages Now: 5, 28 Sum: $\boxed{33}$

6.
$$\begin{array}{r} 3143_{five} \\ 2130_{five} \\ \hline 10323_{five} \end{array}$$

$625+125+10+3$

$\boxed{713}$

7. $\begin{bmatrix} 1 & x \\ x+1 & x-1 \end{bmatrix} \begin{bmatrix} x & 1 \\ x-1 & 2 \end{bmatrix} = AB$

$\begin{bmatrix} x+x^2-x & \sim \\ \sim & x+1+2x-2 \end{bmatrix}$

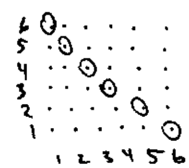
$x^2+3x-1 = 17$

$x^2+3x-18$

$(x+6)(x-3)$

$\boxed{x = 3, -6}$

8. $A = \frac{1}{6}$



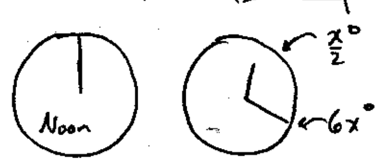
$\frac{6}{36}$

$B = \frac{{}_6C_2}{{}_{10}C_2} = \frac{1}{3}$

$C = {}_7C_5 = 21$

$\frac{BC}{A} = \boxed{42}$

9.



$6x - \frac{x}{2} = 132$

$\frac{11}{2}x = 132$

$\boxed{x = 24 \text{ minutes}}$

10. Ratios:

$$\frac{\text{Ashley}}{\text{Wendy}} = \frac{100}{83} \qquad \frac{\text{Wendy}}{\text{Amy}} = \frac{100}{88}$$

$$\frac{\text{Ashley}}{\text{Amy}} = \frac{\text{Ashley}}{\text{Wendy}} \cdot \frac{\text{Wendy}}{\text{Amy}} = \frac{100}{83}\cdot\frac{100}{88} \approx \frac{100}{73}$$

$\boxed{= 27 \text{ meters}}$

11. $\log_{.6} 120$

$$\log_{.6} 120 = \frac{\log 12 + 1}{\log 6 - 1} = \frac{2\log 2 + \log 3 + 1}{\log 2 + \log 3 - 1}$$

$$= \boxed{\frac{2a+b+1}{a+b-1}}$$

12. $y = x^2 - 2x - 3$

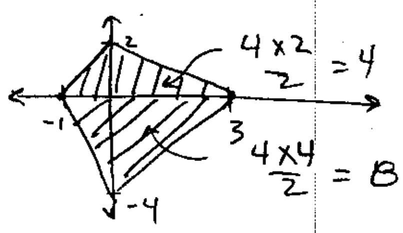
$0 = (x-3)(x+1)$

x-int: $(3,0), (-1,0)$

$x = -y^2 - 2y + 8$

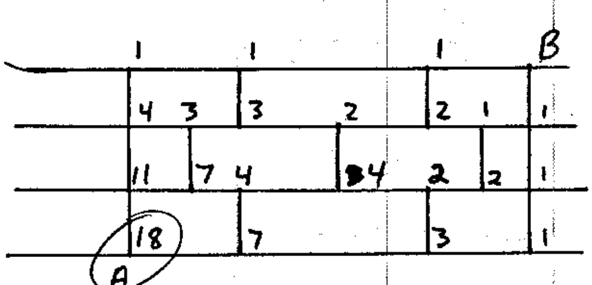
$0 = -y^2 - 2y + 8$

y-int: $(0,-4), (0,2)$



$\boxed{12}$

3)



the #'s show the number of ways from that vertex

13. $\sum \frac{\text{Time together}}{\text{time alone}} = 1$

$$\frac{x}{12} + \frac{x}{18} - \frac{x}{24} = 1$$

$$6x + 4x - 3x = 72$$

$$7x = 72$$

$$x = \frac{72}{7}$$

$\boxed{10 \text{ hrs } 17 \text{ minutes}}$

14. Two series of sums:

$$1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \ldots = \frac{1}{1-\frac{1}{3}} = \frac{3}{2}$$

$$+ \quad \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \ldots = \frac{1/3}{1-1/3} = \frac{1}{2}$$

$$+ \quad \frac{1}{9} + \frac{1}{27} + \ldots = \frac{1/9}{1-1/3} = \frac{1}{6}$$

$$\vdots$$

sum down right side of equation $\quad \sum = \frac{\frac{3}{2}}{1-1/3} = \boxed{\frac{9}{4}}$

15. $A = \frac{\log 36}{\log 5} \cdot \frac{\log 5\sqrt5}{\log\sqrt6}$

$$= \frac{2\log 6}{\log 5} \cdot \frac{\frac{3}{2}\log 5}{\frac{1}{2}\log 6} = 6$$

$B = \log 2\sqrt2 + \log\sqrt5 + \log 5\sqrt{10}$

$= \log 100 = 2$

$C = \left[2^{\log 5} \cdot 2^{2\log 2\sqrt5} - 1\right]^{1/2}$

$= \left[2^{\log 5} \cdot 2^{\log 20} - 1\right]^{1/2}$

$= \left[2^{\log 100} - 1\right]^{1/2} = \sqrt3$

$D = 3^{\log_{\sqrt2} 2\sqrt2} = 3^3 = 27$

$A^B + \log_C D = 6^2 + \log_{\sqrt3} 27 = 36 + 6 = \boxed{42}$