1. a = k/b; 4 = k/6; k = 24; a = 24/-12; a = -2

b. -2

2. $\begin{vmatrix} 5 & 6 \\ 7 & 8 \end{vmatrix}$ = 5 x 8 – 7 x 6 = 40 – 42 = -2

a. -2

3. $x = \frac{4}{7}$ is a vertical line. No slope.

e. NOTA

4. Center (3, -2) and horiz radius 5 implies 2 y-int's. Vert radius 3 implies 2 x-int's.

d. 4

5. ${}_6C_3$ x ${}_7C_2$ = 20 x 21

b. 420

6. $-19 = a_1 + 12d$ and $10 = a_1 + 4d$. $-29 = 8d$. $d = -29/8$. $a_1 = 10 - 4(-29/8) = 80/8 + 116/8 = 196/8$.

$a_2 = 196/8 + -29/8 = 167/8$.

b. $\frac{167}{8}$

7. f(2) = 1/3. f(1/3) = 3/4. f(3/4) = 4/7. f(4/7) = 7/11

b. $\frac{7}{11}$

8. $y = \frac{3x+5}{7-|x|}$. As x approaches infinity, y approaches -3. As x approaches negative infinity, y approaches 3. Vertical asymptotes at x = 7 and x = -7.

c. 4

9. $y = \frac{250}{1+3e^{-.05x}}$. As x approaches infinity, $e^{-.05x}$ approaches zero and y approaches 250.

d. 250

10. Slope (-2, 1) and (1, -3) = 4/-3. Slope of tangent line is perpendicular to slope of the attached radius = 3/4.

c. $\frac{3}{4}$

11. Build x, f, g table.

x =	5	4	3	2	1	0	-1	-2
f =	625	**256**	81	**16**	1	0	1	16
g =	1024	**256**	64	**16**	4	1	0.25	0.0625

Since f > g at x = -1 and f < g at x = 0, there must be a third point of intersection/solution.

d. 3

12. Divide both sides by 5 and split the absolute value: $-3 \le x - 7 \le 3$. Add 7. $4 \le x \le 10$.

d. $[4,10]$

13. l x w x h = 50. l = 2w. $h = 25/w^2$. $S = lw + 2wh + 2hl = 2ww + 2w(25/w^2) + 2(2w)(25/w^2)$

$S = 2w^2 + 50/w + 100/w$.

c. $S(x) = 2x^2 + \frac{150}{x}$

14. $y = 2(x-3)^2 - 7$. 0 for x. $y = 2(0 - 3)^2 - 7 = 2(9) - 7 = 18 - 7 = 11$.

e. NOTA

15. a x b/2 = 120. ab =240. $a + b + \sqrt{(a^2 + b^2)} = 60$. $a + b + \sqrt{(a^2 + b^2)} = 60$.

$a + b - 60 = -\sqrt{(a^2 + b^2)}$. $(a + b - 60)^2 = a^2 + b^2 = a^2 + ab - 60a + ba + b^2 - 60b - 60a - 60b + 3600$.

$120a + 120b = 3600 + 2ab = 3600 + 2(240)$. $a + b = 30 + 4$

b. 34

16. $10x^5+6x^4-49x^3+33x^2-96x+36=0$. Possible rat. roots: $\pm \frac{1, 2, 3, 4, 6, 9, 12, 18, 36}{1, 2, 5, 10}$

Synthetic substitution:		10	6	-49	33	-96	36
x = 2/5	|	10	10	-45	15	-90	0

reduce the polynomial:		2	2	-9	3	-18	
x = 2	|	2	6	3	9	0	

$2x^3+6x^2+3x+9$ factor by grouping: $(2x^2 + 3)(x + 3)$. Non-real and negative solutions. 2 + 2/5 =

c. $\frac{12}{5}$

17. $y=-\sqrt{x+5}-6$. Domain: [-5, ∞). Range: (-∞, -6]. No intersection.

e. NOTA

18. If $z=a+bi$, then $z\cdot\bar{z}=(a+bi)(a-bi)=a^2-abi+abi-b^2i^2=a^2-b^2(-1)$

a. a^2+b^2

19. $\frac{1}{5}$ = probability of guessing right, for 20 questions $\left(\frac{1}{5}\right)^{20}$. $\frac{4}{5}$ probability of guessing wrong, for

10 questions $\left(\frac{4}{5}\right)^{10}$. ${}_{30}C_{20}$ possible arrangements of 20 questions from 30 total.

d. ${}_{30}C_{20}\left(\frac{1}{5}\right)^{20}\left(\frac{4}{5}\right)^{10}$

20. $A\times B=B\times A$ is generally false. True for inverses or identity matrix.

b. sometimes

21. $f(x)=3x+7$. By definition, switch x and y. Solve for y.

b. $\frac{x-7}{3}$

22. y-intercept of $y=4x^5+9x^4-2x^2-3x$

a. $(0,0)$

23. 15D + 1C + .25M = 100. D + C + M = 100. Subtract the two: 14D – 3/4 M = 0. 14D = 3/4 M. 14*4D = 3M. D must be a positive multiple of 3 (3, 6, 9,…). D = 9 exceeds the $100. D = 6 costs $90, but does not leave enough $ for 94 other animals. So D = 3 and M = 56 and C = 41.

a. 1

24. By definition, f(a) = f(-a). So, I (yes), II (not a function), III (yes), IV (no).

d. I, III

25. $y = (x-4)(x+2)$. X-intercepts (4, 0) and (-2, 0). Vertex is half way between: (4 + -2)/2 = 1.

Substitute: y = (1 - 4)(1 + 2) = -9. 1 + -9 = -8

b. -8

26. $\sqrt{3-x}+\sqrt{x+2}=3=2+1=1+2$. 3 – x = 4. x = -1. 3 – x = 1. x = 2. -1 + 2 = 1.

b. 1

27. $\frac{(x-h)^2}{A}+\frac{(y-k)^2}{B}=1$. Cannot be determined since focus location based on ellipse's orientation.

d. cannot be determined

28. C + G = 44 and 2C + 4G = 156. Simplify: C + 2G = 78. Subtract: G = 34

c. 34

29. $\sum_{n=1}^{\infty} 5\left(\frac{1}{2}\right)^{n-1} = 5+\frac{5}{2}+\frac{5}{4}+\frac{5}{8}+\frac{5}{16}+\ldots = 5\left(1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots\right) = 5(2)$

b. 10

30. $\log_6\left(\log_2 x\right)=1$. $\left(\log_2 x\right)=6$. $x=2^6=64$.

b. 4