

Summer Math Review 2017

For Section 9 Honors

- You should not use a calculator for this work, except for section 3, question 5 and section 10, question 5i.
- Work on a separate sheet of paper.
- Show all work.

Section 1 – Operations with Integers

Simplify each of the following.

1. $-1000 + (-1010) + 2000$
2. $-13 + (-17) + 15 + (-14) + (-16)$
3. $212 - (-222) + (-22) - 232$

Section 2 – Fraction Practice

Simplify each of the following, giving your final answer in mixed form when appropriate. Reduce all fractional answers as far as possible.

1. $2\frac{5}{9} - \frac{5}{6}$
2. $2\frac{3}{4} \cdot 3\frac{1}{5}$
3. $\frac{4}{15} \div \frac{2}{5}$
4. $\frac{\frac{1}{3} - \frac{5}{6}}{\frac{3}{4}}$
5. $\frac{\frac{4}{9} \cdot 2.25}{\frac{2}{5} - 2\frac{4}{10}}$

Section 3 – Exponents

Simplify:

1. $\sqrt[3]{54x^6}$

2. $64^{\frac{2}{3}}$

3. $\left(\frac{x^4}{x^7}\right)^{-5}$

4. Consider the function $f(x) = 16\left(\frac{2}{3}\right)^x$.

- a. Does this equation represent exponential growth or exponential decay? How do you know?
 - b. What is the initial value of the function when $x = 0$?
 - c. What is the growth or decay factor?
 - d. Make a table and sketch the function for the range $-2 \leq x \leq 4$.
5. At 12:00 noon, I bring a petri dish into my lab containing 15 colonies of bacteria. The bacteria increase at a rate of 7.5% per hour.
- a. Write an equation relating the number of colonies in the dish to the number of hours elapsed since 12:00 noon.
 - b. When I go home at 6:00 pm, how many colonies will be in the petri dish?

Section 4 – Algebraic Fractions

Simplify:

$$1. \frac{x-2}{x} \div \frac{6x-12}{3x}$$

$$2. \frac{2x}{x-1} - \frac{2}{x+3}$$

Solve for x (remember to check for extraneous solutions).

$$3. \frac{x}{3} - \frac{2+x}{4} = 5$$

$$4. \frac{3}{x-2} - \frac{2x}{x+3} = \frac{12}{x^2+x-6}$$

$$5. \frac{x}{x-2} + \frac{4}{x+1} = \frac{6}{x^2-x-2}$$

Section 5 – Radicals

Simplify.

$$1. \sqrt{20} + \sqrt{125} - \sqrt{45}$$

$$2. \frac{\sqrt{72}}{\sqrt{50}}$$

$$3. (3\sqrt{2})^3$$

Solve for x .

$$4. \sqrt{x} + 2 = 5$$

$$5. 2\sqrt{x+3} = 3\sqrt{x-2}$$

Section 6 – Polynomials

Find the sum or difference.

1. $(5x^2 - 4x + 32) + (-6x^2 - 17x + 2)$

2. $(-x^3 - x) - (x^3 + x^2) - (-x^2 + x)$

Find the products.

3. $(2x - 4)(3x^2 - 17x + 24)$

4. $x(x + 2)(x - 3) + (x - 1)(3 - x)(x + 2)$

5. If $2 + 3i$ is a solution of the equation $ax^3 + bx^2 + cx + d = 0$ where $a, b, c,$ and d are all real numbers, then what must be another solution of the equation?

6. What is the vertex of the parabola $y = x^2 - 4x + 1$?

Section 7 – Factoring

Solve these equations by factoring.

1. $6x^2 + 24x = 0$

2. $x^2 + 6x - 40 = 0$

3. $x^6 - 13x^3 + 36 = 0$

4. $100x^2 - 49 = 0$

5. $x^3 - 11x^2 + 24x = 0$

Section 8 – More quadratics

Solve the following equations using the quadratic formula. Give exact answers in simplest form.

1. $x^2 - 4x - 2 = 0$

2. $-6x - 4x^2 = -5$

Solve the following equations by completing the square. Leave answers in exact form.

3. $x^2 + 4x + 2 = 0$

4. $3x^2 - 12x + 5 = 0$

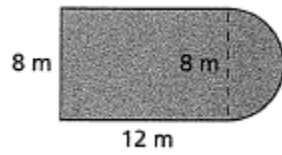
Section 9 – Direct and Inverse Proportion

1. y varies directly as x . If $y = 7$ when $x = 343$, find y when $x = 49$.
2. If y varies inversely as x , what happens to y when x is doubled?
3. The heex of a rog varies directly as the square of the rog's kof. If a rog's kof and heex are 6 and 9, respectively, find the heex of a rog whose kof is 10.
4. If y varies directly as x and inversely as z , and if $y = 7$ when $x = 3$ and $z = 4$, find the value of the constant of variation, k .
5.
 - a. If (2,3) and (3, b) belong to the same direct variation, then $b = \underline{\hspace{2cm}}$.
 - b. If (2,3) and (3, c) belong to the same inverse variation, then $c = \underline{\hspace{2cm}}$.

Section 10 - Geometry Formulas

1. Draw an angle that has measure 150 degrees.
2. How many degrees in a straight angle?
3. How many degrees in $\frac{2}{3}$ of a circle?
4. What is the perimeter of a circle with radius 6?
5. Find the area of each figure to the nearest tenth.

i.



ii.

