

Do your own work.

2 | 16
2 | 8
2 | 4
2

1. (5 pts) Simplify $\sqrt{-16} = i\sqrt{16}$

$= 4i$

2. (5 pts) Use a calculator to approximate $\sqrt{29}$ to three decimal places.

5.385

3. Simplify:

a. (5 pts) $\sqrt[4]{16x^4} = \sqrt[4]{2^4 x^4}$

$= 2|x|$

2 | 20
2 | 10
5

c. (5 pts) $\sqrt{5}\sqrt{20}$

$= \sqrt{5 \cdot 20}$
 $= \sqrt{5 \cdot 2 \cdot 2 \cdot 5} = 2 \cdot 5 \sqrt{1}$
 $= 10$

d. (5 pts) $\sqrt{-5}\sqrt{-20}$

$= i\sqrt{5} i\sqrt{20}$
 $= i^2 \sqrt{5 \cdot 20}$
 $= -10$

b. (5 pts) $\sqrt[3]{16x^3} = \sqrt[3]{2^3 \cdot 2 \cdot x^3}$

$= 2x\sqrt[3]{2}$

e. (5 pts) $\sqrt{5}\sqrt{-20}$

$= i\sqrt{5 \cdot 20}$
 $= 10i$

4. Solve each equation by the square root property. For full credit, show the absolute value steps. Leave final answers in simplified radical form.

3 | 27
3 | 9
3

a. (5 pts) $x^2 - 27 = 0$

$x^2 = 27$
 $|x| = \sqrt{27}$
 $x = \pm \sqrt{27}$
 $x = \pm 3\sqrt{3}$

b. (5 pts) $(x - 7)^2 = 45$

$|x - 7| = \sqrt{45}$
 $x - 7 = \pm 3\sqrt{5}$
 $x = 7 \pm 3\sqrt{5}$

c. (5 pts) $(x - 7)^2 = -45$

$|x - 7| = \sqrt{-45}$
 $x - 7 = \pm i\sqrt{45}$
 $x = 7 \pm 3i\sqrt{5}$

5. Simplify:

2 | 28
2 | 14
7

a. (5 pts) $\frac{-4 \pm \sqrt{28}}{4}$

$= \frac{-4 \pm 2\sqrt{7}}{4} = \frac{2(-2 \pm \sqrt{7})}{4}$
 $= \frac{-2 \pm \sqrt{7}}{2}$

b. (5 pts) $\frac{-4 \pm \sqrt{-28}}{4}$

$= \frac{-2 \pm i\sqrt{7}}{2}$

Bonus (Next quiz material)

5pts

6. Solve by completing the square: $x^2 + 18x - 2 = 0$

$$x^2 + 18x = 2$$

$$x^2 + 18x + 9^2 = 2 + 81$$

$$(x+9)^2 = 83$$

$$x+9 = \pm \sqrt{83}$$

$$x = -9 \pm \sqrt{83}$$

$$\begin{array}{r} 618 \\ 18 \\ \hline 144 \\ 180 \\ \hline 324 \end{array}$$

7. Use the discriminant to determine the number and type of solutions of the quadratic equation. Then solve by any of the three methods.

$$\begin{array}{r} 2 \overline{)332} \\ \underline{2} \\ 166 \\ \underline{166} \\ 0 \end{array}$$

$$\sqrt{2 \cdot 2 \cdot 83} = 2\sqrt{83}$$

i. (4 pts) $x^2 + 18x - 2 = 0$
 $a=1, b=18, c=-2$

$$b^2 - 4ac = 18^2 - 4(1)(-2) = 324 + 8 = 332$$

2 distinct real roots

$$x = \frac{-18 \pm 2\sqrt{83}}{2} = -9 \pm \sqrt{83}$$

$$\sqrt{-28} = 2i\sqrt{7}$$

by previous

ii. (4 pts) $x^2 + 2x + 18 = 0$
 $a=1, b=2, c=18$

$$b^2 - 4ac = 2^2 - 4(1)(18) = -68$$

2 distinct nonreal zeros

$$x = \frac{-2 \pm 2i\sqrt{17}}{2} = -1 \pm i\sqrt{17}$$

$$x = -1 \pm i\sqrt{17}$$

$$\begin{array}{r} 2 \overline{)68} \\ \underline{2} \\ 34 \\ \underline{34} \\ 0 \end{array}$$

iii. (4 pts) $x^2 - 5x - 6 = 0$
 $a=1, b=-5, c=-6$

$$b^2 - 4ac = (-5)^2 - 4(1)(-6) = 25 + 24 = 49 = 7^2$$

FACTORS. 2 RATIONAL zeros.

$$(x-6)(x+1) = 0$$

$$x = -1 \text{ OR } x = 6$$

iv. (4 pts) $3x^2 - 5x + 2 = 0$
 $a=3, b=-5, c=2$

$$b^2 - 4ac = (-5)^2 - 4(3)(2) = 25 - 24 = 1 = 1^2$$

FACTORS 2 rational roots.

$$x = \frac{5 \pm 1}{2(3)} = \frac{5 \pm 1}{6}$$

$$x = 1 \text{ OR } x = \frac{4}{6} = \frac{2}{3} = x$$

v. (4 pts) $9x^2 - 30x + 25 = 0$

$$b^2 - 4ac = 0$$

One real root (rational)

$$(3x-5)^2 = 0 \implies x = \frac{5}{3}$$