Solutions Algebra 2 Individual Test

1	C		11	E	4	21	C
2	B		12	C		22	D
3	E	-42	13	D		23	C
4	D		14	B		24	A
5	D		15	B		25	D
6	C		16	D		26	C
7	D		17	C		27	C
8	C		18	C		28	A
9	A		19	C		29	D
10	B		20	B		30	C

Algebra II Individual Test

1. $\frac{3}{2x-4} - \frac{5}{x+3} = \frac{2}{x-2}$

$\frac{3(x+3) - 5(2x-4)}{(2x-4)(x+3)} = \frac{2}{x-2}$

$\frac{-7x+29}{2(x-2)(x+3)} = \frac{2}{x-2}$

$\frac{-7x+29}{2x+6} = 2$

$-7x+29 = 4x+12$

$-11x = -17$

$\boxed{x = \frac{17}{11}}$

2. $x+3 + x-3 > 8$ $\quad -x-3 + -x+3 > 8$

$2x > 8$ $\quad -2x > 8$

$\boxed{x > 4}$ $\quad \boxed{x < -4}$

3. $2\,g(x) = 6x^3 - 20x + 18$

$g(x) = 3x^3 - 10x + 9$

$g(-3) = -81 + 30 + 9$

$g(-3) = \boxed{-42}$

4. Linear term is in the 5th term of the expansion.

$\binom{5}{4} \frac{1}{x}^1 (-2x^{1/2})^4$

$n = 5 \qquad r = 4$

$(-2^4)\left(\frac{5!}{4!1!}\right)$

$5 \cdot 16 = \boxed{80}$

5. Coefficient Matrix

$$\begin{vmatrix} 2 & 3 & 1 \\ 1 & 1 & 1 \\ 3 & 4 & -2 \end{vmatrix} = 4$$

$$x = \frac{\begin{vmatrix} 7 & 3 & 1 \\ 4 & 1 & 1 \\ 6 & 4 & -2 \end{vmatrix}}{4} = \frac{5}{2}$$

$$y = \frac{\begin{vmatrix} 2 & 7 & 1 \\ 1 & 4 & 1 \\ 3 & 6 & -2 \end{vmatrix}}{4} = \frac{1}{4}$$

$$z = \frac{\begin{vmatrix} 2 & 3 & 7 \\ 1 & 1 & 4 \\ 3 & 4 & 6 \end{vmatrix}}{4} = \frac{5}{4}$$

$\boxed{\frac{5}{2}, \frac{1}{4}, \frac{5}{4}}$

6. A B _ _ _
_ A B _ _
_ _ A B _
_ _ _ A B

$4 \times (2 \cdot 1 \cdot 3 \cdot 2 \cdot 1)$

$4 \times 2! \times 3! = \boxed{48}$

7. $\begin{bmatrix} 3 & 0 & -4 \\ 9 & -8 & 2 \end{bmatrix} \cdot \begin{bmatrix} 7 \\ -1 \\ -5 \end{bmatrix}$

$\begin{bmatrix} (3)(7) + (-4)(-5) \\ (9)(7) + (-8)(-1) + (2)(-5) \end{bmatrix}$

$\begin{bmatrix} 41 \\ 61 \end{bmatrix}$

8. $\left| \frac{(3+3i)^2}{1+i} \right|$

$\left| \frac{18i}{1+i} \right|$

$\frac{18}{\sqrt{2}} = \boxed{9\sqrt{2}}$

9. $f(x) = ax^2$

$-4 = a(5)^2$

$\boxed{\frac{-4}{25} = a}$

10. $\frac{5x-11}{2x^2+x-6} = \frac{A}{x+2} + \frac{B}{2x-3}$

$\frac{5x-11}{2x^2+x-6} = \frac{A(2x-3) + B(x+2)}{(x+2)(2x-3)}$

$\frac{5x-11}{2x^2+x-6} = \frac{2Ax - 3A + Bx + 2B}{(x+2)(2x-3)}$

$2A + B = 5$
$-3A + 2B = -11$

$7B = -7$
$B = -1$

$2A - 1 = 5$
$A = 3$

$\boxed{\begin{matrix} A = 3 \\ B = -1 \end{matrix}}$

11. $\sqrt{m} + \sqrt{m-3} = \frac{3}{\sqrt{m-3}}$

$\sqrt{m^2-3m} + m - 3 = 3$

$\sqrt{m^2-3m} = 6 - m$

$m^2 - 3m = 36 - 12m + m^2$

$9m = 36$

$\boxed{m = 4}$

12. $2x^3 + 3x^2 - 8x + 3$

$(x-1)(x+3)(2x-1)$

$\boxed{x = 1, -3, \frac{1}{2}}$

13. Two fixed points are the foci
$\therefore$ center of ellipse is $(1,2)$

Sum of distance is the major axis which is $2a$ so:

$2a = 8$

$a = 4$

$c = 3$

$b^2 = a^2 - c^2$

$b^2 = 16 - 9$

$b^2 = 7$

$\boxed{\frac{(x-1)^2}{16} + \frac{(y-2)^2}{7} = 1}$

14. $\log_{10}[\log_2(\log_7 x)] = 0$

$\log_2(\log_7 x) = 1$

$\log_7 x = 2$

$\boxed{x = 49}$

15. $y = 3x^2 - 24x + 50$

$y - 50 = 3(x^2 - 8x)$

$y - 50 + 48 = 3(x^2 - 4x + 16)$

$y = 3(x-4)^2 + 2$

$3 = \frac{1}{4p}$

$\boxed{\frac{1}{3} = 4p}$

16. $f(x) = \sqrt[3]{x^2+1}$ $\quad g(x) = x^3 + 1$

$f(4) = \sqrt[3]{17}$ $\quad g(\sqrt[3]{17}) = (\sqrt[3]{17})^3 + 1$

$\boxed{g(x) = 18}$

1. $8x^2 + 72y^2 = 1152$

$\frac{x^2}{144} + \frac{y^2}{16} = 1$

Area = $AB\pi$

Area = $(12)(4)\pi$

$\boxed{\text{Area} = 48\pi}$

By Decarte's Rule (sign changes)

c)

Pos	Neg	imaginary/complex
3	1	0
1	1	2

∴ the only ones that can be true are:

* 3 pos 1 neg
1 pos 1 neg 2 complex

$\boxed{\text{II \& IV}}$

9. $\log 2 = a \log 3$

$\log 5 = b \log 3$

$\log_{10} 50 = \frac{\log 50}{\log 10} = \frac{2\log 5 + \log 2}{\log 2 + \log 5}$ *

substitute in for $\log 2$ and $\log 5$

$\frac{2(b\log 3) + (a \log 3)}{(a\log 3) + (b \log 2)} = \frac{\log 3 (2b + a)}{a + b}$

$\boxed{\frac{2b+a}{a+b}}$

20. Euler's Phi Function

Prime Factorization $= p^{k_1} \cdot p^{k_2} \cdot p^{k_3} \cdots p^{k_n}$

$\phi(x) = (p^{k_1} - p^{k_1 - 1})(p^{k_2} - p^{k_2-1})(p^{k_3} - p^{k_3-1}) \cdots (p^{k_n} - p^{k_n-1})$

$2520 = 2^3 \cdot 3^2 \cdot 7 \cdot 5$

$\phi(x) = (2^3 - 2^2)(3^2 - 3)(7-1)(5-1)$

$24 \cdot 24 = \boxed{576}$

21. $3x^2 - 11x - 4$

$(3x+1)(x-4)$

$\boxed{x = -1/3 \quad x = 4}$

$\boxed{y = 1/3}$

degree same in numerator and denominator.

$\frac{1x^2}{3x^2} = \frac{1}{3}$

$y = 1/3$

22. $f(x) = x^5 - 4x^4 + 13x^3$

$x^3(x^2 - 4x + 13)$

$x \cdot x \cdot x (x^2 - 4x + 13)$

$x = 0$ of multiplicity 3

23. at least one deficient $= \binom{15}{3} - \binom{10}{3}$

total combinations $\binom{15}{3}$

$\frac{\binom{15}{3} - \binom{10}{3}}{\binom{15}{3}} = \frac{455 - 120}{455} = \boxed{\frac{67}{91}}$

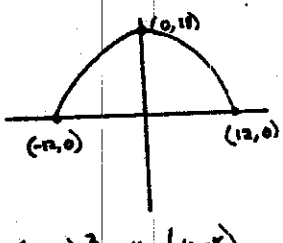
24. $g(f(x)) = 5(x-2) + \sqrt{x-2}$

$5x - 10 + \sqrt{x-2}$

x cannot be less than 2

so $\boxed{[2, \infty)}$

25.



$(x-h)^2 = 4a(y-k)$

$(x-0)^2 = 4a(y-18)$

find a use (12,0) or (-12,0)

$(12-0)^2 = 4a(0-18)$

$144 = 4a(-18)$

$\frac{144}{-72} = a$

$-2 = a$

$(x-0)^2 = -2(y-18)$

use (8,0) solve for y

$(8-0)^2 = -2(y-18)$

$64 = -2y + 144$

$-80 = -2y$

$\boxed{40 = y}$

26. $5 \cdot 5^{1/2} \cdot 5^{1/4} \cdot 5^{1/8}$

$5^{1 + 1/2 + 1/4 + 1/8 + \ldots \text{ infinite}}$ $\quad \frac{a}{1-r}$

$\frac{1}{1 - 1/2} = 2$

so $5^2 = \boxed{25}$

27. Let $z = a+bi$, $w = c+di$

I. $\overline{a+bi+c+di} = \overline{a+bi} + \overline{c+di}$

$a+c-(b+d)i$ $\quad a+c-(b+d)i$

II. $\overline{(a+bi)(c+di)} = \overline{a+bi} \cdot \overline{c+di}$

$(ac-bd) - (bc+ad)i = (ac-bd) - (bc+$

III $\overline{\overline{a+bi} + \overline{c+di}} = a+bi+c+di$

$(a+c) + (b+d)i = (a+c) + (b+d)i$

$\boxed{\text{I, II, III}}$

28. $y = \frac{3x}{2x-1}$

horizontal $\frac{3x}{2x}$

$\boxed{y = \frac{3}{2}}$

29. $0 < n < 1$

$n^2 > 1$ no

$\boxed{n^2 > n^3}$ yes

$\boxed{\sqrt{n} > n}$ yes D

30. Let $y = 3^x$

$(3^x)^2 - 10(3^x) + 9 = 0$

$y^2 - 10y + 9 = 0$

$(y-1)(y-9) = 0$

$y = 1 \quad y = 9$

$3^x = 1 \quad 3^x = 9$

$x = 0 \quad x = 2$

$x^2 + 1$

$0^2 + 1 = 1$

$2^2 + 1 = 5$

$\boxed{1 \text{ or } 5}$