

Answer Key for College Algebra & Trigonometry Test

D) Functional notation.

1) -10

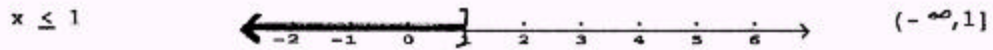
2) $[3(x + h) - 1] - (3x - 1) = 3x + 3h - 1 - 3x + 1 = 3h$

3) $3(3x^2 - 2x + 5) - 1 = 9x^2 - 6x + 14$

4) $g^{-1}(x) = (x + 1)/3$

II) Linear inequalities in one variable.

1)



III) Exponents and polynomials.

1) $81x^4 - 540x^3 + 1350x^2 - 1500x + 625$

2) $(16x^4y^{12}z^2)(x^{30}y^{42}z^{48}) = 16x^{34}y^{54}z^{50}$

3) $2x^3 + x^2 + 3x + 2 + 8/(2x - 3)$

IV) Complex numbers.

1)

$$5i \times 9i = 45i^2 = -45$$

2)

$$\frac{3 - 4i}{6 + 2i} \times \frac{6 - 2i}{6 - 2i} = \frac{18 - 30i + 8i^2}{36 - 4i^2} = \frac{10 - 30i}{40} = \frac{1}{4} - \frac{3}{4}i$$

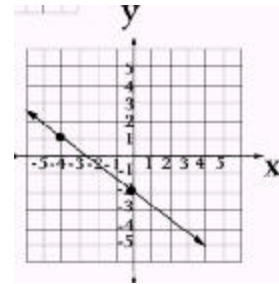
3)

$$-15 - 31i - 10i^2 = -5 - 31i$$

V) Equations and inequalities in two variables.

1)

plot y-intercept $(0,-2)$
count slope (rise over run) = $-3/4$
x-intercept $(-8/3,0)$



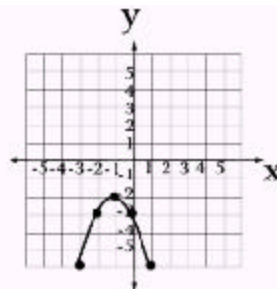
2)

$$\begin{array}{rcl} 2x - 2y - z = -1 & & 4x - 4y - 2z = -2 \\ -x - y + z = -8 & & x + 2y + 2z = 9 \\ x - 3y = -9 & & 5x - 2y = 7 \end{array} \quad \text{elimination}$$
$$\begin{array}{rcl} 5x - 2y = 7 & & \\ -5x + 15y = 45 & & \\ \hline 13y = 52 & & \text{elimination} \\ y = 4 & & x - 3(4) = -9 \\ & & x = 3 \\ & & 3 + 4 - z = 8 \\ & & z = -1 \\ & & (3, 4, -1) \end{array}$$

VI) Quadratic equations and functions.

1)

vertex $(-1,-2)$
x-intercepts none
y-intercept $(0,-3)$



VII) Rational functions and expressions.

- 1) The domain is all real numbers except $a = -2/3$ or $a = -3$.
Written in interval notation:
 $(-\infty, -3) \cup (-3, -2/3) \cup (-2/3, \infty)$
- 2) $p = 1/2$ or $p = -6$

VIII) Logarithms and exponentials.

- 1) $\log(10) - \log(5) = \log(10/5) = \log(2)$
- 2) $\log(a) + \log(b) + 3\log(c) - 2\log(d)$
- 3)

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

$$e^0 = 2x^2 + x$$

$$1 = 2x^2 + x$$

$$2x^2 + x - 1 = 0$$

$$(2x - 1)(x + 1) = 0$$

$$x = 1/2 \text{ or } x = -1 \quad (\text{you must discard the } x = -1 \text{ answer since } \ln(-1) \text{ is undefined})$$

b) This can be solved without logs: $(3^2)^x = 3^3$

$$3^{2x} = 3^3$$

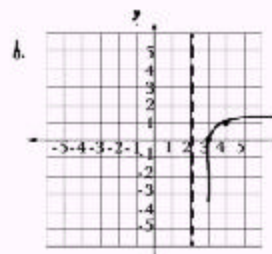
$$2x = 3$$

$$x = 3/2$$

4)

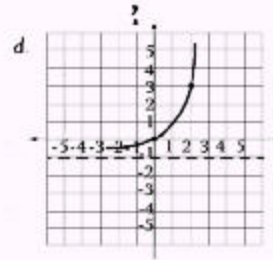
a)

vertical asymptote $x = 2$
x-intercept $(3, 0)$



b)

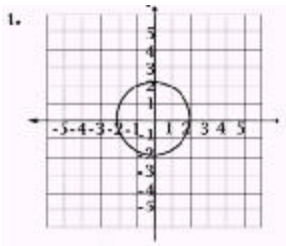
horizontal asymptote $y = -1$
y-intercept $(0,0)$



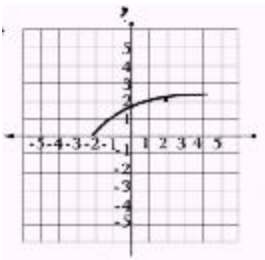
IX) Miscellaneous graphing.

1)

Circle with center at $(0, 0)$ and radius 2.

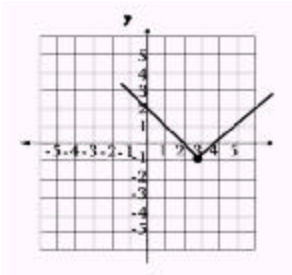


2) x-intercept $(-2, 0)$ y-intercept $(0, 2)$



3) x-intercepts at (4, 0) and (2, 0)

y-intercept at (0, 2)



X) Polynomial functions.

1)

of real positive zeros 3 or 1
of real negative zeros 1
possible rational zeros $\pm 1, \pm 1/2, \pm 2, \pm 4, \pm 8$

$$\begin{array}{r} 1 \mid -2 \quad 13 \quad -21 \quad 2 \quad 8 \\ \quad -2 \quad 11 \quad -10 \quad -8 \\ \hline -2 \quad 11 \quad -10 \quad -8 \quad 0 \end{array}$$

$$(x - 1)(-2x^3 + 11x^2 - 10x - 8) = 0$$

$$\begin{array}{r} 2 \mid -2 \quad 11 \quad -10 \quad -8 \\ \quad -4 \quad 14 \quad 8 \\ \hline -2 \quad 7 \quad 4 \quad 0 \end{array}$$

$$-(x - 1)(x - 2)(2x^2 - 7x - 4) = 0$$

$$-(x - 1)(x - 2)(2x + 1)(x - 4) = 0$$

$$\text{zeros } x = 1 \quad x = 2 \quad x = -1/2 \quad x = 4$$

XI) Matrices and determinants.

1) $15 - 8 = 7$

XII) Sequences and series.

1) 6, 1, -4, -9, -14

2) $a_{10} = 8 + 9(12) = 116$

$$S_{10} = (10/2)(8 + 116) = 620$$

3) $1, 1/3, 1/9, 1/27, 1/81$

4)

$$S_{10} = 8 \frac{1 - \frac{1}{4}^{10}}{1 - \frac{1}{4}} = 6.4$$

XIII) Trigonometry

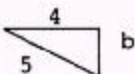
1)


a. $\frac{1}{2}$

b. $\frac{\sqrt{2}}{2}$

c. $60 \left(\frac{\uparrow}{180} \right) = \frac{\uparrow}{3}$ radians

d. $\uparrow \left(\frac{180}{\uparrow} \right) = 180^\circ$

e.  $4^2 + b^2 = 5^2$ $\sin x = -\frac{3}{5}$
 $b = -3$

f.  $(-3)^2 + (-4)^2 = c^2$ $\cos x = -\frac{4}{5}$
 $c = 5$

g. $\frac{\sqrt{3}}{2}$

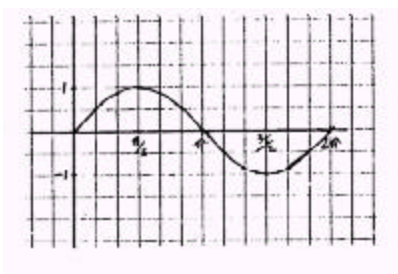
h. 0

i. $\frac{6}{5}$

j. $\sqrt{3}$

2)

a



b

