

Solutions for self-test. If you get between 50% and 70% correct, then you need to refresh your math skills and will have to work very hard in order to succeed in Math 121. If you score below 50%, then it is very unlikely that you will succeed in Math 121, so it would be to your advantage to immediately drop this course and sign-up for the Intermediate Algebra course, GMS 99, or enroll in an equivalent course at a Community College. Attempting this course without the basic skills necessary only sets you up for frustration and failure. All students are likely to benefit from honestly examining their weaknesses in algebra that this self-test should point out. You may seek an algebra book to review areas where you perform poorly. You will be expected to be fluent in this material when it appears in this course.

1. $x = 2$,

2. $x = -2, -3$,

3. $x = -1.5$,

4. $x = 3, -2$,

5. $x = -2$,

6. $x = 2 \pm \sqrt{13}$,

7. $x = 112.5$,

8. $x = 1 \pm \sqrt{7}$,

9. $x = 5$,

10. $x = -5$,

11. $x = 980$,

12. $x = 6$,

13. $x = 8$,

14. $x = 4$,

15. $x = 6, -10$,

16. $x = \frac{16}{15}$,

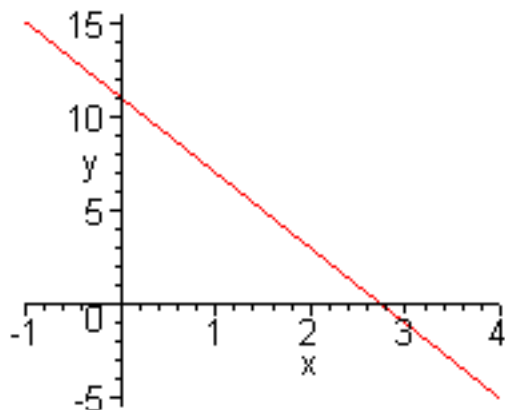
17. $x < 3$,

18. $x \geq 3$ or $x \leq -1$,

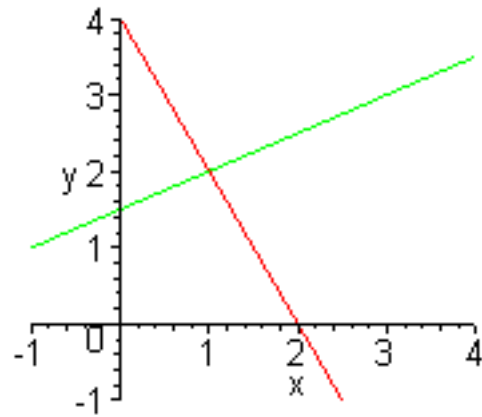
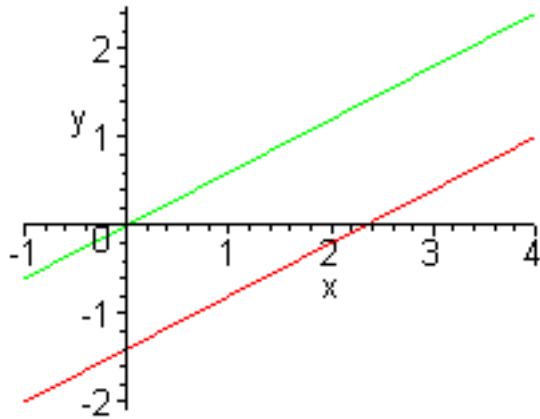
19. $-1 - \sqrt{6} < x < -1 + \sqrt{6}$,

20. $x < -6$ or $-2 < x < 0$.

21. The line is $y = -4x + 11$. Below is a graph of the line.

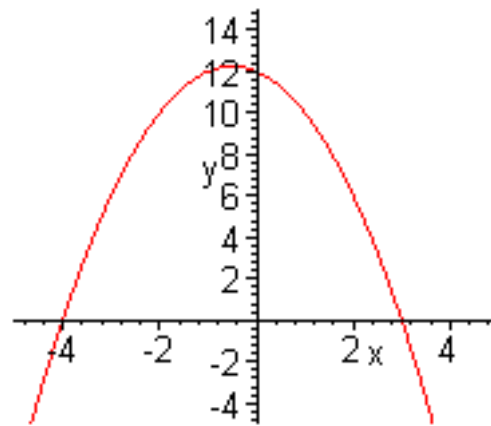
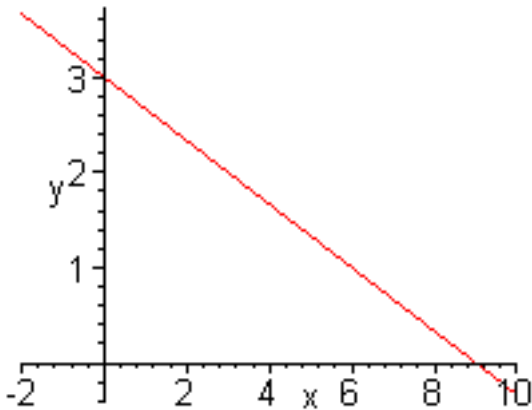


22. The line $y = \frac{3}{5}x$ is parallel to the given line $y = \frac{3}{5}x - \frac{7}{5}$. Below left is a graph of both lines.



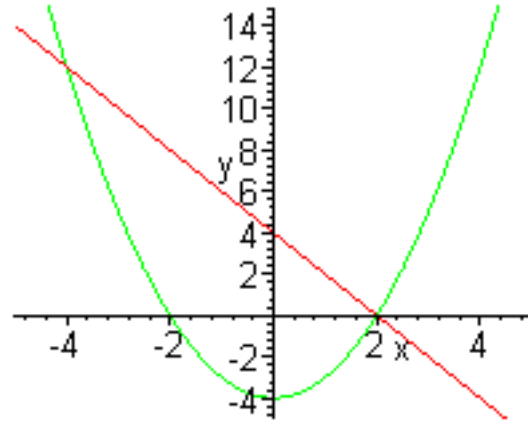
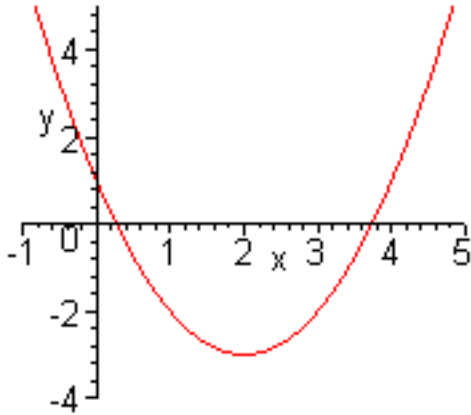
23. The line $y = \frac{1}{2}x + \frac{3}{2}$ is perpendicular to the given line $y = 4 - 2x$. Above right is a graph of both lines.

24. The line is given by $y = -\frac{1}{3}x + 3$. The x -intercept is $(9, 0)$, and the y -intercept is $(0, 3)$. Below left is a graph of the line.



25. The y -intercept is $(0, 12)$. The x -intercepts are $(-4, 0)$ and $(3, 0)$. The vertex occurs at $(-\frac{1}{2}, 12\frac{1}{4})$. The graph of this parabola is shown above right.

26. The y -intercept is $(0, 1)$. The x -intercepts are $(2 + \sqrt{3}, 0)$ and $(2 - \sqrt{3}, 0)$. The vertex occurs at $(2, -3)$. The graph of this parabola is shown below left.



27. The x and y -intercepts for the line are $(2, 0)$ and $(0, 4)$, respectively. The x -intercepts for the quadratic are $(-2, 0)$ and $(2, 0)$, while the y -intercept is $(0, -4)$. The points of intersection are $(-4, 12)$ and $(2, 0)$. The graphs of both functions are shown above right.

28. $\frac{x+1}{y^3}$,

29. $\frac{x^2y^4}{z^3}$.

30. 3,

31. 2,

32. 1.

33. $f(g(x)) = 2x^2 + 7$.

34. $f(g(1)) = \frac{1}{2}$, $g(f(1)) = 2$.

35. $\frac{f(1+h) - f(1)}{h} = -\frac{1}{2(4+h)}$.

36. a. $r = \left(\frac{P}{P_0}\right)^{1/n} - 1$.

b. $n = \frac{\log(P) - \log(P_0)}{\log(1+r)}$.

c. The capital after 2 years is \$10,816.

37. One side is $2\sqrt{3}$ cm, and the other side is $4\sqrt{3}$ cm.

38. The area of the isosceles triangle is $A = 12 \text{ cm}^2$.

39. The population is 22,050 at the end of the second year.

40. The monthly bill for electricity is now \$255.

41. The tip should be \$4.20. To the nearest dollar, the amount that you leave at the table is \$32, but if you don't want to undertip, then you should leave \$33.
42. a. Thelma should leave at 9:36 am, while Louise should leave at 9:00 am.
b. The cost is \$270.
43. The mean (average) rainfall is 0.825 inches/month.
44. a. The total rain received by the yard is 61,983 gallons.
b. The number of flushes of the toilet is 49,586.
45. You buy six 25 cent comic books and eight 40 cent comic books.
46. This problem has two solutions (assuming the simplest case where the points are colinear, *i.e.*, all lie on a line). If the points are arranged with Point B between Point A and C, then the distance between Points A and C is 10 inches. If the points are arranged on a line with Point A between Points B and C, then the distance between Points A and C is $\frac{10}{3}$ inches.
47. You pass Mr. Jones at 5:40 pm (assuming not too much rush hour traffic).
48. The box is 2 ft by 2 ft by 1 ft, which gives a volume of 4 ft³.
49. A black cow gives only $\frac{5}{8}$ of the milk that a brown cow gives. Hence, the brown cow is the better milker.
50. The man has 13 dimes and 7 quarters totaling \$3.05.