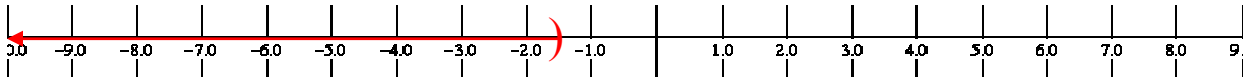


## math 009 online practice final

The equation  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  might be found useful.

1. Solve the inequality  $3 - 8x > 15$  and illustrate the solution set on a number line.

$$\begin{array}{r} 3 - 8x > 15 \\ -3 \quad -3 \\ \hline -8x > 12 \\ -8 \quad -8 \end{array} \quad x < -1\frac{1}{2} \quad \text{or} \quad \{x \mid x < -1\frac{1}{2}\}$$



2. Solve the inequality:  $-7x - 2(3 + 2x) + 7 < -9$

$$\begin{array}{r} -7x - 6 - 4x + 7 < -9 \\ -11x + 1 < -9 \\ \quad -1 \quad -1 \\ \hline -11x < -10 \\ -11 \quad -11 \end{array} \quad x > \frac{10}{11}$$

3. What is meant by “the solution set” of the inequality  $y > 5 - 2x$ ? (Yes, you do need to provide a written answer!)

That (y) will be greater if the variable is replaced by any number greater than the difference between five and the product of two and (x).

4. Complete the table of values for the function  $y = x^2 - 3x - 4$

x	-2	-1	0	1	2	3	4	5
y	6	0	-4	-6	-6	-4	0	6

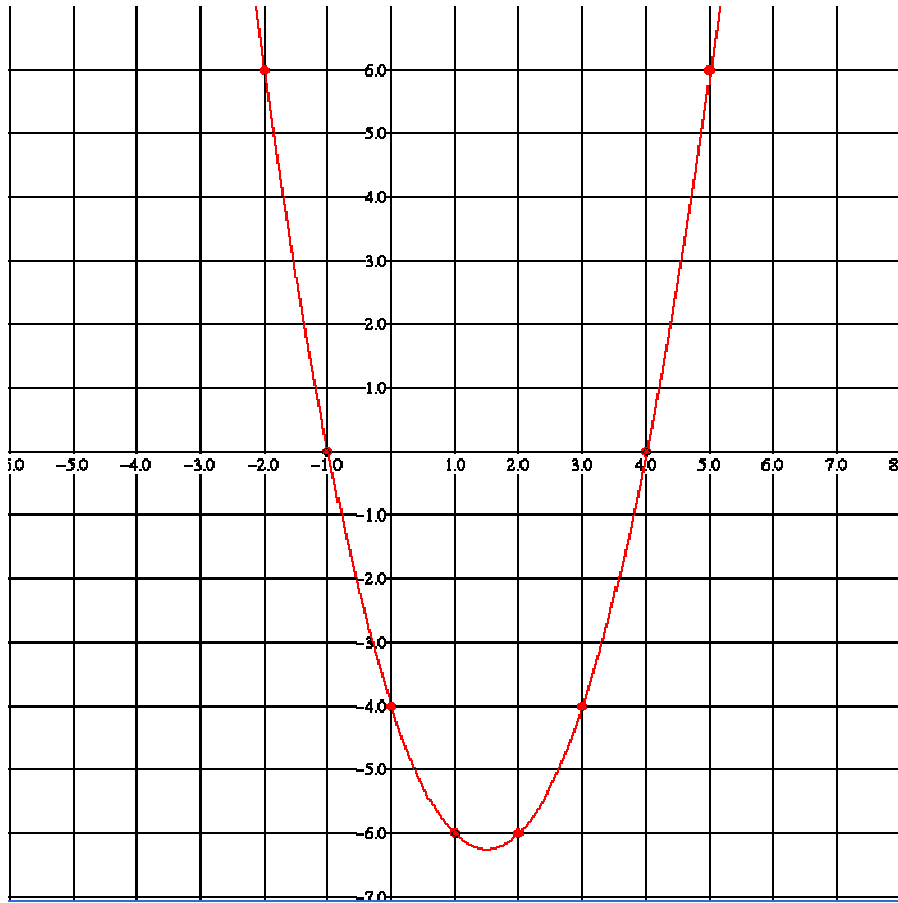
I substituted the value given for x and did the math.

$$y = 2^2 - 3 \cdot -2 - 4$$

$$y = 4 + 6 - 4$$

$$y = 6$$

5. Draw the graph of the function  $y = x^2 - 3x - 4$  (see question above)



6. Solve:  $(3x - 4)(3x + 8) = 0$

$$3x - 4 = 0$$

$$\frac{+4+4}{3} = \frac{3x}{3} \quad x = 1\frac{1}{3}$$

$$3x + 8 = 0$$

$$\frac{-8-8}{3} = \frac{3x}{3} \quad x = -2\frac{2}{3}$$

$$3 \cdot 1\frac{1}{3} - 4 = 4 - 4 = 0$$

$$3 \cdot -2\frac{2}{3} + 8 = -8 + 8 = 0$$

7. Solve:  $(2x - 5)^2 = 48$

$$\sqrt{(2x - 5)^2} = \sqrt{48}$$

$$2x - 5 = \pm \sqrt{48}$$

$$2x - 5 = \pm \sqrt{16 \cdot 3}$$

$$2x - 5 = \pm 4\sqrt{3}$$

$$x = \frac{5 \pm 4\sqrt{3}}{2}$$

8. Solve:  $2x^2 + 11x - 3 = 0$   $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{-11 \pm \sqrt{11^2 - 4 \cdot 2 \cdot 3}}{2 \cdot 2}$$

$$x = \frac{-11 \pm \sqrt{145}}{4}$$

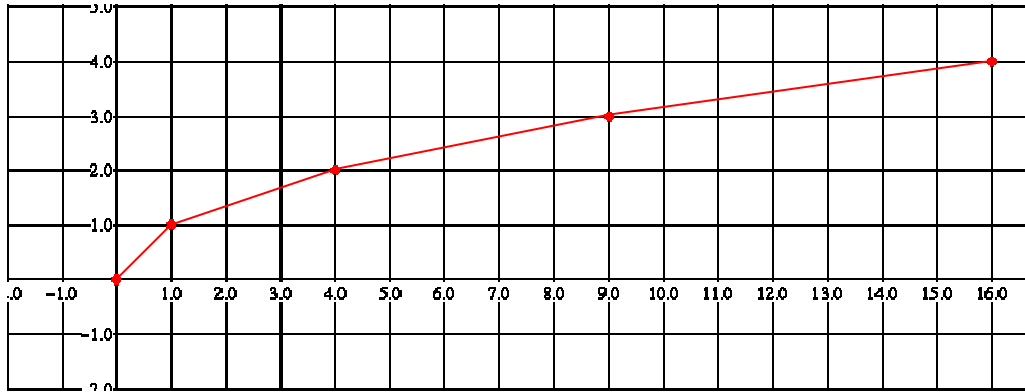
9. Using your calculator, find an approximation for  $\sqrt{37}$  correct to the nearest thousandth.

6.083

10. Complete the table of values for the function  $y = \sqrt{x}$

x	-1	0	1	4	9	16
y	undefined	0	1	2	3	4

11. Draw the graph of the function  $y = \sqrt{x}$  (see question above)



12. Simplify:  $\sqrt{48} + \sqrt{75} - \sqrt{27}$

$$4\sqrt{3} + 5\sqrt{3} - 3\sqrt{3} = 6\sqrt{3}$$

13. Multiply:  $(x + \sqrt{2})^2$

$$(x + \sqrt{2})(x + \sqrt{2}) = x^2 + x\sqrt{2} + x\sqrt{2} + (\sqrt{2})^2 = x^2 + 2x\sqrt{2} + 2$$

14. Solve:  $\sqrt{3 - 2x} - 11 = -8$

$$\begin{aligned} \sqrt{3 - 2x} - 11 &= -8 \\ \sqrt{3 - 2x} &= 3 \end{aligned}$$

$$\begin{aligned} (\sqrt{3 - 2x})^2 &= 3^2 \\ 3 - 2x &= 9 \\ -3 & \quad -3 \\ \hline -2x &= 6 \\ -2 & \quad -2 \\ \hline x &= -3 \end{aligned}$$

15. Subtract:  $(3x^5 - 3x^4 + 7x^2 - 4) - (-8x^4 + 3x^3 - 2x^2 + 7) = 3x^5 + 5x^4 - 3x^3 + 9x^2 - 11$

16. Multiply:  $(3x^2 + 7x - 6)(3x - 5) = 9x^3 - 15x^2 + 21x^2 - 35x - 18x + 30 = 9x^3 + 6x^2 - 53x + 30$

17. Factor by grouping:  $6x^2 + 9x + 10x + 15$

$$\begin{aligned} &3x(2x + 3) + 5(2x + 3) \\ &(2x + 3)(3x + 5) \end{aligned}$$

18. Factor:  $12x^2 - 14x + 4$

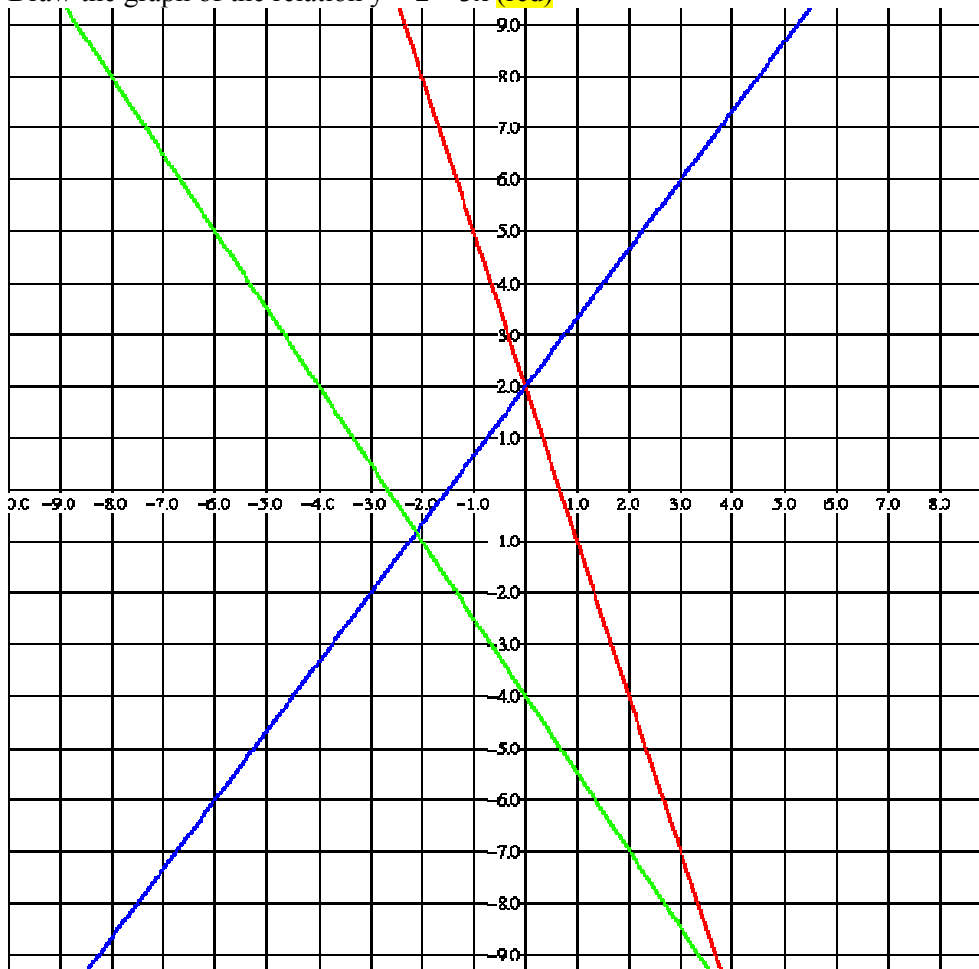
$$\begin{aligned} &12x^2 - 6x - 8x + 4 \\ &3x(4x - 2) - 2(4x - 2) \\ &(4x - 2)(3x - 2) \\ &2(2x - 1)(3x - 2) \end{aligned}$$

19. Factor:  $3x^3 - 9x^2 - 120x$   
 $3x(x^2 - 3x - 40)$   
 $3x(x+5)(x-8)$

20. Multiply:  $\frac{x^2 + 4x + 3}{x^2 - 9} \cdot \frac{x^2 - 11x + 24}{x^2 + 5x + 4} = \frac{\cancel{(x+1)}\cancel{(x+3)}}{\cancel{(x+3)}\cancel{(x-3)}} \cdot \frac{\cancel{(x-3)}(x-8)}{\cancel{(x+1)}(x+4)} = \frac{(x-8)}{(x+4)}$

21. Subtract:  $\frac{3}{x+5} - \frac{7}{x-2} = \frac{3x-6}{(x+5)(x-2)} - \frac{7x+35}{(x+5)(x-2)} = \frac{-4x-41}{(x+5)(x-2)}$

22. Draw the graph of the relation  $y = 2 - 3x$  (red)



23. Draw the graph of the relation  $y = \frac{4}{3}x + 2$  (blue)

24. Draw the graph of  $2y + 3x + 8 = 0$  (green)

25. Find the slope and y-intercept of the graph of  $2y + 3x + 8 = 0$ .

y intercept is -4 and the slope is  $-\frac{3}{2}$

26. Find the equation of the straight line which has a slope of  $-5$  and which passes through the point  $(6, -4)$ .

$$y = mx + b \quad -4 = -5 \cdot 6 + b \quad \boxed{y = -5x + 26}$$

$$-4 = -30 + b$$

$$\begin{array}{r} +30 \quad +30 \\ \hline 26 = b \end{array}$$

27. Find the equation of the straight line which passes through the points  $(5, 11)$  and  $(7, 1)$ .

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad m = \frac{1 - 11}{7 - 5} = \frac{-10}{2} \quad m = -5$$

$$y = mx + b \quad 1 = -5 \cdot 7 + b$$

$$1 = -35 + b \quad \boxed{y = -5x + 36}$$

$$\begin{array}{r} +35 \quad +35 \\ \hline 36 = b \end{array}$$

28. Is  $x = 3, y = 4$  the solution of the system?

**YES**

$$4x + 3y = 24$$

$$2x - 3y = -6$$

$$\begin{array}{r} 6x = 18 \\ \hline 6 \quad 6 \end{array} \quad \boxed{x = 3}$$

$$4 \cdot 3 + 3y = 24$$

$$12 + 3y = 24$$

$$\begin{array}{r} -12 \quad -12 \\ \hline 3y = 12 \\ \hline 3 \quad 3 \end{array} \quad \boxed{y = 4}$$

29. Solve the system of equations:

$$5x + y = 7 \quad 20x + 4y = 28 \quad 3 \cdot 2 - 4y = 18$$

$$3x - 4y = 18 \quad \underline{3x - 4y = 18} \quad 6 - 4y = 18$$

$$\begin{array}{r} 23x = 46 \\ \hline 23 \quad 23 \end{array} \quad \boxed{x = 2} \quad \begin{array}{r} -6 \quad -6 \\ \hline -4y = 12 \\ \hline -4 \quad -4 \end{array} \quad \boxed{y = -3}$$

30. Solve the system of equations:

$$5x + 2y = 4 \quad -10x - 4y = -8$$

$$3x + 4y = -10 \quad \underline{3x + 4y = -10}$$

$$\begin{array}{r} -7x = -18 \\ \hline -7 \quad -7 \end{array} \quad \boxed{x = 2\frac{4}{7}}$$

$$5 \cdot 2\frac{4}{7} + 2y = 4$$

$$12\frac{6}{7} + 2y = 4$$

$$\begin{array}{r} -12\frac{6}{7} \quad -12\frac{6}{7} \\ \hline \end{array}$$

$$\begin{array}{r} 2y = -8\frac{6}{7} \\ \hline 2 \quad 2 \end{array} \quad \boxed{y = -4\frac{3}{7}}$$