CC Algebra II

Test #5 – Rational Exponents and Rational Functions - Review Sheet

**Regents Problems

August 2017 Regents Exam

1. The solution set for the equation $\sqrt{x + 14} - \sqrt{2x + 5} = 1$ is
   a. {-6}
   b. {2}
   c. {18}
   d. {2, 22}

2. What does $\left( \frac{-54x^9}{y^4} \right)^{2/3}$ equal?
   a. $\frac{9ix^{6\sqrt[4]{4}}}{y^3\sqrt[2]{y^2}}$
   b. $\frac{9ix^{6\sqrt[4]{4}}}{y^2\sqrt[4]{y^2}}$
   c. $\frac{9x^{6\sqrt[4]{4}}}{y^{\sqrt[2]{y}}}$
   d. $\frac{9x^{6\sqrt[4]{4}}}{y^2\sqrt[4]{y^2}}$

3. Explain how $(-8)^{4/3}$ can be evaluated using properties of rational exponents to result in an integer answer.

June 2017 Regents Exam

4. For $x \neq 0$, which expressions are equivalent to one divided by the sixth root of $x$?

   I. $\frac{6\sqrt[6]{x}}{\sqrt[6]{x}}$
   II. $\frac{x^{1/6}}{x^{1/3}}$
   III. $x^{-1/6}$

   a. I and II, only
   b. I and III, only
   c. II and III, only
   d. I, II, and III
5. Write $\sqrt[3]{x} \cdot \sqrt{x}$ as a single term with a rational exponent.

January 2017 Regents Exam

6. The expression $\left(\frac{m^2}{m^3}\right)^{-1/2}$ is equivalent to
   
   a. $-\sqrt[6]{m^5}$
   
   b. $\frac{1}{\sqrt[6]{m^5}}$
   
   c. $-m^{5\sqrt[6]{m}}$
   
   d. $\frac{1}{m^{5\sqrt[6]{m}}}$

7. Given the equal terms $\sqrt[3]{3^x} \cdot y^{5/6}$, determine and state $y$, in terms of $x$.

8. The speed of a tidal wave, $s$, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where $t$ represents the time from its origin in hours.
   
   a. Algebraically determine the time when $s = 0$.
   
   b. How much faster was the tidal wave traveling after 1 hour than 3 hours, to the nearest mile per hour? Justify your answer.
7. \( \sqrt{2x+6} + 4 = x + 3 \)
   What is the solution set of the equation above?
   A) \{-1\}
   B) \{5\}
   C) \{-1, 5\}
   D) \{0, -1, 5\}

11. The expression \( \frac{x^2 \cdot y^3}{x^3 \cdot y^{-1}} \), where \( x > 1 \) and \( y > 1 \), is equivalent to which of the following?
   A) \( \frac{y}{y^2} \)
   B) \( \frac{y \cdot \sqrt{y}}{y^2} \)
   C) \( \frac{y \cdot \sqrt{y}}{x \cdot \sqrt{x}} \)
   D) \( \frac{y \cdot \sqrt{y}}{x^2 \cdot \sqrt{x}} \)

13. If \( a^{-\frac{1}{2}} = x \), where \( a > 0 \), what is \( a \) in terms of \( x \)?
   A) \( \sqrt{x} \)
   B) \( -\sqrt{x} \)
   C) \( \frac{1}{x^2} \)
   D) \( \frac{1}{x^2} \)

29. A motor powers a model car so that after starting from rest, the car travels \( s \) inches in \( t \) seconds, where \( s = 16t \sqrt{t} \). Which of the following gives the average speed of the car, in inches per second, over the first \( t \) seconds after it starts?
   A) \( 4 \sqrt{t} \)
   B) \( 16 \sqrt{t} \)
   C) \( \frac{16}{\sqrt{t}} \)
   D) \( 16t \)
**REGENTS Answers**

1. ANS: B  TOPIC: Solving Radicals
2. ANS: D  TOPIC: Radicals and Rational Exponents
3. Rewrite $4/3$ as $\frac{1}{4} \cdot \frac{1}{4} = 1$, using the power of a power rule.  TOPIC: Radicals and Rational Exponents
4. ANS: D  TOPIC: Radicals and Rational Exponents
5. $x^{5/6}$  TOPIC: Operations with Radicals
6. ANS: B  TOPIC: Radicals and Rational Exponents
7. $(x^{5/3})^{6/5} = (y^{5/6})^{6/5} \rightarrow x^2 = y$  TOPIC: Radicals and Rational Exponents
8. ANS:

$$
0 = \sqrt{t - 2t + 6} - 6 \left( \frac{9}{4} \right) - 6 < 0, \text{ so } \frac{9}{4} \text{ is extraneous.}
$$

$$
2t - 6 = \sqrt{t}
$$

$$
4t^2 - 24t + 36 = t
$$

$$
4t^2 - 25t + 36 = 0
$$

$$(4t - 9)(t - 4) = 0
$$

$$
t = \frac{9}{4}, 4
$$

$$
(\sqrt{1 - 2(1) + 6} - (\sqrt{3} - 2(3) + 6) = 5 - \sqrt{3} \approx 3.268 \text{ mph} \quad \text{TOPIC: Solving Radicals}
$$

**SAT Answers**

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