MAT-080 Section N Problem Set 10

Answers and hints are shown in blue

Name: _____

Do not approximate.

1. Evaluate and simplify each expression without using a calculator.

   (a) $16^{3/2} = 64$

   (b) $\sqrt{5}\sqrt{20} = 10$

2. Find the domain of $h(u) = \sqrt{10u - 3}$, $u \geq \frac{3}{10}$

3. Simplify each expression.

   (a) $\left(\dfrac{x^{1/2}}{x^{1/3}}\right)^2 = x^{1/3}$

   (b) $\sqrt[3]{24} = 2\sqrt[3]{2}$

   (c) $\sqrt[4]{16x^5y^8} = 2xy^2\sqrt[4]{x}$

   (d) $5^{1/4} \cdot 5^{7/4} = 25$

4. Rationalize the denominator and simplify: $\dfrac{2}{\sqrt{16x}} = \dfrac{\sqrt{x}}{2x}$

5. Rationalize the denominator and simplify: $\dfrac{10}{\sqrt{6}-\sqrt{2}} = \dfrac{5(\sqrt{6}+\sqrt{2})}{2}$

6. For each expression, perform the indicated operation and simplify.

   (a) $5\sqrt{3x} - 3\sqrt{75x} = -10\sqrt{3x}$

   (b) $\sqrt{5}(\sqrt{15x} + 3) = 5\sqrt{3x} + 3$

   (c) $(4 - \sqrt{2x})^2 = 2x - 8\sqrt{2x} + 16$

7. Solve each equation.

   (a) $\sqrt{3x} - 6 = 9 \qquad x = 75$

   (b) $\sqrt{x} - x + 6 = 0 \qquad x = 9$

8. For each expression, perform the indicated operations and simplify.

   (a) $(2+3i) - \sqrt{-25} = 2 - 2i$

   (b) $(2-3i)^2 = -5 - 12i$

   (c) $(3-2i)(1+5i) = 13 + 13i$

9. Write in standard form $\dfrac{5-2i}{3+i} = \frac{13}{10} - \frac{11}{10}i$.

10. Galileo drops from the top of a tower a rock weighing 15 pounds. The speed s of a falling object is given by the formula $s = \sqrt{2gh}$, where h is the distance in feet the object has fallen. g is the acceleration due to gravity, about 32 feet per second per second. At the base of the tower the rock hits Aristotle at a speed of 80 feet per second. Estimate the height of the tower. The tower is about 100 feet tall.