

MAT 1372 Fall 2013 Sample Exam #2 With Solutions

1. Multiply and simplify:

$$(a) (4\sqrt{5xy^5}) \cdot (-2x\sqrt{75x^2}) = -40x^2y^2\sqrt{15xy}$$

$$(b) \sqrt{7}(\sqrt{3x} - 2\sqrt{14}) = \sqrt{21x} - 14\sqrt{2}$$

$$(c) (\sqrt{2} - 3\sqrt{3x})(5 + 2\sqrt{6x}) = -11\sqrt{3x} + \sqrt{2}(5 - 18x)$$

$$(d) (6 - \sqrt{5})^2 = 41 - 12\sqrt{5}$$

$$(e) (5\sqrt{y} - \sqrt{2})(5\sqrt{y} + \sqrt{2}) = 25y - 2$$

2. Write in simplest radical form:

$$(a) \frac{5}{\sqrt{2}} = \frac{5\sqrt{2}}{2}$$

$$(b) \frac{5x\sqrt{3}}{2x^2\sqrt{9x}} = \frac{5\sqrt{3x}}{6x^2}$$

$$(c) \sqrt{\frac{8}{6x}} = \frac{2\sqrt{3x}}{3x}$$

$$(d) \frac{3}{2 + \sqrt{7}} = -2 + \sqrt{7}$$

$$(e) \frac{\sqrt{3} + 2\sqrt{5}}{\sqrt{3} - 3\sqrt{5}} = \frac{33 + 5\sqrt{15}}{-42}$$

3. Solve and check:

$$(a) \sqrt{3x+1} - 7 = 0; \text{ Solution set: } \{16\}$$

$$(b) \sqrt{a+11} - 5 = a; \text{ Solution set: } \{-2\}$$

$$(c) \sqrt{9p^2 + 8p - 11} = 3p - 2; \text{ Solution set is: } \left\{\frac{3}{4}\right\}$$

$$(d) x - 3\sqrt{x-5} = 5; \text{ Solution set is: } \{5, 14\}$$

4. Simplify

$$(a) \sqrt{-98} = 7i\sqrt{2}$$

(b) $2\sqrt{-18} \cdot \sqrt{-50} = -60$

(c) $\frac{\sqrt{-90}}{\sqrt{-125}} = \frac{3\sqrt{2}}{5}$

5. Perform the operation indicated then write in $a + bi$ form:

(a) $(-4 + 5i) - (2 - 3i) = -6 + 8i$

(b) $\left(\frac{2}{3} + 6i\right) + \left(\frac{4}{5} - \frac{1}{2}i\right) = \frac{22}{15} + \frac{11}{2}i$

(c) $(-3 + 2i)(2 - 5i) = 4 + 19i$

(d) $(2 + 7i)(2 - 7i) = 53$

(e) $\frac{2 - 7i}{3 + 4i} = -\frac{22}{25} - \frac{29}{25}i$

(f) $\frac{-4i}{1 - i} = 2 - 2i$

(g) $= \frac{4 - i}{3i} = -\frac{1}{3} - \frac{4}{3}i$

6. Solve by factoring:

(a) $x^2 - 4x = 5$; Solution set: $\{-1, 5\}$

(b) $2x^2 - 11x - 21 = 0$; Solution set; $\{-\frac{3}{2}, 7\}$

7. Solve by using the square root property:

(a) $4x^2 = 20$; Solution set: $\{\pm\sqrt{5}\}$

(b) $(x - 3)^2 - 25 = 0$; Solution set: $\{-2, 8\}$

8. Solve by completing the square:

(a) $x^2 - 8x + 13 = 0$; Solution set: $\{4 \pm \sqrt{3}\}$

(b) $2x^2 = 6x + 10$; Solution set: $\{\frac{3}{2} \pm \frac{\sqrt{29}}{2}\}$

9. Solve by using the quadratic formula:

(a) $2x^2 - 6x + 3 = 0$; Solution set: $\left\{\frac{3 \pm \sqrt{3}}{2}\right\}$

(b) $5x(x - 1) = x - 5$; Solution set: $\left\{\frac{3}{5} \pm \frac{4}{5}i\right\}$