PreCalculus Practice for Test 2
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Please work all of the following problems on your own paper in order. Show all work and answers. Do not write anything on this sheet other than your name.

1. Simplify: $\left(\frac{2x^3}{3x^{-5}}\right)^4$
2. Simplify: $\sqrt[5]{x^2y^8z^{14}}$
3. Simplify: $64^{\frac{2}{3}}$

4. Find and simplify the difference quotient, $\frac{f(x + h) - f(x)}{h}$, for $f(x) = -2x^2 + x + 10$

5. For the following function $f(x)$
   a. Determine Domain
   b. Determine Range
   c. X-intercepts?
   d. Y-intercept?
   e. When is $f(x)$ increasing, decreasing, or constant?
   f. Determine the functions values asked at graph’s base.

Determine an equation of a line in slope-intercept form that satisfies the given conditions for problems 6, 7.

6. Passing through (1, 6) and (1, 2)

7. Passing through (-3,6) and perpendicular to the line whose equation is $y = \frac{1}{3}x + 4$

8. A person standing on the roof of a building throws a ball directly upward. The ball misses the rooftop on its way down and eventually strikes the ground. The function $s(t) = -16t^2 + 64t + 80$ describes the ball’s height above the ground, $s(t)$, in feet, $t$, seconds after it was thrown.
   a. Find the ball’s average velocity between the time it was thrown and 2 seconds later.
   b. Find the ball’s average velocity between 2 and 4 seconds after it was thrown.
   c. What is the height of the building?

9. If $g(x)$ contains the point (-3, 5), determine what point each transformation of $g(x)$ must have.
   a. $g(-x)$
   b. $-g(x)$
   c. $g(x+5)-2$
   d. $2g(x-1)$
   e. $g(3x)+4$

10. Determine the standard form of the equation of a circle that has a diameter with endpoints (0, 0) and (6, 8).
11. Determine the standard form of the equation for a circle represented by the relation 
\[ x^2 + y^2 - 4x + 2y - 4 = 0. \] Then determine the domain and range of the relation.

12. How much of a 75% vinegar solution should be added to 20 liters of a cleaning solution that is already 40% vinegar to increase the concentration to 50% vinegar?

13. If you made two investments in the stock market in 2008 with a total investment of $22,000, determine how much you invested if you lost a total of $1,800. The first investment made had a loss of 34% and the second gained an amount of 7%. (Round answers to nearest cent.)

14. Graph the line \( 3x + 5y = 15 \) with the intercept method. Show both the x and y intercept on your graph.

15. Graph the line \( y = \frac{2}{3}x - 6 \) showing at least two coordinates on your graph.