Name _____

1. Factor completely :
   (a) $x^2 - 7x - 60$ (b) $4x^2 + 20x - 24$ (c) $16x^2 - 56x + 49$ (d) $16n^4 - 64$

2. Write a quadratic equation whose roots are -5 and 7

3. The roots of $x^2 + 3x - 8 = 0$ are _____

4. For the function $f(x) = x^2 - 5x + 6$, the zeros are?

5. Write the solution of $x^2 + x + 5 = 0$.   6. What is the value of $\sqrt{-16} \cdot \sqrt{-25}$?

7. Simplify: $(4 + 3i) + 2(3 - 5i)$ 8. Find the product of $(2 + 4i)(4 - 3i)$

9. Find $\left(5i^{10}\right)\left(-2i^6\right)\left(-4i^{26}\right)$ 10. Simplify : $\dfrac{5 - 3i}{8 + 2i}$ 11. $\left(\dfrac{4}{5}\right)^{-3} =$

12. What would you add to $x^2 - 5x +$ ____ to complete the square?

13. What is the equation of the line which passes through the points (2,5) and (-3,7)?

14. Write an equation of the line that is <u>parallel</u> to $y = \dfrac{2}{3}x - 4$ going through the point (-3, 5). Write your answer in slope-intercept form.

15. Write an equation of the line that is <u>perpendicular</u> to $y = \dfrac{2}{3}x - 4$ going through the point (-3, 5). Write your answer in point-slope form.

16. A boat travels 80 miles downstream in 4 hours. It makes the return trip, against the current, in twice the time. What is the speed of the current?

17. State whether each vertex is a maximum or a minimum   18. Solve: $\dfrac{1}{3}\left|6x - \dfrac{1}{2}\right| = 9$

    A) $y = 5x^2 - 2$
    B) $y = -2(x + 4)^2 + 9$ 19. Convert 60 km/h to meters/s
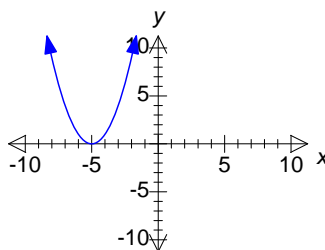   C) $y = \tfrac{1}{3}(x - 5)^2 - 4$

20. You wish to purchase a 14 pound bag of mixed nuts. Peanuts are $5.00 per pound and almonds are $6.00 per pound. How many pounds of peanuts should you buy if the entire bag costs $74?

21. What is the vertex of $y = 2(x+3)^2 - 10$?
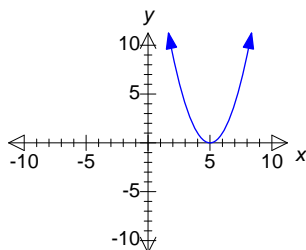
22. What is the transformation of $y = 2(x-9)^2 - 3$ from the parent graph $y = x^2$?
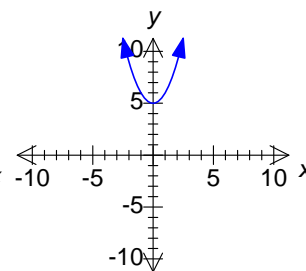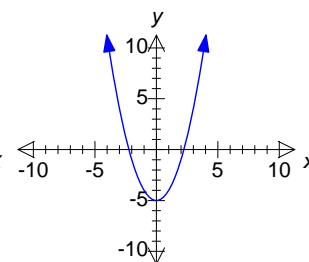
23. Which could be the graph of $y = x^2 - 5$?

A)   B)   C)   D)
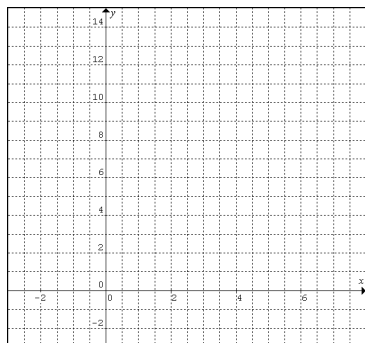

24. Simplify: $\left(3x^3 - 4x + 5\right) - 2\left(4x^3 + 3x^2 - 5x + 1\right)$ 25. $\left(3x^4 - 5x^3 + 7x + 4\right) \div (x - 2)$

26. Graph $|3x + 2| - 4 > 2$ on the number line.

27. Graph: $\begin{cases} y \geq 1 \\ x < 6 \\ y \leq 2x + 1 \end{cases}$ 28. Solve the system: $\begin{cases} x + 2y + z = 10 \\ 2x - y + 3z = -5 \\ 2x - 3y - 5z = 27 \end{cases}$

Find the corner-points of the feasible region. Use these corner-points to find the maximum and minimum values using $f(x, y) = 2x - 3y$

29. Convert the following

a. 52 miles per hour to feet per second

b. 123,000,000 centimeters to kilometers