COMMON CORE Benchmark Review

1. **Simplify:** $\log_2 16$
   a. 4
   b. -4
   c. $\dfrac{1}{3}$
   d. -3

2. **Simplify:** $\log_3 \dfrac{1}{27}$
   a. 4
   b. -4
   c. $\dfrac{1}{3}$
   d. -3

3. **Expand using properties of logarithms:**

   $$\log_2\left(\dfrac{x^3 z^4}{y^2}\right)$$

   a. $\dfrac{(3\log_2 x)(2\log_2 y)}{4\log_2 z}$
   b. $3\log_2 x + 2\log_2 y - 4\log_2 z$
   c. $3\log_2 x - 2\log_2 y + 4\log_2 z$
   d. $\log_2(x^3 + y^2 - z^4)$

4. **Solve for x,** $5^{2x} = 4$

   a. $x = \dfrac{4\log 2}{\log 5}$
   b. $x = \dfrac{2\log 5}{\log 4}$
   c. $x = \dfrac{\log 4}{2\log 5}$
   d. no solution

5. **Write as a single logarithm:** $3\log_a x + 3\log_a y$

   a. $\log_a(xy)^2$
   b. $\log_a(x-y)^2$
   c. $\log_a\left(\dfrac{x}{y}\right)^2$
   d. $\log_a\left(\dfrac{y}{x}\right)^2$

Algebra 2 Third Quarter

For #6 and 7, use the following data:
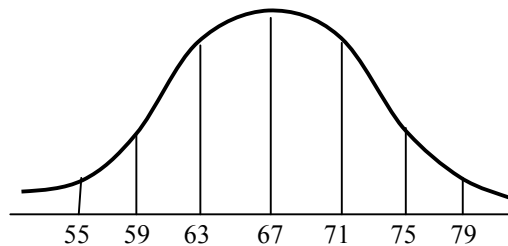   1, 4, 6, 6, 7, 8, 8, 8

6. Find the mean
   a. 5
   b. 6
   c. 7
   d. 30

7. Find the standard deviation
   a. 42
   b. $\sqrt{42}$
   c. $\dfrac{\sqrt{21}}{2}$
   d. $\sqrt{\dfrac{21}{2}}$

8. The ages of 5000 employees at a local factory were recorded and found to be approximated by the normal curve below.   Find the mean and the standard deviation for this data.

   55   59   63   67   71   75   79

   a.   mean = 55, standard deviation = 3
   b.   mean = 64, standard deviation = 6
   c.   mean = 67, standard deviation = 4
   d.   mean = 64, standard deviation = 3

For #9 – 11, use the stem and leaf plot below

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1 | 2, 2, 6, 7
2 | 3, 4, 4, 4,5
3 | 3, 3, 5, 6
4 | 0, 0, 1, 2, 2
5 | 0, 1
```

9. **Find the mode.**
   a.   33
   b.   24
   c.   4
   d.   42

10. **Find the median.**
   a.   33
   b.   3
   c.   49
   d.   12

11. **Find the first quartile.**
   a.   23.5
   b.   33
   c.   24
   d.   none

12. **A drawer contains 3 white, 2 red and 4 green socks. A sock is picked and put back then another sock is picked. What is the probability that both are red?**
   a. $\dfrac{1}{5}$
   b. $\dfrac{1}{9}$
   c. $\dfrac{4}{81}$
   d. $\dfrac{8}{9}$

13. **In how many ways can 4 different math books be arranged on a shelf?**
   a.   1
   b.   8
   c.   16
   d.   24

14. **If you roll two standard dice, what is the probability that the sum of the numbers showing on the two dice is 8?**
   a. $\dfrac{31}{36}$
   b. $\dfrac{1}{12}$
   c. $\dfrac{1}{4}$
   d. $\dfrac{5}{36}$

15. **In how many ways can you select one math book, one English book, and one science book from a collection of 8 different math books, 5 different English books and 3 different science books?**
   a.   16
   b.   64
   c.   120
   d.   256

16. **Which equation matches the graph below?**
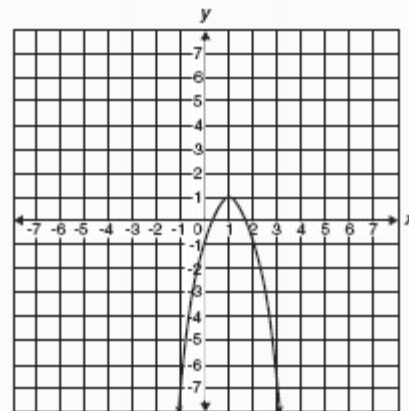
   a. $y = 2(x + 1)^2 + 1$

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

   c. $y = -2(x - 1)^2 + 1$

   d. $y = -2(x + 1)^2 + 1$

17. **An object is shot upward from the earth's surface. The height of the object follows the formula $h(t) = 40t - 3t^2$. Find the height in meters after 3 seconds.**

   a. 147 m
   b. 93 m
   c. 0 m
   d. 107 m

18. **Consider the quadratic function equation $y = a(x - h)^2 + k$. What effect does changing the value of a have on the graph of y?**

   a. Shifts the graph horizontally by k units

   b. Shifts the graph vertically by k units

   c. Stretches (or shrinks) the graph vertically by a factor of k units

   d. Changing k has no effect on the graph of y

19. **Consider the graph of the parabola shown. Describe the value of b.**

   $$y = a(x - b)^2 + c$$
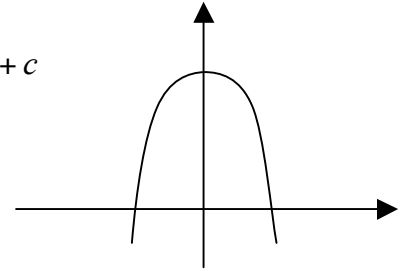
   a. positive
   b. negative
   c. zero
   d. not enough information to tell

20. **Given the equation $y = 4x^2 + x - 1$, find the discriminate and describe the nature of the roots**

21. **Find the roots by factoring, quadratic formula, or by completing the square:**
   $$y = 3x^2 + 4x - 21$$

22. **Solve for x factoring, quadratic formula, or by completing the square:**
   $$x^2 + 6x - 8 = 0$$

23. **From a group of 5 boys and 3 girls, three violin students are to be selected at random to represent their school in a regional orchestra. What is the probability that 2 students selected are boys and 1 a girl.**

Free Response Question

DIRECTIONS: Read the question carefully. Answer question thoroughly.

I.   Sammie's grandmother gave him $2,000. He wants to save as much money as he can in the next 3 years so he can put a good down payment on a new car. He went to the bank and they gave him two different ways to invest his money. His first choice is to put the money in a savings account at a rate of 3% annually. His second choice is a money market account at a rate of 3% compunded semi-annually. Which would give him the best return on his money? Show both methods and explain your reasoning.