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

2. **A** \( \frac{5 + x}{2} = 2 \quad x = -1; \quad \frac{7 + y}{2} = -9 \quad y = -25 \)

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:
\[
\begin{align*}
x^2 - 4x + 4 + y^2 + 6y + 9 &= 4 + 9 + 11; \\
(x - 2)^2 + (y + 3)^2 &= 24 \\
R &= \sqrt{24} = 2\sqrt{6}
\end{align*}
\]

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** \[
\begin{align*}
\frac{4(x-3)^2}{64} - \frac{(y-2)^2}{16} &= 1; \\
\frac{(x-3)^2}{16} - \frac{(y-2)^2}{64} &= 1; \\
a^2 &= 16; \\
b^2 &= 64; \\
a^2 + b^2 &= 80; \\
c &= \sqrt{80}; \\
c &= 4\sqrt{5}; \\
c &= 8\sqrt{5}
\end{align*}
\]

9. **D** Complete the square to find the vertex.
\[
\begin{align*}
x^2 - 8x + 19 &= 0; \\
x^2 - 8x - 16 &= -8 - 16; \\
x^2 - 8x + 16 &= -8y - 19 + 16; \\
(x - 4)^2 &= -8(y + \frac{3}{2})
\end{align*}
\]

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

10. **A** Since the ladybug 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; \( m = -\frac{5}{3} \). Plug in point: \( 5(5) + 3(-2) = 19; \\
5 = -19 = -11 \)

12. **B** \[
\frac{6(7) + (8)(-6) - 5}{\sqrt{7^2 + (-6)^2}} = \frac{65}{\sqrt{85}} = \frac{\sqrt{85}}{\sqrt{85}}
\]

13. **C** \( h(x) = g(x + 3) = 2(x + 3)^2 - 3(x + 3)^2 + 4(x + 3) - 5 = 2(2x^2 + 27x + 28 - 3x^2 + 6x + 9 + 4x + 12 - 5) = 2x^2 + 15x + 12x + 34 \)

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:
\[
\begin{align*}
x^2 + y^2 - 18x + 6y + 88 &= 0; \\
x^2 - 18x + 81 + y^2 + 6y + 9 &= 81 + 9 - 88;
\end{align*}
\]
\( (x - 9)^2 + (y + 3)^2 = 2 \): 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:
\[
\begin{align*}
3x^2 - 2y^2 - 18x - 20y - 47 &= 0; \\
3(x - 3)^2 - 20y - 220 &= 0; \\
\frac{10y + 25}{2} &= 47 - 25 - 50. Center is (3, -5)
\end{align*}
\]

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 \( ab\pi \); the length of the major axis is \( 2a \); \( a = 9 \) and \( b = 36\pi/9 = 4 \); \( b = 4 \);

\[
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 \( \frac{1}{2} |\begin{array}{ccc} 2 & 4 & 1 \\ 9 & -12 & 1 \end{array}| = \frac{177}{2} \)
20. The intersection of the lines is (7, -5); \(15\pi = 2\pi r; r = \frac{15}{2}; r^2 = \frac{225}{4}; \)
\((x - 7)^2 + (y + 5)^2 = \frac{225}{4}; x^2 - 14x + 49 + y^2 - 10x + 40y + 25 - \frac{225}{4} = 0; 4x^2 + 4y^2 - 56x + 40y + 71 = 0\)
21. Complete the square to find \(2b; \)
\(x^2 - 4y^2 + 10x + 24y + 25 = 0; \)
\((y - 3)^2 - \frac{(x + 5)^2}{36} = 1; b = 6\) and \(2b = 12.\)
22. The triangle is an isosceles right triangle with a base of 16 and a height of 8. The area is 64.
23. 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. The greatest distance from the moon to the earth is \(c + a\). \(2a = 500,000; a = 250,000.\)
Eccentricity = \(c/a; .05 = c /250,000.\) \(C = 12,500.\) \(A + c = 250,000 + 2500 = 262,500.\) 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.
\[1 + 4 + D - 2E + F = 0; \quad 25 + 16 + 5D + 4E + F = 0; \quad 100 + 25 + 10D + 5E + F = 0\]
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:
\[x^2 - 10x + 51 + y^2 + 6y + 9 = 51 + 9 - 25\]
\[81 + 9 - 25 = 65.\] Therefore the radius is \(\sqrt{65}.\)
26. D. Complete the square to find the center and the slope of the asymptotes:
\[49y^2 + 98y - 4x^2 - 48x - 291 = 0; \quad 49(y^2 + 2y + 1) - 4(x^2 + 2x + 3) = 291\]
\[+ 49 - 144; 49(y + 1)^2 - 4(x + 6)^2 = 196; \quad \frac{(y + 1)^2}{4} - \frac{(x + 6)^2}{49} = 1;\] 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:
\[x^2 + y^2 + 25 \quad + (x^2 - y = -5) \quad y^2 - y = 20; \]
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. \(f(x) = (x^4 - 4(-x)^3 + 2; f(x) = x^4 - 4x^3 + 2\)
III. \(f(x) = (x^4) - (x) + 1; f(x) = -x^2 + x + 1\) Not true