BECA/Huson/Algebra 2: Regents Preparation Name:
20 May 2024

Prep #14 Do Now Quiz: Exponents **Mental math - no calculators**

1. 3.OA.7 Use the relationship between multiplication and division, know from memory all products of two one-digit numbers.

   (a) $12 \div 3 =$

   (b) $40 \div 5 =$

   (c) $28 \div 4 =$

   (d) $56 \div 7 =$

   (e) $15 \div 3 =$

   (f) $48 \div 6 =$

2. 6.EE.A.1 Evaluate numerical expressions involving whole-number exponents.

   (a) $4^2 =$

   (b) $7^2 =$

   (c) $9^2 =$

   (d) $2^3 =$

   (e) $3^3 =$

   (f) $10^3 =$

3. 8.EE.A.2 Evaluate square roots of small perfect squares and cube roots of small perfect cubes.

   (a) $\sqrt{9} =$

   (b) $\sqrt{25} =$

   (c) $\sqrt{64} =$

   (d) $\sqrt{36} =$

   (e) $\sqrt[3]{1} =$

   (f) $\sqrt[3]{125} =$

4. N.RN.2 Convert between radical expressions and expressions with rational exponents using the properties of exponents.

   (a) $x^2 \cdot x =$

   (b) $x^3 \cdot x^{-2} =$

   (c) $x^{\frac{2}{3}} \cdot x^{\frac{4}{3}} =$

   (d) $\sqrt{x^4}$

   (e) $\sqrt[3]{x^6}$

   (f) $\sqrt{x^3} \cdot \sqrt{x^5}$

AII-F.BF.2: Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

For a geometric series:

$$\sum_{k=1}^{n} a_k = a_1 + a_2 + \ldots + a_n = a_1 \left(\frac{1 - r^n}{1 - r} \right)$$

5. Write a recursive formula for the sequence 2, 5, 8, 11, ...

6. Write an explicit formula for the sequence $14\frac{1}{4}$, $8\frac{3}{4}$, $3\frac{1}{4}$, $-2\frac{1}{4}$, ...

7. Given the sequence beginning 2, 6, 18, 48, ..., find the sum of the first 12 terms.

F.LE.2: Construct a linear or exponential function symbolically given: a graph, a description of the relationship, or two input-output pairs (including from a table).

8. Complete the table for $f(x)$ and write an explicit formula for the exponential function.

x	0	1	2	3	4
$f(x)$	10	20			

BECA/Huson/Algebra 2: Regents Preparation Name:
20 May 2024

9. The frequency table below shows the number of students who turned in their homework on time.

Class	On time	Late
11.1	18	12
11.2	15	10
11.3	17	8

(a) Add totals to the table.

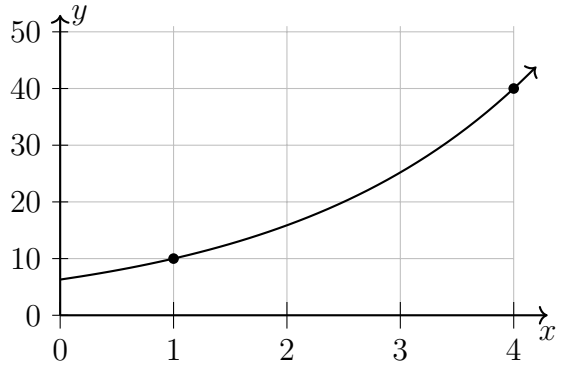
(b) Which class has the fewest students?

(c) What percentage of all students turned in their homework on time?

(d) Using the blank template below, translate the values above into decimal proportions of the whole student population rounded to *the nearest thousandth*.

Class	On time	Late	Total
11.1			
11.2			
11.3			
Total			

10. Determine the average rate of change, in mph, from one to four hours on the graph.



AII-F.LE.2: Construct a linear or exponential function symbolically given: a graph, a description of the relationship, or two input-output pairs (include reading these from a table).

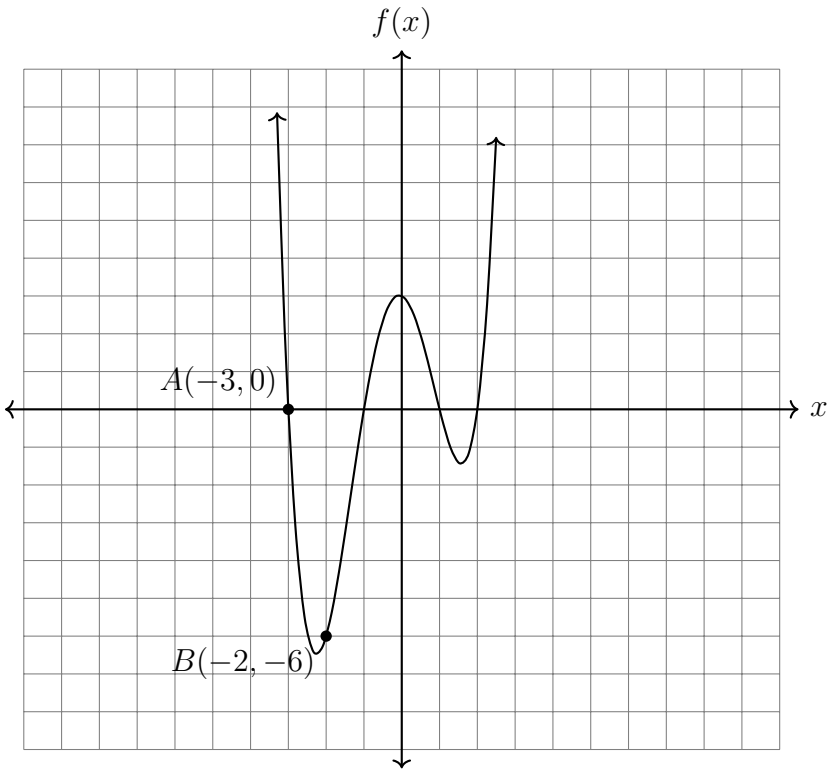
11. Given the quartic function $f(x) = a(x-1)(x-2)(x+j)(x+k)$, graphed below.

    (a) Is the leading coefficient a positive or negative?

    (b) Write down the values of j and k.

    (c) Over the interval $0 < x < 1$, is the function increasing, decreasing, or constant?

    (d) Find the average rate of change of the function over the interval from point A to point B.



12. Go through the steps to factor by grouping $f(x) = x^3 - 4x^2 - x + 4$

    (a) Use your calculator to find the zeros of the function.

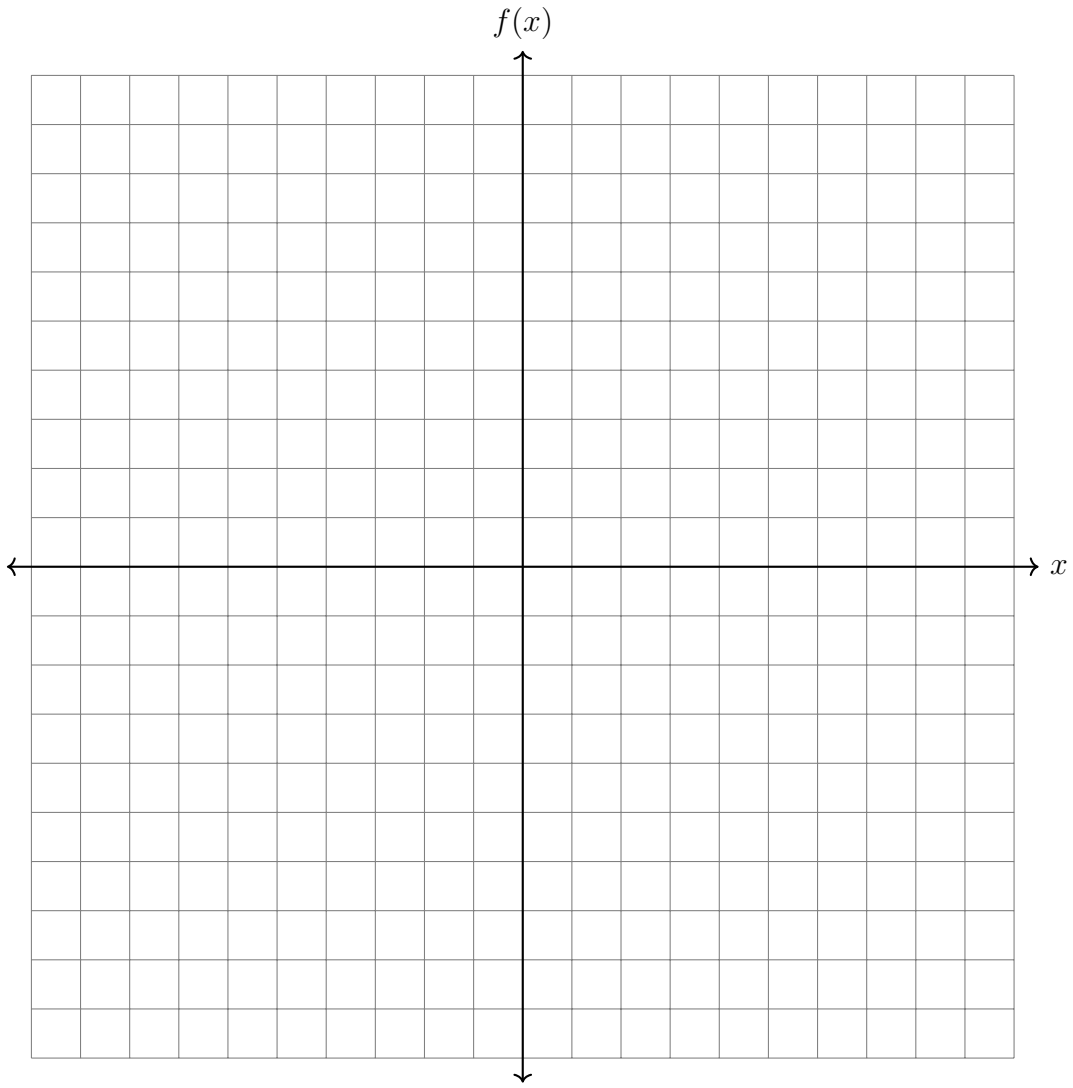
    (b) Write down the factors of the function.

    (c) Write the final row and complete the grouping step by filling in the blanks.

$$\begin{aligned} f(x) &= x^3 - 4x^2 - x + 4 \\ &= (x^3 - 4x^2) - (x - 4) \\ &= \_\_\_\_\_\,(x-4) - \_\_\_\_\_\,(x-4) \\ &= (x^2 - 1)(x - 4) \\ &= \end{aligned}$$

13. Go through the steps to factor by grouping $f(x) = x^3 + 2x^2 - 4x - 8$

14. Graph the function $f(x) = x^3 - 5x^2 + 3x + 4$ over the domain $-1 \leq x \leq 4$.



Mark the relative minimum at $x = 3$ and label it as an ordered pair.

Is $x - 4$ a factor of $f(x)$? Justify your answer.