

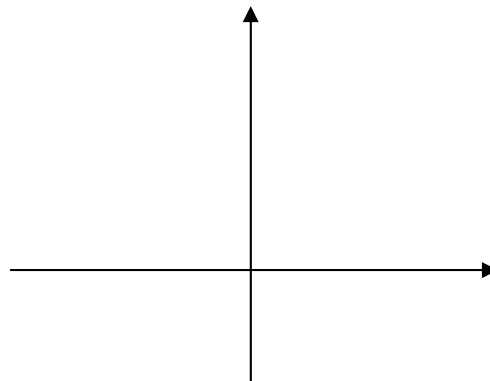
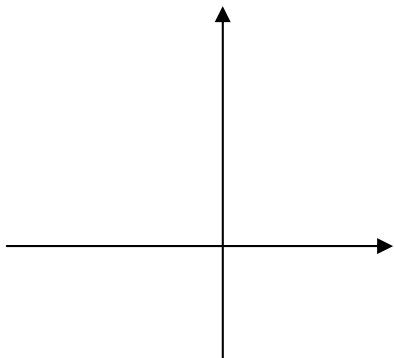
Math 121A Practice Test 4
(Kime text)

Write in complete sentences on your scratch paper and turn it in with your test for partial credit consideration.

- For a beach ball, if the diameter is increased by a factor of 2 (i.e., doubled) the volume is increased by a factor of _____. If the radius is increased by a factor of 3, the volume is increased by a factor of _____.
- The value of an antique watch increases each year. In year 1 it was worth \$56. In year 11 it was valued at \$429.90, and in year 22 it was valued at \$774.90. These values all fit a power function, so a power model $V(x)$ can describe the value in year x . (a) First, find that power function:
(b) Find the value in year 40: _____
(c) In what year will the work of art be worth over \$2000? _____
- Solve $V = \pi r^2 h$ for r . _____
- The force of gravity between two planets obeys the inverse square law $G(d) = \frac{k}{d^2}$, where d is the distance from one planet to another. If the two planets move from 50 million miles apart to 100 million miles apart, by what factor does the force of gravity between them decrease? _____.
- Find the focal point of the parabola described by $y = \frac{1}{2}x^2$. Express your answer as an ordered pair: _____
- Find the vertex of (a) $y = -4x^2 - 16x + 6$: _____
(b) $y = 3x^2 - 12x$: _____
- Use completing-the-square to put each function in the form $y = a(x-h)^2 + k$. Then sketch the graph of the function.
(a) $y = x^2 + 5x - 2$ (b) $y = -2x^2 - 4x + 5$

Vertex form: _____

Vertex form: _____



8. Factor each function and identify all horizontal intercepts (zeros) of the function.

(a) $y = x^3 - 2x^2 - 4x + 8$ Factored: _____

Zeros: _____

(b) $y = 5x^2 - 3x - 2$ Factored: _____

Zeros: _____

9. Solve for x:

(a) $4x^2 = 6x + 10$: _____

(b) $4x = x^2 + 4$: _____

(c) $(3x + 8)(x^2 - 5x + 6) = 0$: _____

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

(a) $f(g(2)) =$ _____

(b) $(g \circ f)(x) =$ _____

11. Aaron Henry hit a baseball from home plate. As it went over the fence 380 feet in left field, it was still 46.8 feet high. Here's some more data:

<u>Distance from Home Plate</u>	<u>Height $h(t)$ in feet</u>
150 ft.	125
170 ft.	130.8
350 ft.	75

Use your calculator to find the best **quadratic** that fits these four points and answer the following:

(a) What is the equation for $h(t)$? _____

(b) How high was the ball when Aaron hit it? _____

(c) At what distance from home did the ball reach its maximum height?

(d) What was the maximum height of the ball? _____

Name _____