

Math Department: Summer Assignment for Students Entering Advanced Math Applications

The purpose of this assignment is to keep your math skills “fresh” over the summer. The assignment will be checked when you return to school. A quiz will be given on this material after classes begin.

If you would like additional practice, or tutorials on problems similar to those below, visit www.math.com (the most helpful categories will most likely be the “Algebra” and “Trigonometry” categories). Also, you can refer to your notebook from previous math classes if you need additional help.

Below, show work to indicate how you got your answer; do so without the use of a calculator.

Simplifying Expressions

1. $(3x^2y)(-4xy^3)$

2. $\left(\frac{2x^2}{3y}\right)^3$

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

4. $\sqrt{x^3y^4z}$

5. $\sqrt{8x^4y^2}$

6. $\frac{1}{\sqrt{3}}$

7. $8^{\frac{2}{3}} - 27^{\frac{4}{3}}$

8. $81^{\frac{-1}{2}} + 3^{-2} + 27^{\frac{-2}{3}}$

9. $(8x^{-3})^{-2}$

10. $\left(-\frac{1}{2}x^{-3}\right)^3$

11. $\frac{(2x^2y)(-5x^{-5}y^6)}{20x^5y^9}$

12. $(2a+b)^3$

13. $\sqrt[3]{64x^8y^{16}}$

14. $(5+2i)^2$

15. $\frac{x^2+5x+6}{x^2-x-20} \div \frac{x^2+x-2}{x^2+3x-4}$

16. $\frac{\frac{1}{a} + \frac{1}{b}}{\frac{1}{b} - \frac{1}{a}}$

17. $\frac{3}{(x-2)} - \frac{4}{(x+2)}$

Solving Equations (Remember to reject any solutions that are restrictions on the variable.)

18. $-\frac{3}{5}x = \frac{12}{5}$

19. $\frac{6x-3}{2x+1} = \frac{5}{x}$

20. $\frac{2x}{5} - \frac{5}{3} = \frac{x}{15}$

21. $\frac{4}{3y} - \frac{3}{y} = \frac{10}{3}$

22. $\frac{x^2}{x-2} = \frac{4}{x-2}$

23. $x^2 - 8x + 25 = 0$ (Complex # answers)

24. $\sqrt{5x+39} = x-9$

25. $\sqrt[3]{4x+7} + 2 = 5$

Use The Following Functions To Find The Values.

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

26. $f(2)$

27. $f(g(2))$

Factoring – Factor each problem completely

28. $x^3 - 3x$

29. $x^2 - 7x + 10$

30. $4x^2 - 4x - 15$

31. $3x^2 + 2x - 5$

Solve By Completing The Square.

32. $x^2 - 3x - 88 = 0$ (on this problem, you can use a calculator to calculate a difficult square root)

Solve Using The Quadratic Formula.

33. $2w^2 + 3w + 3 = 0$

Coordinate Geometry

34. Graph these lines:

a. $2x + 5y = 10$

b. $y = -\frac{2}{3}x + 1$

35. Find the slope:

a. $y = 2x + 5$

b. through $(3, 1)$, $(-2, 4)$

36. Find the equation of each line:

a. the slope is 2, the y-intercept is -3

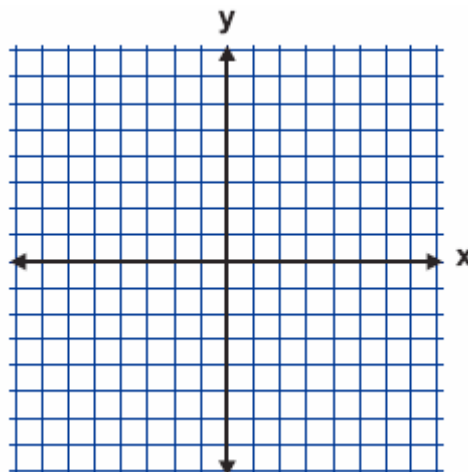
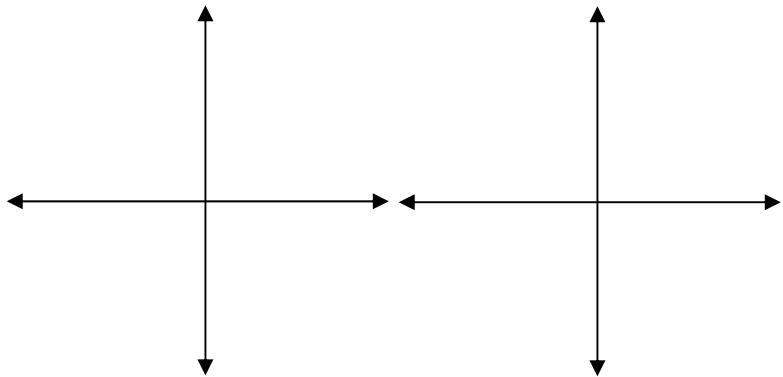
b. $m = \frac{1}{2}$, the line goes through the point $(-2, 3)$

Solving Systems

37. By Graphing

$y = -x + 3$

$x - y = 1$



38. By Substitution

$$x + 2y = 6$$

$$2x + 6y = 5$$

39. By Substitution

$$y = 2x - 5$$

$$-x + 3y = 5$$

40. By Elimination

$$x + y = 8$$

$$-x + 2y = 7$$

41. By Elimination

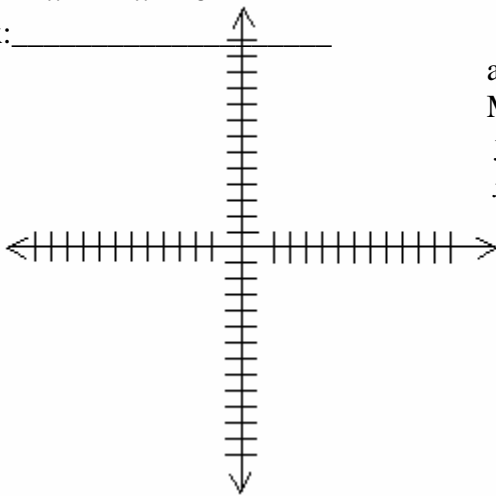
$$2x + 5y = 10$$

$$3x + 4y = 12$$

Graph and analyze the following quadratic function.

42. $F(x) = 2x^2 + 12x + 16$

vertex: _____



axis of symmetry: _____

MAXimum or MINimum: _____ at _____

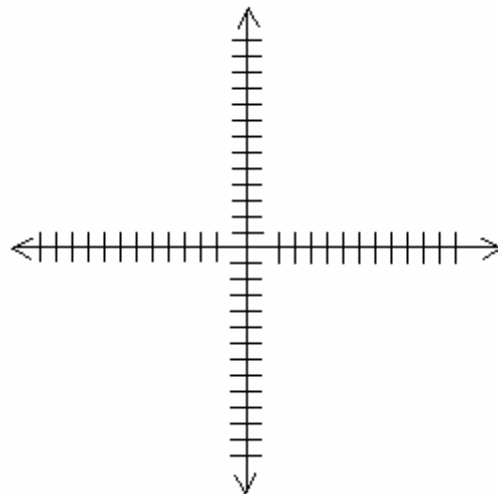
y -intercept = _____

x -intercept(s) = _____

Graph The Following System.

43. $y \geq -2$

$$3x + y < 4$$



Write An Equation And Solve.

44. The sum of the squares of two consecutive even integers is 52. Find the integers.

Trigonometry

45. Evaluate: $\tan\left(\frac{5\pi}{4}\right) + \sin\left(\frac{11\pi}{6}\right) \cdot \sin\left(\frac{-5\pi}{3}\right)$ (do this problem without a calculator)

46. If $f(x) = \cos 2x + \sin x$, find $f\left(\frac{\pi}{4}\right)$. (no calculator)

47. If $f(x) = \sin 2x$, find $f(270)$. (no calculator)

48. If $f(x) = \cos 2x \cdot \sin x$, find $f\left(\frac{\pi}{6}\right)$. (no calculator)

49. If $f(x) = \cos 2x \sin x$, find $f\left(\frac{\pi}{2}\right)$. (no calculator)

50. If $\sin A = .6820$, find the measure of A . (round answer to nearest tenth)
(you may use a calculator for this problem)

51. If $\cos A = .6820$, find the measure of A . (round answer to nearest tenth) (calculator allowed)

52. A ramp leaning against a wall makes an angle of 12° with the level ground. If the ramp measures 19 feet, how far away is the bottom of the ramp from the bottom of the wall?
(Express answer to the nearest tenth of a foot) (calculator allowed)

53. A wire attached to the top of a pole reaches a stake in the ground 20 feet from the foot of the pole and makes an angle of 58° with the ground. Find to the nearest foot the length of the wire.
(calculator allowed)

54. The top of a 40-foot ladder touches a point on the wall that is 36 feet above the ground. Find to the nearest degree the measure of the angle that the ladder makes with the wall.
(calculator allowed)

ANSWERS

1. $-12x^3y^4$

2. $\frac{8x^6}{27y^3}$

3. $4x^2 + 12x + 9$

4. $xy^2\sqrt{xz}$

5. $2x^2y\sqrt{2}$

6. $\frac{\sqrt{3}}{3}$

7. -77

8. $\frac{1}{3}$

9. $\frac{x^6}{64}$

10. $-\frac{1}{8x^9}$

11. $-\frac{1}{2x^8y^2}$

12. $8a^3 + 12a^2b + 6ab^2 + b^3$

13. $4x^2y^5\sqrt[3]{x^2y}$

14. $21 + 20i$

15. $\frac{x+3}{x-5}$

16. $\frac{b+a}{a-b}$

17. $\frac{-x+14}{(x-2)(x+2)}$

18. $x = -4$

19. $\left\{-\frac{1}{3}, \frac{5}{2}\right\}$

20. $x = 5$

21. $y = -\frac{1}{2}$

22. $x = \pm 2$, reject 2, so $x = -2$

23. $4 \pm 3i$

24. $x = 21, x = 2$

25. $x = 5$

26. -3

27. -7

28. $x(x^2 - 3)$

29. $(x - 5)(x - 2)$

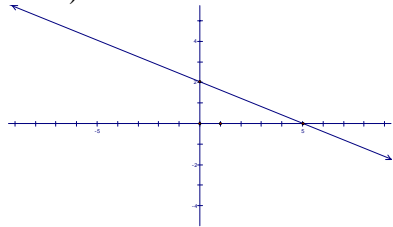
30. $(2x - 5)(2x + 3)$

31. $(3x + 5)(x - 1)$

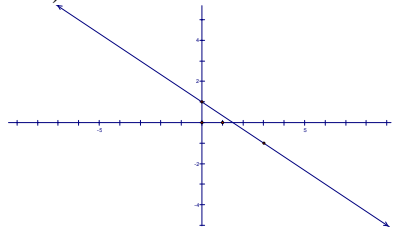
32. $x = 11, x = -8$

33. $w = \frac{-3 \pm i\sqrt{5}}{4}$

34. a)



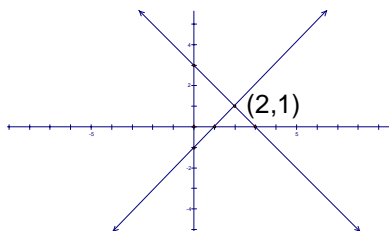
b)



35. a) $m = 2$ b) $m = -\frac{3}{5}$

36. a) $y = 2x - 3$ b) $y = \frac{1}{2}x + 4$

37.



38. $(4, 3)$

39. $\left\{13, -\frac{7}{2}\right\}$

40. $(3, 5)$

41. $\{\frac{20}{7}, \frac{6}{7}\}$

42. vertex: (-3, -2), axis of sym: $x = -3$, MIN (-3, -2), y-int: $y = 16$, x-int: $x = -2, x = -4$. The graph will be shown in class.

43. The graph will be shown in class.

44. -6 & -4 and 4 & 6

45. $1 - \frac{\sqrt{3}}{4}$

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

47. 0

48. $\frac{1}{4}$

49. -1

50. 43.0°

51. 47.0°

52. 18.6 ft

53. 38 ft

54. 26°