To students entering grade 11 SL Applications & Interpretation

In order to keep your current math skills sharp, please complete the summer review packet. Please complete before the first day of school.

Show all work and solutions on a separate sheet of paper. Show all work and graphs clearly!

Have a great summer!
CDS Mathematics Department

Linear Equations

1. Write an algebraic expression to represent each verbal expression
   a. Twice the difference of a number and 11
   b. The product of the square of a number and 5
2. Solve each equation
   a. $8.5(3y + 4) = 3.5(y - 28)$
   b. $12g - 9g + 24 - g - 9 = 13$
   c. $5(4x - 9) - 2x = 6x + 15$
3. If $3m + 5 = 23$, what is the value of $2m - 3$?
4. Solve each inequality and graph the solution set on a number line.
   a. $-3b - 5 \geq -6b - 13$
5. Carson has $35 to spend at the water park. The admission price is $25 and each soda is $2.50. Write an inequality to show how many sodas he can buy.
6. Find the slope of the line that passes through the points (-2, 7) and (3, -1).
7. Write an equation in slope-intercept form for the line that has slope -2 and passes through the point (3, -4).
8. Write an equation through the points (2, -4) and (1, 6).
9. Write an equation in slope-intercept form for the line that passes through (-3, 5) and is parallel to $y = -6x + 1$.
10. Graph each inequality
    a. $y \geq 4x - 1$
    b. $2x + 6y < -12$
11. Solve each system of equations by using either substitution or elimination
    a. $y = x + 4$
       $x + y = -12$

    b. $3x + 5y = -7$
       $6x - 4y = 0$
12. Solve each system of inequalities by graphing
    a. $x + y > 6$
       $x - y < 0$

    b. $y \geq 2x - 5$
       $y \leq x + 4$
13. Sierra King is a nail technician. She allots 20 minutes for a manicure and 45 minutes for a pedicure in her 7-hour work day. No more than 5 pedicures can be scheduled for each day. The prices are $25 for a manicure and $45 for a pedicure. If she must schedule both procedures, how many of each should Ms. King schedule to maximize her daily income? What is her maximum daily income?

Relations and Functions

14. State the domain and range for each relation. Determine whether the relation is a function.

    a. $\{(-3,0), (0,2), (2,4), (4,5), (5,2)\}$

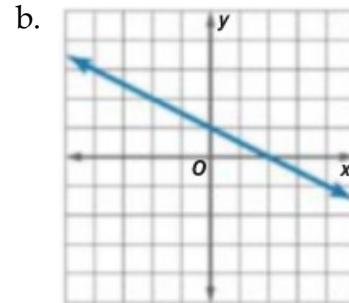   b. $\{(-4,1), (3,3), (1,1), (-2,5), (3,-4)\}$
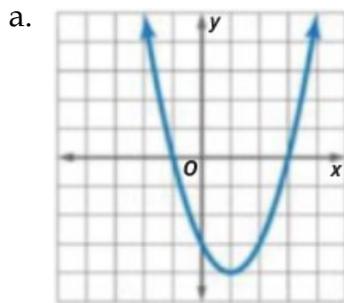
15. State whether each function is a linear function.
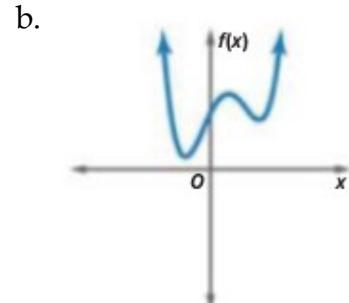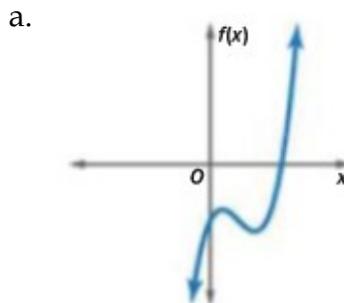
    a. $3x + 4y = 12$

    b. $y = x^3 - 6$

    c. $f(x) = -2x + 9$

16. Identify the type of symmetry in the graph of each function.

    a.

    b.

17. For each graph, describe the end behavior and state the number of real zeros

    a.

    b.

18. Use a graphing calculator to estimate the x-coordinates at which the maxima and minima of each function occur. Round to the nearest hundredth.

    a. $f(x) = 2x^3 - 3x^1 - 4x + 5$

    b. $f(x) = x^4 + 3x^3 - x^1 + 8x + 1$

19. For each function below, state the parent function and describe the transformations.

    a. $f(x) = 3\sqrt{x - 5} + 7$

    b. $f(x) = -(x + 2)^1 - 1$

20. Find the x- and y- intercepts of the following by hand.

    a. $y = 3x - 4$

Quadratics

21. Solve each quadratic equation by graphing. If exact roots cannot be found, state the consecutive integers between which the roots are located.

    a. $x^1 - x - 20 = 0$

    b. $4x^1 - 6x - 15 = 0$

22. Simplify:

    a. $\sqrt{-8}$

    b. $(2 - i) + (13 + 4i)$

    c. $(6 + 2i) - (4 - 3i)$

    d. $(6 + 5i)(3 - 2i)$

23. Solve each equation. Write your answer in simplest radical form.

    a. $2x^1 + 50 = 0$

    b. $3x^1 + 15 = 0$

    c. $4x^1 + 1 = 0$

24. Solve each equation by factoring

    a. $x^1 - x - 12 = 0$

    b. $x^1 + 3x - 40 = 0$

25. Solve each equation by using the quadratic formula. Round to the nearest hundredth.

    a. $2x^1 + 19x - 33 = 0$

    b. $4x^1 - 4x + 1 = 0$

    c. $2x^1 - 3x = 5x + 7$

    d. $5x^1 + 9x = 10$

Functions

26. Given $f(x) = 2x + 9$ and $g(x) = x^1 + 2x + 1$, find each function.

    a. $(f + g)(x)$

    b. $(f - g)(x)$

    c. $(f \cdot g)(x)$

27. Find $(f \circ g)(x)$ and $(g \circ f)(x)$ for each of the following:

    a. $\begin{aligned} f(x) &= 2x + 1 \\ g(x) &= 4x - 5 \end{aligned}$

    b. $\begin{aligned} f(x) &= x^1 + 1 \\ g(x) &= x - 7 \end{aligned}$

28. Find the inverse of each function

    a. $f(x) = 5x - 6$

29. Sketch $f(x) = \sqrt{x+5} - 3$. State the domain and range.

30. Solve each equation. (Don't forget to plug back into the original to make sure it works.)

    a. $\sqrt{x-3} + 5 = 15$

    b. $\sqrt{m+3} = \sqrt{2m+1}$

    c. $(x+1)^{0/4} = -3$

    d. $a^{0/3} - 4 = 0$

Sets

31. Define each of the following and label them with the appropriate symbol $(\mathbb{N}, \mathbb{P}, \mathbb{Q}, \mathbb{R}, \mathbb{Z})$

    a. Natural Numbers
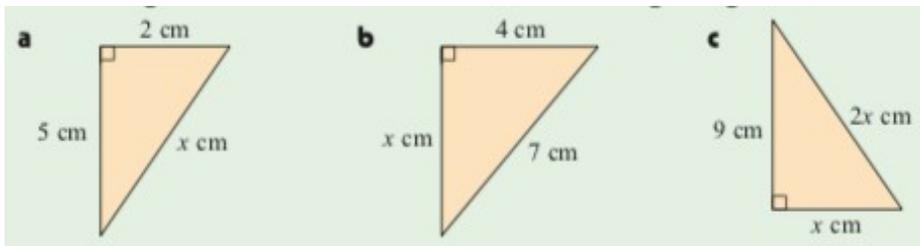
    b. Integers

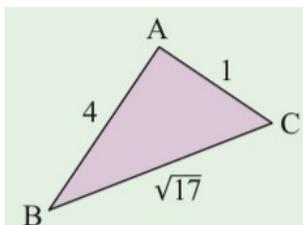   c. Rational Numbers

    d. Irrational Numbers

    e. Real Numbers

Pythagoras' Theorem

32. Find the lengths of the unknown sides in the following triangles:

33. Is the following triangle right angled? Give evidence

34. Show that $\{5, 11, 13\}$ is not a Pythagorean triple

35. A rectangle has diagonal 15cm and one side 8 cm. Find the perimeter of the rectangle.

36. A circle has a chord of length 10 cm. The shortest distance from the circle's center to the chord is 5 cm. Find the radius of the circle

37. A boat leaves X and travels due east for 10 km. It then sails 10 km south to Y. Find the distance and angle from X to Y.

38. What is the length of the longest toothpick which can be placed inside a rectangular box that is 3 cm x 5 cm x 8 cm?

Coordinate Geometry

39. Find the equation of the vertical line through (-1, 5)
40. Find the distance between the points S(7, -2) and T(-1, 1)
41. Given P(-3, 2) and Q(3, -1), find the midpoint of PQ.
42. Find the gradient (slope) of all lines perpendicular to a line with gradient $-\frac{0}{1}$.
43. Find the y-intercept for the line $4x - 3y = -9$.
44. Determine the gradient of the line with equation $4x + 5y = 11$.
45. If X(-2, 3) and Y(a, -1) are 6 units apart, find the value of a.
46. Given A(-3, 1), B(1, 4) and C(4, 0)
    a. Show that triangle ABC is isosceles
    b. Find the midpoint X of AC
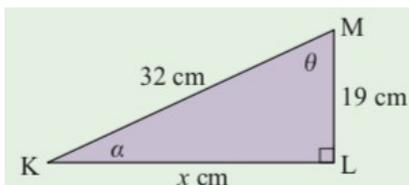   c. Use gradients to verify that BX is perpendicular to A

Trigonometry

47. Use your calculator to find, correct to 4 decimal places:
    a. cos(74°)
    b. sin (132°)
    c. tan(97°)
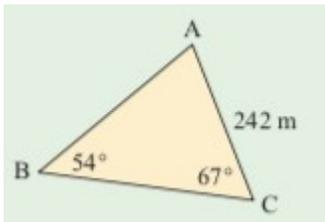
48. Find the value of x in the following

49. Find the measure of all unknown

50. sides and angles in triangle KLM

51. The angle of elevation from a point 2 km from the base of the vertical cliff to thetop of the cliff is 17.7°. Find the height of the cliff, in meters.

52. Jason's sketch of his father's triangular vegetable path is shown alongside. Find:

a. The length of the fence AB
b. The area of the patch