

Review Guide for College Algebra & Trigonometry

I) Functional notation. Given that $f(x) = 3x^2 - 2x + 5$ and $g(x) = 3x - 1$, find each of the following:

1) $g(4) - f(-2)$

2) $g(x + h) - g(x)$

3) $g \circ f(x)$

4) $g^{-1}(x)$

II) Linear inequalities in one variable. Solve. Graph on a number line and write in interval notation.

1) $3(x - 4) - (x + 1) \leq x - 12$

III) Exponents and polynomials. Simplify. Write all answers with positive exponents.

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

2) $(4x^2y^6z)^2 (-x^5y^7z^8)^6$

3)

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

IV) Complex Numbers. Simplify.

1)

$$\sqrt{-25} \sqrt{-81}$$

2)

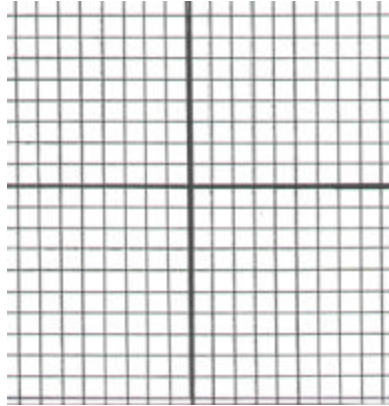
$$\frac{3 - 4i}{6 + 2i}$$

3)

$$(5 + 2i)(-3 - 5i)$$

V) **Equations and inequalities in two variables.** Graph on a coordinate system. Identify the intercepts and the slope of the linear equation.

1) $y = (-3/4)x - 2$

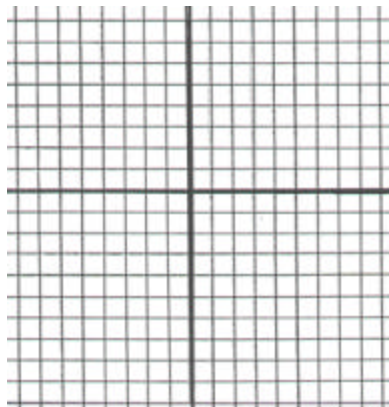


2) Solve the system:

$$\begin{aligned} 2x - 2y - z &= -1 \\ x + 2y + 2z &= 9 \\ x + y - z &= 8 \end{aligned}$$

VI) **Quadratic equations and functions.** Graph on a coordinate system. Identify the coordinates of the vertex and the intercepts.

1) $g(x) = -(x + 1)^2 - 2$



VII) **Rational functions and expressions.**

1) Find the domain of

$$f(a) = \frac{a^2 + 2a - 3}{3a^2 + 11a + 6}$$

2) Solve:

$$\frac{3p}{p^2 + 5p + 6} = \frac{5p}{p^2 + 2p - 3} - \frac{2}{p^2 + p - 2}$$

VIII) Logarithms and exponentials.

1) Condense into a single log and simplify: $\log(10) - \log(5)$

2) Expand into sums, differences, and products.

$$\log \frac{abc^3}{e d^2}$$

3) Solve:

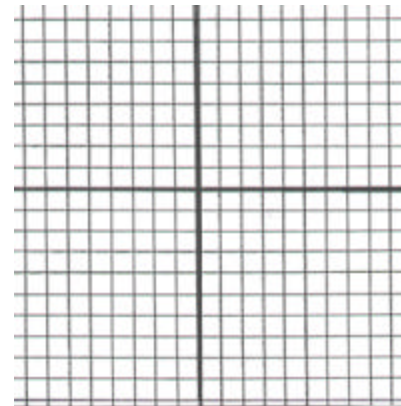
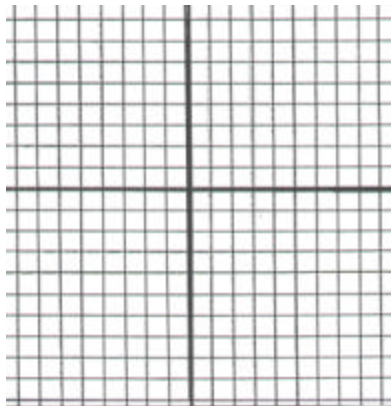
a) $\ln x + \ln(2x + 1) = 0$

b) $9^x = 27$

4) Graph:

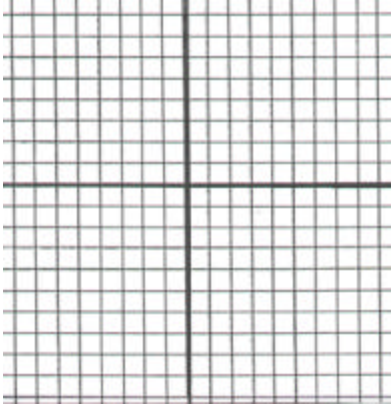
a) $g(x) = \log_2(x - 2)$

b) $p(x) = 2^x - 1$



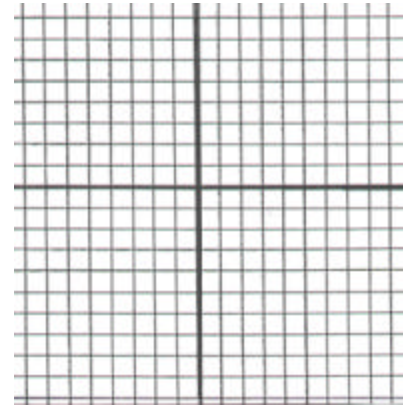
IX) Miscellaneous graphing. Graph on a coordinate system.

1) $x^2 + y^2 = 4$

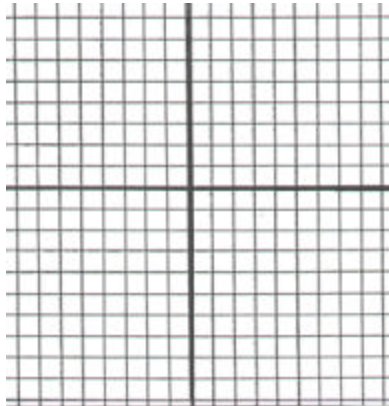


2)

$f(x) = \sqrt{x+2}$ for $x \geq -2$



3) $f(x) = |x - 3| - 1$



X) Polynomial functions.

1) Find all zeros of the function: $f(x) = -2x^4 + 13x^3 - 21x^2 + 2x + 8$

XI) Matrices and determinants.

1) Evaluate the determinant of

$$\begin{vmatrix} 3 & 4 \\ 2 & 5 \end{vmatrix}$$

XII) Sequences and series.

- 1) Write the first five terms of the arithmetic sequence

$$A_1 = 6, \quad A_{k+1} = A_k - 5$$

- 2) Find the n^{th} partial sum of the arithmetic sequence

$$8, 20, 32, 44, \dots \quad n = 10$$

- 3) Write the first five terms of the geometric sequence $a_1 = 1, r = 1/3$

- 3) Find the given sum. Round your answer to the nearest tenth.

$$\sum_{k=1}^{10} 8 \left(\frac{1}{4}\right)^{k-1}$$

XIII) Trigonometry.

- 1) Find the indicated values.

a) $\sin 30^\circ = \underline{\hspace{2cm}}$

b) $\cos 45^\circ = \underline{\hspace{2cm}}$

c) $60^\circ = \underline{\hspace{2cm}}$ radians

d) π radians = $\underline{\hspace{2cm}}$ $^\circ$

e) in quadrant IV, if $\cos x = 4/5$, then $\sin x = \underline{\hspace{2cm}}$

f) in quadrant III, if $\tan x = 3/4$, then $\cos x = \underline{\hspace{2cm}}$

g) $\sin(2\pi/3) = \underline{\hspace{2cm}}$

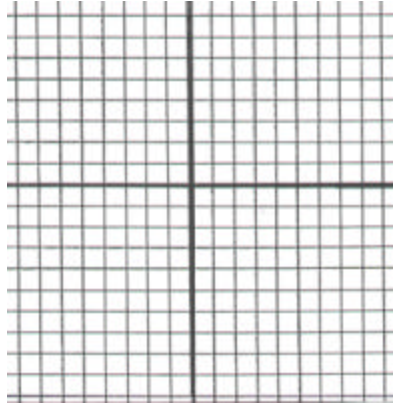
h) $\cos(\pi/2) = \underline{\hspace{2cm}}$

i) if $\tan x = 5/6$, then $\cot x = \underline{\hspace{2cm}}$

j) $\tan(\pi/3) = \underline{\hspace{2cm}}$

2) Graph on a coordinate system.

a) $f(x) = \sin x$



b) $f(x) = \cos x$

