These are some review questions for Exam #1. If you can successfully complete these TYPES of questions, you should be well prepared for the questions that will appear on the exam. I also suggest you follow the study tips on the review guide.

1. Simplify and rewrite each expression with only positive exponents
   (a) $\left(\frac{x^{-3}y^4}{3}\right)^{-3}$
   (b) $\frac{x^{4/3}y^{2/3}}{(xy)^{1/3}}$
2. Factor the following
   (a) $\frac{4}{25}y^2 - 64$
   (b) $3x^2 + 10x + 8$
   (c) $4x^2 - 4xy + y^2$
3. Solve the following equations (Be sure to check for extraneous solutions where required).
   (a) $9x - 10 = 5x + 2(2x - 5)$
   (b) $3x + x^2 - 1 = 0$
   (c) $(x + 6)^2 = 16$
   (d) $\frac{6}{x} - \frac{2}{x+3} = \frac{3(x+5)}{x^2+3x}$
   (e) $\sqrt{x + 5} = \sqrt{x - 5}$
   (f) $|x - 10| = 2x + 5$
4. Solve $0 \leq \frac{x+3}{2} < 5$ and graph the solution on the real number line.
5. Consider $(3, -5)$ and $(-2, 1)$
   (a) Find the distance between the points.
   (b) Find the midpoint of the line segment joining the points.
6. Use the Pythagorean Theorem to verify that the points $(1, 5)$, $(1, -2)$, and $(5, -2)$ are the vertices of a right triangle.
7. Find the x and y-intercepts of $y = (x - 3)^2 - 4$.
8. Use algebraic tests to check $y = x^2 - 10$ for symmetry with respect to both axes and the origin. Then sketch the graph of the equation.
9. Find the center and the radius of the circle $x^2 + (y - 8)^2 = 81$.
10. Find the standard form of the equation of the circle for which the endpoints of a diameter are $(0, 0)$ and $(4, -6)$.

11. Find the slope of the line through the points $(0, 8)$ and $(-3, 12)$.

12. Find the slope and the y-intercept of $10x + y - 9 = 0$ by writing the equation in slope intercept form.

13. Write an equation of the line that passes through $(10, -3)$ with slope $m = -\frac{1}{2}$. Write your answer in both point-slope form and slope-interecept form and clearly label which is which.

14. Write the equation of the line (in slope-intercept form) that passes through the point $(3, -2)$ and is
    (a) parallel to $5x - 4y = 8$
    (b) perpendicular to $5x - 4y = 8$

15. Evaluate $f(x) = x^2 + 4$ at
    (a) $f(2)$
    (b) $f(-3)$
    (c) $f(t^2)$
    (d) $f(t + 1)$

16. Evaluate $h(x) = \begin{cases} 2x + 1 & x \leq -1 \\ x^2 + 2 & x > -1 \end{cases}$ at
    (a) $h(-2)$
    (b) $h(-1)$
    (c) $h(6)$

17. Find the domain of
    (a) $f(x) = \sqrt{25 - 2x}$
    (b) $h(x) = \frac{x}{x^2 - x - 6}$

18. Find the difference quotient $\frac{f(x+h)-f(x)}{h}$, $h \neq 0$, and simplify your answer for $f(x) = 2x^2 + 3x - 1$.

19. Chapter 1 review exercises: # 82 page 119.

20. Find the zeros of $f(x) = 5x^2 + 4x - 1$.

21. Chapter 1 review exercises: # 90 page 119.

22. Find the average rate of change for $f(x) = x^3 + 12x - 2$ for $x_1 = 0$ and $x_2 = 4$.

23. Determine whether the function $f(x) = 2x\sqrt{x^2 + 3}$ is even, odd, or neither.

24. Graph the following:
    (a) $h(x) = x^3 - 4$
    (b) $f(x) = \sqrt{x+1}$
    (c) $h(x) = \begin{cases} 5x - 3 & x \geq -1 \\ -4x + 5 & x < -1 \end{cases}$

25. Consider h(x) below. For each h, identify the parent function f and describe the sequence of transformations from f to h. Then graph h.
    (a) $h(x) = (x-2)^3 + 2$
    (b) $h(x) = -\frac{1}{3}x^3$
    (c) $h(x) = -(x-5)^3 - 5$

26. For $f(x) = x^2 + 3$ and $g(x) = 2x - 1$ calculate the following:
    (a) $(f+g)(x)$
    (b) $(f-g)(x)$
    (c) $(fg)(x)$
    (d) $\left(\frac{g}{f}\right)(x)$

27. For $f(x) = 2x^3 + 1$ and $g(x) = x^2$ calculate the following:
    (a) $(f \circ g)(x)$
    (b) $(f \circ g)(1)$
    (c) $(g \circ f)(x)$
    (d) $(g \circ f)(-2)$

28. If $f(x) = 5x - 1$ and $g(x) = \frac{x+1}{5}$ are $f(x)$ and $g(x)$ inverse functions? Why or why not?

29. Find the inverse of $f(x) = x^3 + 2$.