

MATH ENTRANCE EXAM

10th Grade

1. Simplify each equation.

a) $4 + 3^2 : (-1)(4)(-2) - (3^2)^0$

b) $7^{-\frac{1}{2}} \times \sqrt{7^2}$

c) $\sqrt[3]{-27x^4}$

d) $\sqrt[3]{x} \times \sqrt[6]{x}$

2. Solve each equation.

a) $\sqrt{3x} - 5 = 4$

b) $\frac{3}{8}x + 7 = 13$

c) $5x^2 + 16x + 3 = 0$

d) $3|4x + 1| + 10 = 7$

e) $5|x - 1| - 2 = 23$

3. Factor each polynomial.

a) $x^3 - 16x$

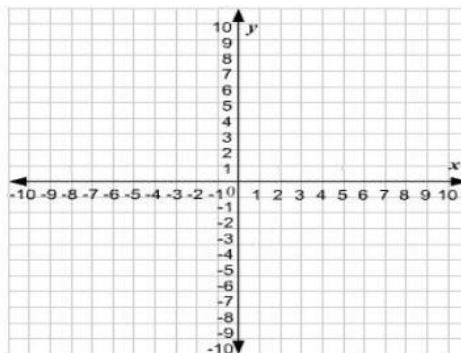
b) $64x^2y^4 - 169z^6$

c) $6x^2 + x - 12$

4. Solve the following system and represent each equation graphically.

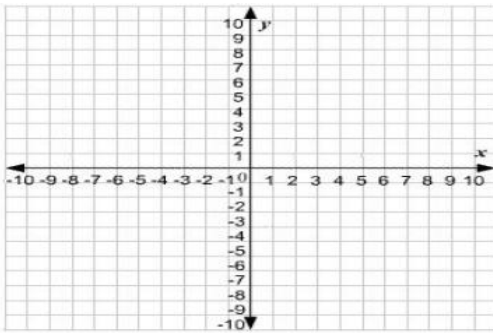
$$x + 3y = 6$$

$$2x - 4y = 12$$

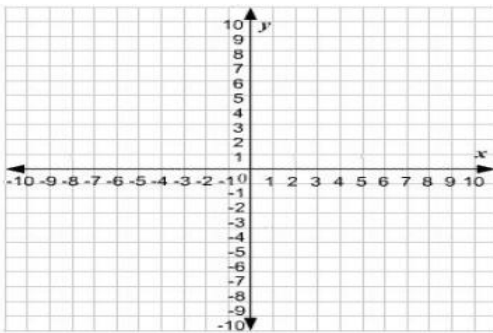


5. Graph the solutions to each inequality.

a) $2x - 3y > -1$



b) $2x + 3y \leq 12$



6. It is given a function $f(x)$, where $f(x) = 3x^2 - 2x + 1$.

- a) Find the value of x , where $f(x)$ is minimum.
- b) Find the x intercept of the given function.

7. A list of 10 data values is shown.

8, 10, 10, 12, 13, 15, 15, 15, 18, 20

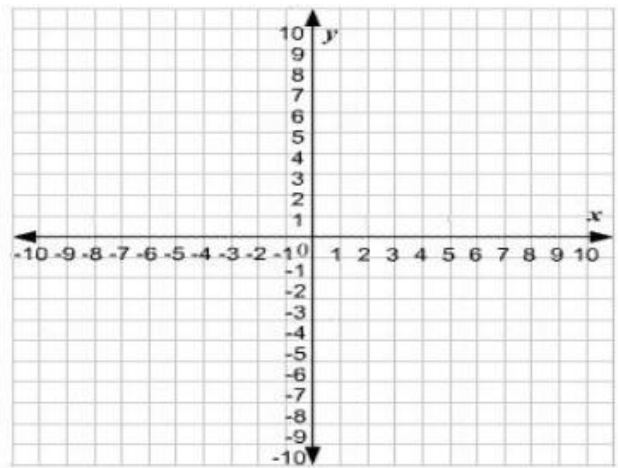
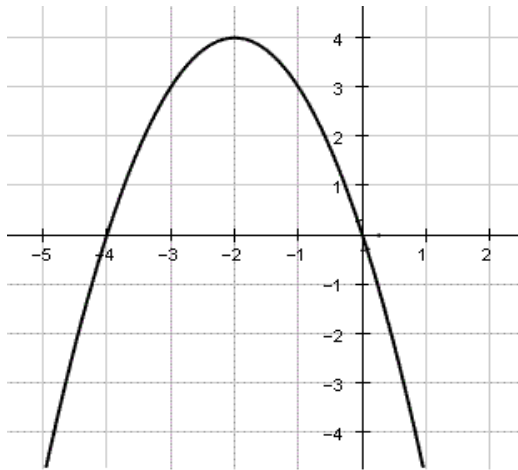
What is the *mean*, *median* and *mode* of the data?

8. The owner of a bookstore purchases new books at the beginning of each month and sells them with a markup of 200%. At the end of each month, for the unsold books, the owner applies a 60% discount, reducing the price of a book to \$24. What is the purchase price of a book for the owner at the beginning of each month?

9. The cost for 2 adults and 5 children to eat at the local buffet restaurant is \$46.50. The cost for 1 adult and 1 child is \$15. What is the cost of a child's meal?

10. A graph of a parabola is shown below. Find:

- The point where the parabola reaches its maximum
- The equation of the parabola
- Graph the function $f(x) + 4$.



11. Two data sets of 23 integers each are summarized in the histograms shown. For each of the histograms, the first interval represents the frequency of integers greater than or equal to 10, but less than 20. The second interval represents the frequency of integers greater than or equal to 20, but less than 30, and so on. What is the smallest possible difference between the mean of data set A and the mean of data set B?

