

No Calculator

1) Graph the following on a number line:

a. $-2 < x \leq 5$

b. $x > 10$ or $-\infty \leq x \leq 9$

2) Write an inequality from the given number line.



3) Graph the function $f(x) = -\frac{1}{2}|x-5|+2$. Describe in words the transformations that were performed on $g(x) = |x|$ to get $f(x)$.

4) Write the equation of a parabola that has been stretched by a factor of 10, translated right 8 units and down 6 units.

5) Given $h(x) = 2x+5$ and $r(x) = -x^2+9$

a. Evaluate $r(-10)$

b. Simplify completely: $h(x)+r(x)$

c. Simplify completely: $h(x)-r(x)$

d. Simplify completely: $r(h(x))$

6) Factor completely

a. $10x^3 - 35x^2 - 75x$

b. $9x^2 - 64$

c. $x^2y - 20xy + 100y$

d. $(2x+1)^2 - (x+3)^2$

7) Find the vertex, axis of symmetry, and y-intercept of each of the following:

a. $f(x) = -2x^2 + 8x - 3$

b. $g(x) = (x+9)^2 + 4$

8) Simplify each of the following:

a. $(4-6i)-(7+i)$

b. $(10-3i)(10+3i)$

c. $5i(2-9i)$

9) Simplify each of the following. Does the result end up being a real number or a complex number?

a. $\sqrt{-81}$

b. $(4i)(-3i)$

c. i^{40}

d. $3\sqrt{-24} + 2\sqrt{-54}$

10) Write the quadratic $g(x) = -5x^2 - 20x + 15$ in the form $y = a(x-h)^2 + k$.

11) Write the quadratic $h(x) = 2(3x-2)^2 - 7$ in the form $y = ax^2 + bx + c$.

12) Find the value of the discriminant for each quadratic equation. Then describe how many and the type of solutions the equation has.

a. $0 = 15x^2 - 7x + 4$

b. $3x^2 + 8x + 2 = 0$

c. $2x^2 - 6x + 9 = 0$

13) Find the product of the polynomials, then describe the end behavior of the result:

$$(2x^2 - 4x + 5)(3x - 1)$$

14) Write the equation of a possible polynomial with the end behavior "as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$ and as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$ " and has a y-intercept at the point $(0, -4)$.

15) Determine whether $x - 5$ is a factor of the polynomial $f(x) = x^3 - 9x^2 + 15x + 25$. Then find the remaining factors of the polynomial. State the multiplicity of each zero.

16) Given that -7 is one of the zeros of the polynomial $2x^3 + 7x^2 - 53x - 28$, find all of the zeros of the polynomial.

17) Write a polynomial in expanded form of least degree whose zeros include -1 and $\sqrt{7}$.

18) Write a polynomial in expanded form of least degree whose zeros include $2i\sqrt{3}$.

19) Solve the following equations:

a. $(2x+5)(3x^2+8x-3)=0$

b. $\sqrt{x-2} = x-4$

c. $\sqrt{\sqrt{x+5}} = 2$

20) Expand

a. $(7x+3)^2$

b. $(x+1)(x+2)(x+3)$

c. $(x-2\sqrt{7})(x+2\sqrt{7})$

21) Simplify. Rewrite using rational exponents:

a. $\sqrt[5]{x^3}$

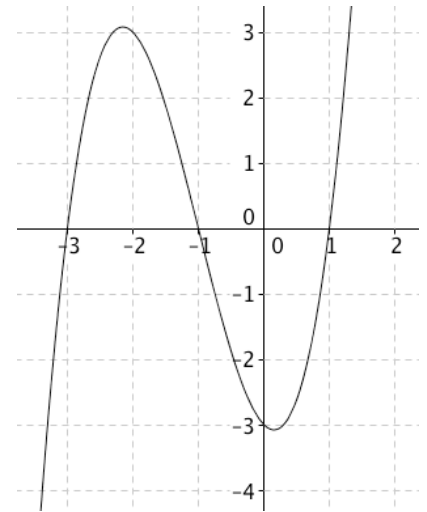
b. $\frac{b^3}{c^{1/2}} \cdot \frac{c}{b^{1/3}}$

c. $\sqrt{\left(\sqrt[3]{x^2}\right)^9}$

22) For what value of k will -5 be a zero of $x^3 + kx^2 - 35x - 150$?

23) The graph of $f(x)$ is given:

- What is the y -intercept of $h(x) = f(x) + 2$?
- What are the zeros of $t(x) = f(x + 4)$?
- Evaluate $f(-2)$
- Will $r(x) = -f(x)$ have a relative minimum or relative maximum on $-4 \leq x \leq -1$?
- How many solutions are there to the equation $f(x) = 1$?
- Identify the multiplicity of each zero.



24) Graph the polynomial $f(x) = (x - 4)^3(x + 2)(x - 1)^2$ as accurately as possible.

25) Simplify $\frac{x^{-2}(y \cdot z^3)^2}{y^3(z \cdot x^2)^{-1}}$

26) State how many solutions the equation $x^3 + 1 = 0$ has. Then, find them all.

27) Given $g(x) = x^4 - 6x - 8$, use synthetic division to evaluate $g(2)$.

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28) Find all solutions to each system of equations:

a.
$$\begin{cases} 4x + 3y = 12 \\ -6x + 4y = -1 \end{cases}$$

b.
$$\begin{cases} y = x^2 + 2x - 8 \\ y = -\frac{1}{3}x + 2 \end{cases}$$

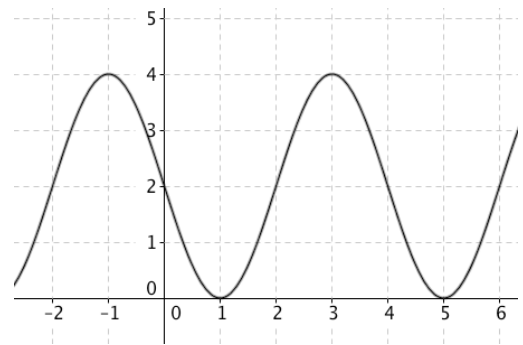
29) Solve the system:
$$\begin{cases} 4x - 3y + 6z = 18 \\ -x + 5y + 4z = 48 \\ 6x - 2y + 5z = 0 \end{cases}$$

30) The table shows the mean selling price of new, privately-owned, single-family homes for six consecutive years.

Year	0	1	2	3	4	5
Price in thousands	154.5	166.4	181.9	207.0	228.7	273.5

- Find the equation for the regression line for the data.
- Identify the r^2 value. Is the line a good fit for the data?
- Predict the selling price of a new home for year 8.
- Predict which year the selling price of a new home will be \$300,000.

31) Find the average rate of change for the graph below on $x = 0$ to $x = 5$.



32) Given the function $f(x) = -4x^3 - 4x^2 + 8$, write the x values where the function is:

- Increasing
- Decreasing

33) Given the function $f(x) = (x+3)(x-1)(x-5)$, solve the following inequalities. Graph your answer on a number line.

- $f(x) > 0$
- $f(x) \leq 0$

34) State the domain and range of each function.

- $y = 2x^2 + 10x - 3$
- $y = \sqrt{5x - 4} - 3$
- $y = -2\sqrt{x} + 7$

35) Find the average rate of change of $f(x) = x^2 - 3x + 1$ on $x = -5$ to $x = -3$.

36) Solve $\sqrt{x+2} - 4 > 0$. Graph your answer on a number line.

37) Solve $\frac{1}{2}(x-3)^2 + 4 = \frac{1}{2}x + 5$