

TAMPA BAY TECH INVITATIONAL – JANUARY 29, 2000
MASTER KEY

Question #	Algebra I	Geometry	Algebra II	Pre-Calculus	Calculus	Statistics
1	B	D	C	B	B	C
2	A	B	C	D	B	D
3	D	A	C	D	A	A
4	D	D	D	A	C	E
5	D	C	D	D	B	A
6	C	B	A	D	C	D
7	B	A	A	C	C	D
8	A	A	B	B	E	A
9	C	B	B	C	D +c	C
10	D	C	A	D	D	E
11	B	B	B	E	B	B
12	A	D	C	D	A	A
13	E	A	B	B	B	C
14	C	C	A	D	A	A
15	D	A	A	A	C	D
16	B	B	C	B	B	C
17	C	A	C	A	D	D
18	B	C	B	D	B	B
19	A	A	B	E	D	E
20	C	B	A	A	C	B
21	D	B	B	A	C +B	C
22	B	D	C	D	D	C
23	D	C	C	B	C	D
24	C	D	C	D	C	A
25	D	A	C	C	D	C
26	C	C	A	C	A	B
27	A	B	D	A	A	C
28	A	C	B	A	D	E
29	B	D	A	C	A	B
30	D	A	D	A	FE	C

1	-12	B & C	$\frac{181}{30}$	124	$(-7, -6) \cup (4, 6)$	
2	$\frac{70}{81}$	$2\frac{4}{5}$	6	25	2,001,001	
3	20 nickles	27.193	1980	10	$\frac{1}{3}$ ft/sec	
4	3	$33.49x^3$	4700.4	83.95	-1	
5	-6	36	x-y	247.886	$\sqrt{3} + \frac{\pi}{6}$	
6	$5x^2 - 12$	89.8	1	1	12,285	
7	1	58.5°	8	3	-200	
8	$\frac{1}{2}$	9	63 apples	4	.13	
9	10, 12 or -10, -8	100	113	12	$\frac{32}{3}$	
10	$9x^2 - 2x + 5$	$\frac{19}{30}$	$-12\sqrt{3}$	$3,145,724\frac{7}{8}$	5	
11	$17/5$	228.8477	20,100	$\frac{2}{x^2-1}$ OR $\frac{2-x^2}{x^2}$	2	
12	21	4	$11 \pm \sqrt{91}$	200	$-2 \cos(2x) - 2$	
13	-4	30	532_6	$\cot x$	4	
14	$x < -2$	19406	$2x+2y$	\$4,468.92	$14 \times \sqrt{2 + \cos^3(7x^2)}$	
15	$2x^2 - 11x - 6$	144	10	5	e	

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C 1. $e^{\ln(x+3)} + 3e^{\ln 2} = e^{\ln(3x+1)}$
 $x+3 + 3(2) = 3x+1$
 $x+9 = 3x+1$
 $8 = 2x$
 $4 = x$

C 2. $3^a(16) = \frac{144}{16}$
 $3^a = 9 = 3^2$
 $a = 2$

C 3. $\sum_{i=4}^{51} (7x-12)$
 $n = 51 - 4 + 1 = 48$
 $a_1 = 7(4) - 12 = 16$
 $a_{48} = 7(51) - 12 = 345$
 $S_{48} = \frac{48}{2} (16 + 345)$
 $24(361) = 8664$

D 4. $M^{-1} = \frac{1}{134} \begin{bmatrix} -40 & 31 & -16 \\ 28 & -15 & 38 \\ 10 & 9 & 4 \end{bmatrix}$
 Sum:
 $\frac{-40 + 31 - 16 + 28 - 15 + 38 + 10 + 9 + 4}{134}$
 $= \frac{49}{134}$

$\det = \begin{vmatrix} -3 & -2 & 2 & -2 \\ 2 & 0 & 2 & 0 \\ 3 & 5 & -2 & 3 \\ 5 & & & 5 \end{vmatrix} = 134$

$M^T = \begin{bmatrix} -3 & 2 & 3 \\ -2 & 0 & 5 \\ 7 & 8 & -2 \end{bmatrix}$

D 5. $y = x^2 + 4x$
 $x = \frac{-b}{2a} = \frac{-4}{2(1)} = -2$
 $y = f(-2) = (-2)^2 + 4(-2) = -4$
 Vertex $(-2, -4)$

A 6. $\sqrt{x+2} + \sqrt{x+2} + \sqrt{x+2} = 2.5$
 $3\sqrt{x+2} = 2.5$
 $(\sqrt{x+4.5})^2 = (2.5)^2$
 $x+4.5 = 6.25$
 $x = 1.75$

A 7. $13^{12} - 11$
 $1 - 1 = 0$
 $3^0 = 1$
 $3^1 = 3$
 $3^2 = 9$
 $3^3 = 27$
 $3^4 = 81$
 $3^5 = 243$
 $3^6 = 729$
 $3^7 = 2187$
 $\therefore 4\sqrt{12} = 3r0$
 end with a 1

B 8. $(3x-4y)^{10}$
 ${}_{10}C_6 (3x)^6 (-4y)^4$
 $210 \cdot 729 \cdot 256 =$
 39191040

B 9. $1+7+21+35+35+21+7+1 =$
 128

A 10. $3(x+2y+z=8)$
 $x-y+3z=10$
 $-3x-6y-3z=-24$

$-2x-7y=-14$

$2x+y=6$

$-6y=-8$

$y = \frac{4}{3}$

$2x + \frac{4}{3} = 6$

$2x = 18 - \frac{4}{3}$

$\frac{1}{2} \cdot 2x = \frac{34}{3} \cdot \frac{1}{2}$

$x = \frac{17}{3}$

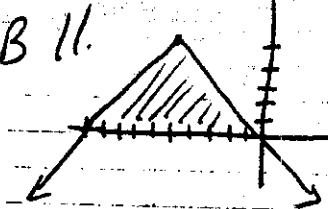
$\frac{7}{3} + 2 \cdot \frac{4}{3} + z = 8$

$\frac{7}{3} + \frac{8}{3} + z = \frac{24}{3}$

$z = \frac{9}{3} = 3 = \frac{9}{3}$

$\frac{17}{3}$
 $\frac{4}{3}$
 $\frac{9}{3}$

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B 11.  $A = \frac{1}{2}bh$
 $\frac{1}{2} \cdot 10 \cdot 5$
 (25)

B 18. $\frac{x^2}{36} + \frac{y^2}{16} = 1$ $A = \pi ab$
 $= \pi \cdot 6 \cdot 4$
 $= (24\pi)$

B 19. $a_1 = r$ ratio = $\frac{r^2}{r} = r$
 $\frac{r}{1-r}$

C 12. Fibonacci sequence
1, 1, 2, 3, 5, 8, ...

B 13. $\log 317 \approx 2.5011$
2 is the characteristic
.5011 is the mantissa
317 is the argument

A 20. $P(1 \text{ or } 3, H) = \frac{1}{3} \cdot \frac{1}{2} = (\frac{1}{6})$

B 21. $A = Pe^{rt}$
 $\frac{10000}{1000} = \frac{1000}{1000} \cdot e^{r \cdot 5}$
 $e^{5r} = 10$
 $\ln 10 = 5r$
 $\frac{\ln 10}{5} = r$
 $r = 46\%$

A 14. $\frac{1}{2} \left| \begin{array}{cc|cc} 2 & -3 & 1 & -3 \\ 4 & 8 & 1 & 8 \\ 7 & 4 & 1 & 7 \end{array} \right|$
 $16 + (-21) + 16 - 56 - 8r + 12 = -41$
 $|\frac{1}{2}(-41)| = (\frac{41}{2})$

C 22. $5x^2 + y^2 = 30$
 $-(9x^2 + y^2 = 16)$
 $14x^2 = 14$
 $x^2 = 1$
 $x = \pm 1$

A 15. $f(g(x)) = f(x^2 - 4x)$
 $4(x^2 - 4x)^2 - (x^2 - 4x)$
 $4x^4 - 32x^3 + 64x^2 - x^2 + 4x$
 $(4x^4 - 32x^3 + 63x^2 + 4x)$

$5(\pm 1)^2 + y^2 = 30$
 $y^2 = 25$
 $y = \pm 5$
 $(\pm 1, \pm 5)$

C 16. $(3a^2 - 4b^4)^2$
 $9a^4 - 24a^2b^4 + 16b^8$
 $9 - 24 + 16 = (1)$

C 23. $\log_5 9765625 = x$ $\log_6 2176782336 = y$
 $5^x = 9765625$
 $5^x = 5^{10}$
 $x = 10$
 $x \cdot y = 10 \cdot 12$
 $(xy = 120)$
 $6^y = 2176782336$
 $6^y = 6^{12}$
 $y = 12$

C 17. $f(x) = f(x-4) + x^2$
 $f(10) = f(6) + 100$
 $f(6) = f(2) + 36$
 $f(2) = 24$
 $f(6) = 24 + 36 = 60$
 $f(10) = 60 + 100 = (160)$

C 24. $a_1 = 6$ $r = 2$
 $a_n = a_1 \cdot r^{n-1}$
 $1536 = 6(2)^{n-1}$
 $256 = 2^{n-1}$
 $2^8 = 2^{n-1}$
 $8 = n-1$
 $(n = 9)$

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C 25. $(3^x)^{(x-1)} = 729$

$$3^{x^2-x} = 3^6$$

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

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

$$x = 3 \text{ or } x = -2$$

$$3 + 2 = \textcircled{1}$$

A 26. $(-2)^4 + 6(-2)^3 + 12(-2)^2 + 8(-2)$
 $16 - 48 + 48 - 16 = \textcircled{0}$

D 27. $\log 192$
 $\log (2^6 \cdot 3)$
 $6 \log 2 + \log 3$
 $\textcircled{6a + b}$

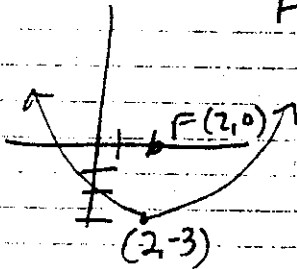
B 28. $x^2 - 12x - 4x - 32 = 0$

$$x^2 - 4x + \quad = 12y + 32$$

$$x^2 - 4x + 4 = 12y + 32 + 4$$

$$(x-2)^2 = 12(y+3)$$

$$F(2,0)$$



A 29. $m^T = \begin{bmatrix} 2 & 3 & 0 \\ 1 & -5 & 8 \\ -7 & 6 & 3 \end{bmatrix} \begin{matrix} 2 & 3 \\ 1 & -5 \\ 7 & 6 \end{matrix}$

$$-30 - 168 + 0 - 0 - 96 - 9 = \textcircled{-303}$$

30. $[3 \cdot 11] + [11] - [-e] + (3^7)$

$$3 + 3 + 7 + 3 + 2187 =$$

$$\textcircled{2196}$$

- | | | |
|------|------|------|
| 1 C | 11 B | 21 B |
| 2 C | 12 C | 22 C |
| 3 C | 13 B | 23 C |
| 4 D | 14 A | 24 C |
| 5 D | 15 A | 25 C |
| 6 A | 16 C | 26 A |
| 7 A | 17 C | 27 D |
| 8 B | 18 B | 28 B |
| 9 B | 19 B | 29 A |
| 10 A | 20 A | 30 D |