Fall Final Exam Review Practice Problems

1. Find the general form of the line perpendicular to 4x - 5y = 10 and passing through the point (-2 , 1).

2. Evaluate the following piece-wise:

$$f(x) = \begin{cases} -2x^2 - 4, & x \le -2 \\ 4x^3 + 2, & x > -2 \end{cases}$$

at f(1) and f(-2)

3. Compare $f(x) = 4(x-3)^2 + 5$

to $g(x) = x^2$

4. Find all the real zeros for:

$$f(x) = x^4 - 13x^2 + 36$$

5. A sum of $2,900 was invested for 9 years and the interest was compounded quarterly. If this sum amounted to $7,026.46 after the given time, what was the interest rate?

6. Determine the zeros (if any) of the rational function:

$$f(x) = \frac{x^2 - 16}{x + 3}$$

7. Find the third degree polynomial function of the lowest degree that has the zeros below and whose leading coefficient is one.

-1, 0, 6

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8. If x = -3 is a root of $x^3 + 7x^2 - 9x - 63,$ use synthetic division to factor the polynomial completely and list all real solutions of the equation.

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9. Simplify f below and find any vertical asymptotes of f.

$$f(x) = \frac{x^2 - 81}{x - 9}$$

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10. Determine the zeros (if any) of the rational function:

$$g(x) = 7 + \frac{4}{x^2 + 3}$$

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11. Find the domain and range of the function below:

$$h(x) = \sqrt{81 - x^2}$$

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12. If $f(x) = x - 3$ and $g(x) = -x^2 + 4$

then find $(g \circ f)(x)$

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13. Evaluate $g(a+3)$ for the following function: $g(x) = -x^2 + 6x - 9$

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14. Graph the following piece-wise function:

$$f(x) = \begin{cases} x+2, & x \le -2 \\ (x-2)^2 - 4, & -2 < x \le 3 \\ -x+4, & x > 3 \end{cases}$$

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