

Clearly indicate your answers. Unless otherwise indicated, all parts of all problems are four points each.

1. For $f(x) = \sqrt{x - 6}$ and $g(x) = 2x + 3$
- a. Determine the domain of $h(x) = f \cdot g(x)$

 - b. Evaluate $h(9)$ if possible.

2. For $f(x) = x^2 - 3x$ and $g(x) = x + 2$
- a. Determine $h(x) = (f \circ g)(x)$

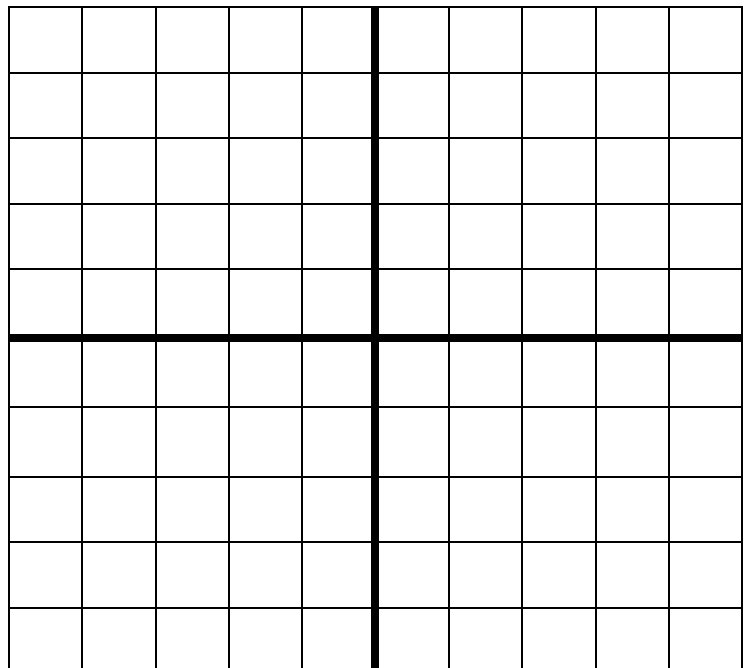
 - b. Determine the domain of $h(x)$

- c. Evaluate $h(1)$.

3. Use the given graphs on the right to find the result of the operations indicated.

a. $(f + g)(0)$

b. $\left(\frac{f}{g}\right)(1)$



4. Use the quadratic equation to find the x -intercepts of $g(x) = x^2 - 6x + 1$

5. The profit from producing x toys is given by $P(x) = -x^2 + 120x - 300$.

a. How many units should be sold to maximize the profit?

b. What is the maximum profit?

6. Divide the following and write the answer as dividend = (divisor)(quotient) + remainder.

$$\frac{x^3 - 5x^2 + 4x - 23}{x - 2}$$

7. Use synthetic division and the factor theorem to determine if $x+3$ is a factor of $x^3 - 3x^2 - 13x + 15$.

8. Use the given zero $x = -2$ to write $x^3 - 5x^2 - 2x + 24$ in completely factored form. (6 points)

9. List all possible rational zeros of $3x^3 - 2x + 20$ (but do not solve). (6 points)

10. Find the zeros of the following polynomial. (6 points)

$$7x^4 + 6x^3 - 49x^2 + 36$$

11. Let $f(x) = (x - 3)(x + 8)^2(x - 7)^2$ Find all of the zeros of $f(x)$.

12. Let $f(x) = 3x^4 + 2x^3 - 8x^2$

(8 points)

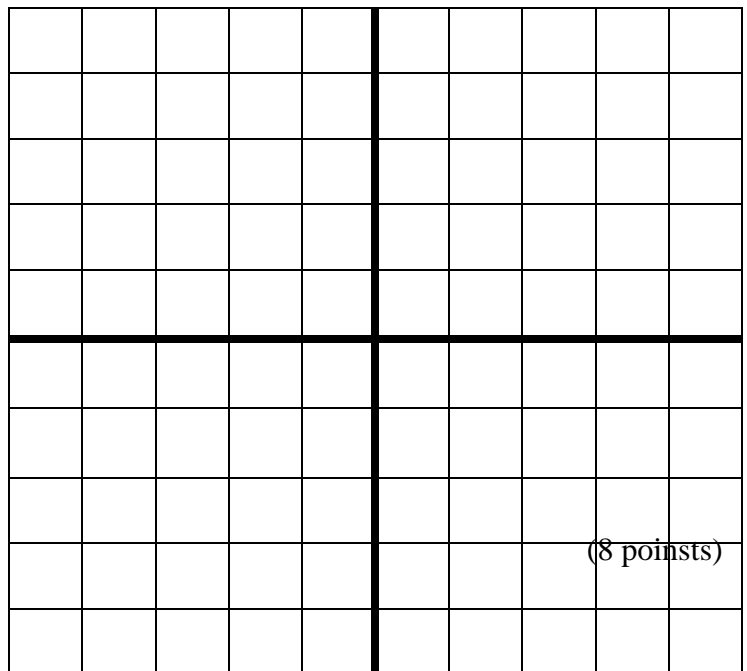
Find all of the zeros of $f(x)$ and write it in completely factored form.

13. Let $y = 2x^2 - 8x + 6$

a. Find the vertex of $f(x)$

b. Find the intercepts

c. Graph the function and label the intercepts and vertex. (8 points)



(8 points)