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

Name: Solutions

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) $12 \div 3 =$ 4
   (b) $40 \div 5 =$ 8
   (c) $28 \div 4 =$ 7
   (d) $56 \div 7 =$ 8
   (e) $15 \div 3 =$ 5
   (f) $48 \div 6 =$ 8

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

   (a) $4^2 =$ 16
   (b) $7^2 =$ 49
   (c) $9^2 =$ 81
   (d) $2^3 =$ 8
   (e) $3^3 =$ 27
   (f) $10^3 =$ 1000

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

   (a) $\sqrt{9} =$ 3
   (b) $\sqrt{25} =$ 5
   (c) $\sqrt{64} =$ 8
   (d) $\sqrt{36} =$ 6
   (e) $\sqrt[3]{1} =$ 1
   (f) $\sqrt[3]{125} =$ 5

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

   (a) $x^2 \cdot x =$ x^3
   (b) $x^3 \cdot x^{-2} =$ x
   (c) $x^{\frac{2}{3}} \cdot x^{\frac{4}{3}} =$ x^2
   (d) $\sqrt{x^4} =$ x^2
   (e) $\sqrt[3]{x^6} =$ x^2
   (f) $\sqrt{x^3} \cdot \sqrt{x^5} =$ x^4

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, ...

$a_1 = 2$

$a_n = a_{n-1} + 3$

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

$a_n = 14\frac{1}{4} - 5\frac{1}{2}(n-1)$

$d = 8\frac{3}{4} - 14\frac{1}{4} = -5\frac{1}{2}$

$= 3\frac{1}{4} - 8\frac{3}{4} = -5\frac{1}{2}$

$= -2\frac{1}{4} - 3\frac{1}{4} = -5\frac{1}{2}$

7. Given the sequence beginning 2, 6, 18, ~~48~~ 54, ..., find the sum of the first 12 terms. (×3, ×3)

$S_{12} = 2\left(\frac{1-3^{12}}{1-3}\right) = 531,440$

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	40	80	160

(×2)

$f(x) = 10 \cdot 2^x$