Advanced Math Drill 2

1. A particular savings account provides no interest in the first year of a deposit and 3% annual compounded interest on a deposit for each year thereafter. If x dollars are deposited initially, which of the following equations expresses the total amount of money $A(n)$ in the account n years later, where n is an integer greater than 2?

   (A) $A(n) = x\,[(0.03)^n]$
   (B) $A(n) = x\,[(0.97)^n]$
   (C) $A(n) = x\,[(0.03)^{n-1}]$
   (D) $A(n) = x\,[(1.03)^{n-1}]$

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2. What is the value of x in the following equation?

$$x^2 + 9 = -6x$$

(A) -3
(B) 0
(C) 3
(D) No solution

3. For $y < 0$, which of the following is equivalent to $\frac{3}{x^2 y}$?

(A) $\frac{3x^{-2}}{\sqrt[4]{y^2}}$
(B) $\frac{3x^{-2}}{-\sqrt[4]{y^4}}$
(C) $\frac{3x^{\frac{1}{2}}}{\sqrt[4]{y^4}}$
(D) $\frac{3x^{-2}}{\sqrt[4]{y^4}}$

4. For positive x and y, $x^{-\frac{3}{4}} y^{\frac{4}{3}}$ is equivalent to

(A) $-\frac{x^3 y^4}{x^4 y^3}$
(B) $\frac{\sqrt[4]{y^3}}{\sqrt[3]{x^4}}$
(C) $\frac{y\sqrt[3]{y}}{\sqrt[4]{x^3}}$
(D) $\frac{y^4\sqrt[3]{y}}{x^3\sqrt[4]{x}}$

5. What are the possible values of x in the following equation?

$$3x^2 + 12x + 6 = 0$$

(A) $-12 \pm \sqrt{3}$
(B) $-2 \pm \sqrt{2}$
(C) $-2 \pm \sqrt{3}$
(D) $2 \pm \sqrt{2}$

6. If $x^2 + x - 12 = 0$ and if $x < 0$, what is the value of x?

(A) -6
(B) -4
(C) -3
(D) 3

7. $64x^6 - 16y^8$ is equivalent to which of the following expressions?

(A) $16(4x^3 + y^4)(x^3 - y^4)$
(B) $16(4x^3 - y^4)(x^3 - y^4)$
(C) $16(2x^3 + y^4)(2x^3 - y^4)$
(D) $16(2x^6 - y^8)(2x - y)$

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$= 16\left[(2x^3)^2 - (y^4)^2\right] = 16(2x^3 + y^4)(2x^3 - y^4)$

8. Solve the following equation for all possible x values. $x^2 = 11x - 24$

   (A) 3
   (B) 3 and 8
   (C) -3 and -8
   (D) Infinitely many solutions

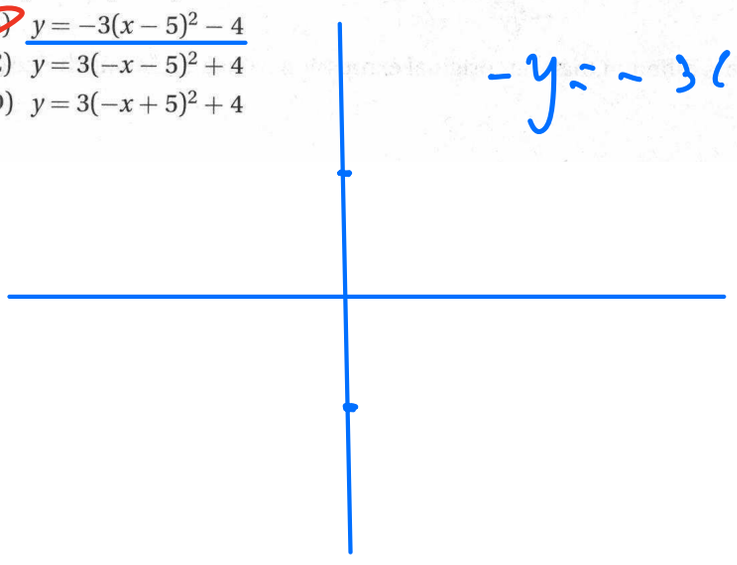
9. The graph of $x - 4 = y^4$ has a minimal x value that compares in what way to the minimal x value of the graph $x = y^4$?

   (A) It is 4 less.
   (B) It is 4 greater.
   (C) They are the same.
   (D) The answer cannot be determined.

10. Which of the following functions represents the reflection across the x axis of $y = 3(x-5)^2 + 4$?

    (A) $y = -3(x+5)^2 - 4$
    (B) $y = -3(x-5)^2 - 4$
    (C) $y = 3(-x-5)^2 + 4$
    (D) $y = 3(-x+5)^2 + 4$

$-y = -3(x-5)^2 - 4$



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Problem Solving and Data Analysis Drill

1. If there are 4 cars for every 5 trucks in the parking lot (with no other types of vehicles), what is the ratio of cars to the total number of vehicles in the parking lot?

   (A) 1 to 5
   (B) 4 to 9
   (C) 5 to 9
   (D) 4 to 5

2. On Monday, the highest temperature reached was 70 degrees Fahrenheit. On Tuesday, the highest temperature increased by 20%. On Wednesday, the highest temperature decreased by 25% from the previous day. What was the difference between Monday's and Wednesday's highest temperatures in degrees Fahrenheit?

   (A) 5
   (B) 7
   (C) 14
   (D) 21

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3. A recipe calls for 3 cups of sugar. There are 16 tablespoons in a cup and 3 teaspoons in a tablespoon. If a cook has 1.5 cups of sugar available in the pantry, how many teaspoons of sugar must the cook obtain from other sources to follow the recipe?

(A) 72
(B) 104
(C) 144
(D) 216

Price per Gallon of Milk	Number of Gallons Sold
$1.50	650
$0.90	780
$1.95	530
$2.80	330
$3.40	190

4. Which of these functions best models the relationship between the number of gallons of milk sold, $N(g)$, and the price per gallon of milk, g?

(A) $N(g) = 530 + 590(g - 1.95)^2$
(B) $N(g) = 1{,}000 - 240g$
(C) $N(g) = 1{,}000 + 240g$
(D) $N(g) = 780 - 360(g - 0.9)^2$

	Employed	Unemployed
Population X	890	112
Population Y	748	205

5. What is the difference between the unemployment percentage in Population Y and the unemployment percentage in Populations X and Y combined, calculated to the nearest tenth?

(A) 5.0%
(B) 5.3%
(C) 5.8%
(D) 6.2%

Questions 6–7 use the following table.

Election Results

	Candidate A	Candidate B	Total
Columbus	350,000	270,000	620,000
Cleveland	180,000	195,000	375,000
Total	530,000	465,000	995,000

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6. Of all eligible voters in Columbus, 40% actually voted in the election. How many total eligible voters did Columbus have?

   (A) 248,000
   (B) 875,000
   (C) 1,550,000
   (D) 2,487,500

7. Suppose that a survey of total 200 randomly selected voters from both cities accurately predicted the results of the election. How many of the people surveyed would have been supporters of Candidate A from Columbus?

   (A) 50
   (B) 70
   (C) 113
   (D) 132

Questions 8—9 use the following table.

Grade	Test 1	Project 1	Test 2	Project 2	Total
A	5	8	9	7	29
B	7	6	5	10	28
C	6	7	4	5	22
D	4	1	3	2	10
F	1	1	3	0	5
Total	23	23	24	24	94

8. The median letter grade for assignments in the class is:

   (A) A
   (B) B
   (C) C
   (D) D

9. For which assignment is the standard deviation of the grade results the least?

   (A) Test 1
   (B) Project 1
   (C) Test 2
   (D) Project 2

10. An online shopping site allows customers to post 1-star, 2-star, 3-star, 4-star, and 5-star reviews for products. If an item currently has an average star rating of 2.3 based on a total of 10 reviews, what is the minimum number of reviews that could bring up the overall average rating to at least a 3.0?

    (A) 2
    (B) 3
    (C) 4
    (D) 5

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