

No notes are allowed. A graphing calculator is allowed. Scrap paper is allowed but please turn in with the exam.

Slope Formula $m = \frac{y_2 - y_1}{x_2 - x_1}$

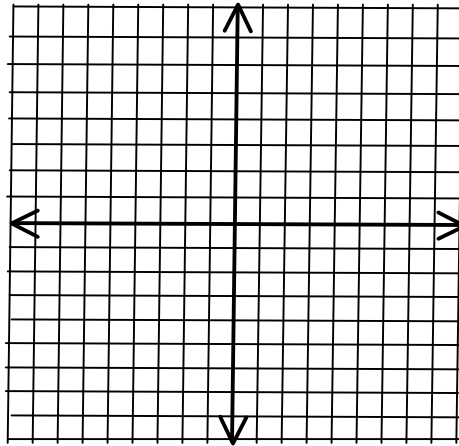
Slope-intercept Equation for a line $y = mx + b$

Point-Slope Equation for a line $y - y_1 = m(x - x_1)$

Standard form of a quadratic function y or $f(x) = a(x - h)^2 + k$ where (h, k) is the vertex.

Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

1. Sketch a graph and find the x and y -intercepts of $y = x^2 - 4$.



x -int _____

y -int _____

2. Write the equation of the line (in $y = mx + b$ form) that passes through the points $(2, -9)$ and $(-2, -6)$. **SHOW ALL WORK!!**

3. Write the equation of the line (in $y = mx + b$ form) that passes through the points $(1, 2)$ and $(-1, 2)$. **SHOW ALL WORK!!**

4. Find the domain of $g(x) = \frac{1}{\sqrt{x}}$. Your answer must be in interval notation.

Domain = _____

5. Given: $f(x) = x^3 - x^2 - 3x + 1$. Find the domain, range, relative maximum point, relative minimum point, increasing intervals and decreasing intervals. Your answers for domain, range, increasing intervals and decreasing intervals must be in interval notation.

Domain = _____

Range = _____

Relative Maximum Point = _____

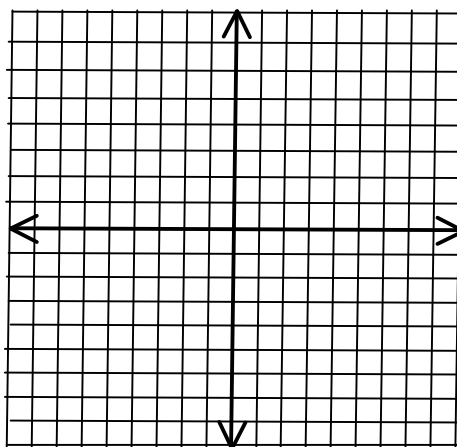
Relative Minimum Point = _____

Increasing Intervals _____

Decreasing Intervals _____

6. Draw a reasonable sketch of the following function:

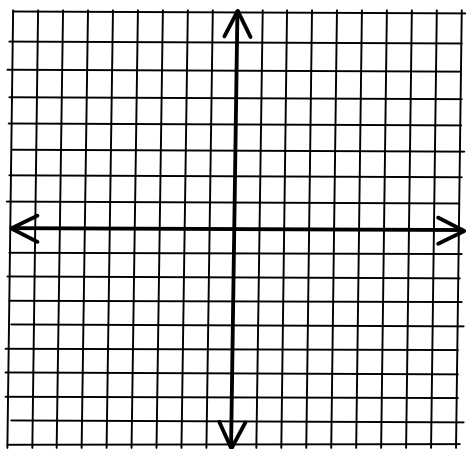
$$g(x) = \begin{cases} x + 5 & \text{if } x \leq -2 \\ x^2 & \text{if } -2 < x \leq 2 \\ x - 2 & \text{if } x > 2 \end{cases}$$



7. Write the equation of the parabola that has a vertex of $(1, 4)$ through the point $(2, 5)$.

SHOW ALL WORK!!

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8. Graph the function $f(x) = x^2 - 2x - 3$. Find the vertex, axis of symmetry and the x -intercepts.



Vertex: _____

Equation of the axis of symmetry: _____

x -intercepts: _____

9. Describe the right-hand and left-hand behavior of $f(x) = x^3 - 4x^2 + 7x - 1$.

Right-hand: _____

Left-hand: _____

10. USE ALGEBRA to find all real zeros of $f(x) = x^4 - 4x^3 + 4x^2$.

SHOW ALL WORK!!

11. Find a polynomial function that has zeros of -2 , 5 , 3 and -7 .

12. Use long or synthetic division to divide $(x^4 + 4x^3 - 8x^2 + 12x - 6) \div (x^2 + 2)$

SHOW WORK!

13. Use long or synthetic division to divide $(x^4 + 2x^3 + 5x^2 - 4x - 7) \div (x - 4)$

SHOW WORK!

14. Write the complex number $8 - \sqrt{-49}$ in standard form. $(a + bi)$

15. Use the Quadratic Formula to solve $x^2 + 2x + 6 = 0$. SHOW WORK!

16. Find all zeros of $f(x) = x^3 + 4x^2 - 11x - 30$ and write the polynomial as a product of factors.

zeros: _____

factors: _____

17. Find the domain, intercepts and any vertical and horizontal asymptotes of $f(x) = \frac{x^2 - 4x - 5}{3x^2 - 3}$.

Domain: _____ x -intercept(s): _____

y -intercept: _____

equation of vertical asymptote(s): _____

equation of horizontal asymptote(s): _____