Circle Equations Answer Key

1. **Choice A** is the correct answer. The formula for a circle with a center at (h, k) and a radius of r is: $(x-h)^2 + (y-k)^2 = r^2$. In this case, we see that $r^2 = 64$. Taking the square root on both sides we get $r = \pm 8$. The radius cannot have a negative length, so we know that the answer is $r = 8$.

   Choice B is incorrect because it is the x-coordinate of the center. Choice C is incorrect because it is the y-coordinate of the center. Choice D is incorrect because it is the radius squared.

2. **Choice D** is the correct answer. If we rewrite the equation to fit the general form of a circle $(x-h)^2 + (y-k)^2 = r^2$, we get $(x-(-13.4))^2 + (y-(8.2))^2 = \sqrt{21.3}^2$. Thus, the center is $(-13.4, 8.2)$ and the radius $\sqrt{21.3}$.

   Choice A is incorrect because it squares the radius. Choice B and C are incorrect because it proposes an incorrect center for the circle.

3. **Choice D** is the correct answer. First, rewrite the equation in standard circle form to get $(x+4.4)^2 + (y-3.3)^2 = \frac{15}{1.5} = 10$. Now, $r^2 = 10, r = \sqrt{10} = 3.2$.

   Choice A and C are incorrect because the coefficient 1.5 was not divided out to be put in standard form. Choice B is incorrect because it is the radius squared.

4. **Choice C** is the correct answer. If we rewrite the equation to fit the general form of a circle $(x-h)^2 + (y-k)^2 = r^2$, we get $(x-(9))^2 + (y-(-49))^2 = 5^2$. Thus, the center is $(9, -49)$ and the radius 5.

   Choice B and D are incorrect because you do not take the square root of the center coordinates. Choice A is incorrect because the radius value is squared.

5. **Choice B** is the correct answer. Using the information given, we can write the equation for the circle in standard form: $(x-(16))^2 + (y-(-23))^2 = 3^2$ can be simplified to $(x-16)^2 + (y+23)^2 = 9$.

   Choices A and C are incorrect because the radius need to be squared. Choice D is incorrect because it is missing a square for x and y.

6. **Choice D** is the best answer. If the center is (h, k) and the radius is r, the equation for the circle is $(x-h)^2 + (y-k)^2 = r^2$. In this case, if r=6, and (0,0) is a point on the circle, simply plug the options into the equation and test of validity. $(0-3)^2 + (0-3)^2 = 6^2; 18 \neq 36$, Choices A and B are incorrect. $(0-6)^2 + (0-6)^2 = 6^2; 72 \neq 36$. Choice C is incorrect. $\left(0-3\sqrt{2}\right)^2 + \left(0+3\sqrt{2}\right)^2 = 36; 18 + 18 = 36$. Choice D is the correct answer.

7. **Choice C** is the best answer. First write the equation in standard form by completing the square and adding the proper constants to both sides of the equation. We get $(x^2 - 6x + 9) + (y^2 + 4y + 4) - 36 = 9 + 4$. This simplifies to $(x-3)^2 + (y+2)^2 - 36 = 13$; $(x-3)^2 +$

$(y+2)^2 = 49 = 7^2$. Now we have the equation in standard form with the center at $(3, -2)$and a radius r= 7. The radius of the circle is 7.

8. **Choice B** is the correct answer. The graph of the equation $(x+1)^2 + y^2 = 9$ has a center at $(-1,0)$and a radius of 3. If the center is translated 3 units to the right, the center of the new circle will be (2,0). If the radius is increased by 1, the new radius will be 4. Therefore, an equation of the new circle in the xy-plane is $(x-2)^2 + y^2 = 16$, so choice B is correct.

   Choices A and D are incorrect because they do not translate the center of the circle 3 units to the right correctly. Choice C is incorrect because it does not increase the radius by 1 correct. In choice C, the new length of the radius is $\sqrt{10} = 3.16$.

9. **Choice A** is the correct answer. We know that the center of the circle is $(-4, 5)$and the radius is of length 4. From the center, only the point $(-1,1)$ is greater than length 4 from the point $(-4,5)$. Check by graphing the circle on a calculator and turning on line grid to check the points.

   Choices B, C, and D are incorrect because they all exist inside the circle.

10. **Choice B** is the correct answer. If the center of the circle is at (0,3), we can write the equation $x^2 + (y-3)^2 = r^2$ where r is the radius. The radius of the circle is the distance from the center (0,3) to the given endpoint of a radius, in this case $\left(\frac{5}{3}, 4\right)$. By the distance formula, $r^2 = \left(\frac{5}{3} - 0\right)^2 + (4-3)^2 = \frac{25}{9} + \frac{9}{9} = \frac{34}{9}$. Therefore, an equation of the given circle is $x^2 + (y-3)^2 = \frac{34}{9}$.

    Choices C and D are incorrect because they result from using r instead of r^2 in the equation for the circle. Choice A is incorrect because it incorrectly places the center of the circle at (3,0) instead of at (0,3).