10

Answers to FAMAT Invitational – January 2001
Algebra I Division

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

1	$x^9 + x^7$
2	$x > {}^{3}/_{2}$ and $x < {}^{-3}/_{2}$
3	97.12
4	-5
5	2
6	15
7	13
8	15
9	16
10	$6x - 2y = 5$
11	0
12	$2\sqrt{10} + {}^{23}/_{6}$
13	$(x\text{-}3)^2$
14	11
15	${}^{9}/_{4}$

Algebra I Team Solutions – FAMAT Invitational – January 2001

1. Simplify the first term to $(x^6)(x^3)$ then simplify to x^9 (all basic laws of exponents). $x^9 + x^7$ cannot be simplified, therefore $\boxed{x^9 + x^7}$

2. Rewrite the eqn. as $3-2|x| < 0$; rewrite as $-2|x| < -3$; $|x| > \frac{3}{2}$. Therefore $\boxed{x > \frac{3}{2} \text{ and } x < -\frac{3}{2}}$.

3. A – $(.80)(^1/_3)(6) = 1.6$, B – $(0.60)(^1/_9)(12) = 0.8$, C – $(1.28)(^6/_5)(20) = 30.72$, D – $(0.64)(10)(10) = 64$. $A + B + C + D = 1.6 + 0.8 + 30.72 + 64 = \boxed{97.12}$.

4. Add the exponents of the left side to get $-2a-6 = 4$. Solve for "a" to be: $\boxed{a = -5}$.

5. Find the two equations to be $(x)(x + 2) – (x+x+2) = 119$. Therefore "$x$" = 11. Therefore the other number is 13. The absolute value of the difference is $\boxed{2}$.

6. Factor the equations to get:
Sum the largest roots to get the answer of $\boxed{15}$.

Eqn.	Factored Eqn.	Roots	Largest Root
$x^2 + 2x – 15 = 0$	(x-3)(x+5) = 0	3, -5	3
$x^2 – 3x – 18 = 0$	(x-6)(x+3) = 0	6, -3	6
$12x^2 – 12x = 0$	12x(x-1) = 0	0, 1	1
$5x^2 – 15x – 50 = 0$	5(x-5)(x+2) = 0	5, -2	5

7. Distribute the terms out using multiplication properties to get $2x^3 + -10x^2 + 17x + 4$. Sum the coefficients to get $\boxed{13}$.

8. Factor (A) to be (x-3)(x-3)(x+5). The (x+5) cancels so the results is (x-3)(x-3) or $\boxed{(x-3)^2 \text{ OR } x^2 – 6x + 9}$.

9. [1*(2 # 0)]*[(4#2)] becomes [1*(4)]*[(4#2)] which becomes [1*4]*[4#2] which becomes (2 * 20) which becomes $\boxed{16}$.

10. P – use point-slope to get $(y-7) = -\frac{5}{3}(x-2)$. Rewrite as $P = 5x + 3y – 31 = 0$. Q – Find the slope first as $\frac{6-5}{4+1} = \frac{1}{5}$. Then use point slope to find $(y-6) = \frac{1}{5}(x-4)$ to get $-x + 5y – 26 = 0$. P + Q therefore = $-6x + 2y + 5 = 0$, rewrite as $\boxed{6x – 2y = 5}$.

11. $\sqrt{33-4x} = 3-x$; $33-4x = 9-6x+x^2$; $x^2 – 2x – 24 = 0$; $(x-6)(x+4) = 0$; $x = 6$ or $x = -4$. Sub- both these results into the original equation as a check, $x = 6$ is an extraneous solution, so $\boxed{x = -4}$.

12. A – slope is $-^a/_b$, -2/3. B – set y equal to 0, solve for x, x = 0.5. C – set x equal to zero, solve for y, y = 4, D – use distance formula, $\sqrt{(4+2)^2+(7-5)^2} = 2\sqrt{10}$. Therefore the sum is $\boxed{2\sqrt{10}+\frac{23}{6}}$.

13. Use repeated substitution using all the equations to find x = 3, y = 5, z = 7. Sum them to find ans. = $\boxed{15}$.

14. Combine exponents on like terms {x,y,z} to get $x^5y^{-2}z^8$. 5 + -2 + 8 = $\boxed{11}$.

15. Simplify both sides to get: $x - 4\sqrt{x} + 4 = x - 2$. Rewrite to get $6 - 4\sqrt{x} = 0; 6 = 4\sqrt{x}$. Therefore $\frac{3}{2} = \sqrt{x}$.

Therefore $x = \frac{9}{4}$