1. B Using distance formula $\sqrt{(-3 - -5)^2 + (-7-4)^2} = \sqrt{4+121} = \sqrt{125} = 5\sqrt{5}$

2. A $\frac{5+x}{2} = 2$ x = -1; $\frac{7+y}{2} = -9$ y = - 25

3. C The slope of the given line is 4, and the line perpendicular to it has a slope of -1/4, the negative reciprocal.

4. A Definition

5. D Reflecting about the line y = x is the inverse of the first equation. Replace x for y and y for x. 4y – 2x = 9; multiply by -1; 2x – 4y = - 9

6. D Complete the square:

$x^2 - 4x + 4 + y^2 + 6y + 9 = 4 + 9 + 11;\ (x-2)^2 + (y+3)^2 = 24$ R = $\sqrt{24} = 2\sqrt{6}$

7. A Solve the system by multiplying the second equation by -2 and adding getting (2x – 3y = 21) + (- 2x + 4y = -26) ; y = - 5; Substituting find x = 3. -5 + 3 = - 2

8. B $[4(x]^2 - 6x + 9) - (y^2 - 4y + 4) = 32 + 36 - 4; 4(x-3)^2 + (y+2)^2 = 32 + 36 - 4$

$\frac{4(x-3)^2}{64} - \frac{(y-2)^2}{64} = 1;\ \frac{(x-3)^2}{16} - \frac{(y-2)^2}{64} = 1; a^2 = 16,\ b^2 = 64;\ a^2 + b^2 = 80; c = \sqrt{80}; c = 4\sqrt{5}; 2c = 8\sqrt{5}$

9. D Complete the square to find the vertex.

$x^2 - 8x + 8y + 19 = 0;\ \ x^2 - 8x = -8y - 19;\ \ x^2 - 8x + 16 = -8y - 19 + 16;\ (x-4)^2 = -8\big(y +$

Because the parabola opens downward, the axis of symmetry is x = 4.

10. A Since the lady bug is traveling at the rate of 0.5 unit/minute, she is traveling 1 unit every two minutes; In 60 minutes she will move 30 units which is 5 cycles. A cycle is actually one unit north and one unit east. Five units north and 5 units east would be (-5 + 5, -2 + 5)= (0, 3) 0 + 3 = 3

11. E The slope is the negative reciprocal of given line; m = - 5/3. Plug in point: 5(5) + 3(-2) = 19; 5 = 3 – 19 = -11

12. B $\frac{|6(7) + (-8)(-6) - 5|}{\sqrt{7^2 + (-6)^2}} = \frac{85}{\sqrt{85}} = \sqrt{85}$

13. C h(x) = g(x + 3) = $2(x+3)^3 - 3(x+3)^2 + 4(x+3) - 5$ =

$2(2(x{\uparrow}3 = 9x{\uparrow}2 + 27x + 27 - 3(x{\uparrow}2 + 6x + 9 + 4x + 12 - 5 = 2x{\uparrow}3 + 15x{\uparrow}2 + 40x + 34$

14. D Definition of a parabola

15. B The shortest distance from a point and a circle is the distance from the center of the circle to the point minus the radius of the circle. Center of circle:

$x^2 + y^2 - 18x + 6y + 88 = 0$: $x^2 - 18x + 81 + y^2$ + 6y + 9 = 81 + 9 – 88;

$(x-9)^2 + (y+3)^2 = 2$: Center(9, -3) & radius = $\sqrt{2}$. Distance between point and center

$\sqrt{(9-5)^2 + (-3-1)^2} = \sqrt{16+16} = 4\sqrt{2}$; $4\sqrt{2} - \sqrt{2} = 3\sqrt{2}$.

16. A Complete the square: $3x^2 - 2y^2$ - 18x – 20y - 47 = 0;

$3(x{\uparrow}2 - 6x + 9) - 2(y{\uparrow}2$ + 10y+ 25) = 47 + 27 - 50. Center is (3, -5)

17. C When the equation is solved for x, the equation is $0.25(4-y)^2 - 0.5 = x$ resulting in a positive y squared the parabola opens to the right.

18. C. The area of an ellipse is abπ; the length of the major axis is 2a; a=9 and b = 36π/9 = 4; b=4;

$c^2 = a^2 - b^2 = 81 - 16 = 65;\ c = \sqrt{65}$ **and the distance between the foci (2c) =** $2\sqrt{65}$.

19. C. Area is the absolute value of .5$\begin{vmatrix} -8 & 4 & 1 \\ 2 & 5 & 1 \\ 9 & -12 & 1 \end{vmatrix} = \frac{177}{2}$

20 A. The intersection of the lines is (7, -5); 15π = 2rπ; r = $\frac{15}{2}$; $r^2 = \frac{225}{4}$;
$(x-7)^2 + (y+5)^2 = \frac{225}{4}$; $x^2 - 14x + 49 + y^2$ - 10x + 40y + 25 - $\frac{225}{4}$ = 0 $4x^2 + 4y^2$ - 56x + 40y + 71 = 0
21. D. Complete the square to find 2b; $x^2 - 4y^2$ + 10x + 24y + 25 = 0;
□ $x□↑2 + 10x + 25 - 4(y↑2$ -6y +9) = 25 - 25 -36; $\frac{(y-3)^2}{9}$ - $\frac{(x+5)^2}{36} = 1$; b = 6 and 2b = 12.
22. B. The triangle is an isosceles right triangle with a base of 16 and a height of 8. The area is 64.
23. B. A : In slope y-intercept form: y = 4x – 7 y-intercept is (0, -7) B: When y = 0, then x = 2 x-intercept is (2, 0) The midpoint is (1, - 3)
24. C. The greatest distance from the moon to the earth is c + a. 2a = 500,000; a = 250,000.
Eccentricity = c/a; .05 = c /250,000. C = 12,500. A + c = 250,000 + 12, 500 = 262,500. These are all approximate values.
25. B. Write the equation of the circle in the form
$x^2 + y^2 + Dx + Ey + F = 0.$ *Substitute in the three points for x and y and solve the 3x3 system.*

1 + 4 + D – 2E + F = 0; 25 + 16 + 5D + 4E + F = 0; 100 + 25 + 10D + 5E +F = 0
The solution of the system gives D = - 18, E = 6, and F = 25 giving the equation of the circle to be
$x^2 + y^2 - 18x + 6y + 25 = 0$ Completing the square:
$x^2 - 18x + 81 + y^2 + 6y + 9 = 81 + 9 - 25$
81 + 9 – 25 = 65. Therefore the radius is $\sqrt{65}$.
26. D. Complete the square to find the center and the slope of the asymptotes:
$49y^2$ + 98y - $4x^2$ – 48x - 291 = 0; $49(y↑2$ + 2y+ 1) - □ 4 $(x□↑2$ + 12x+ 36) = 291 + 49 – 144; 49$(y+1)^2 - 4(x+6)^2 = 196;$ $\frac{(y+1)^2}{4} - \frac{(x+6)^2}{49} = 1;$ The slopes of the asymptotes are $\pm\frac{2}{7}$ and the lines pass through the center of the hyperbola (-6, -1). The asymptotes are 2x – 7y = -5 and 2x + 7y = -19.
27. C. Solve the system: □ ($x□↑2 + y↑2 = 25$) +($-x^2 - y = -5$) $y^2 - y = 20$;
y = -4 or 5; substituting gives the points . (0, 5), (- 3, - 4), (3, - 4)
28. D. I. The vertical asymptotes are where the denominator = 0; x = -2, x = 2. False
II. y cannot equal 1, since substituting y = 1 into the function gives a false statement. Therefore y = 1 is a horizontal asymptote. True
III. There is no oblique asymptote since there is a horizontal asymptote. False
IV. x = 2 or -2 would create division by zero, therefore would be excluded from the domain. True
29. C. Sum of the roots of a quadratic are –b/a; - -12/4 = 3
30. C. F(x) = f(- x)
Replace x with – x I. f(- x) = |- x| + 3; f(x) = |x| + 3
II. $f(x) = (-x)^4 - 4(-x)^2 + 2;$ $f(x) = x^4 - 4x^2 + 2$
III. $f(x) = \left(-x^{(□)3}\right) - (-x) + 1;$ $f(x) = -x^3 + x + 1$ Not true