MATH 60/GRACEY
WORKSHEET/9.9, 10.1

Name_____

Write the expression as a pure imaginary number.

1) $\sqrt{-208}$

2) $\sqrt{-196}$

3) $\sqrt{-49}$

4) $\sqrt{-4}$

Write the expression as a complex number in the form a + bi.

5) $9 + \sqrt{-49}$

6) $\sqrt{-49} + \sqrt{-64}$

7) $\frac{9 + \sqrt{-18}}{3}$

Add or subtract.

8) $4i + (-5 - i)$

9) $(7 + 8i) - (-9 + i)$

10) $(6 - 6i) + (2 + 3i)$

Multiply. Write the result in the form a + bi.

11) $6i(4 - 4i)$

12) $(8 - 3i)(3 + 9i)$

13) $(5 + \sqrt{6}\, i)(5 - \sqrt{6}\, i)$

14) $\left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} i \right)^2$

Find the conjugate of the complex number. Then multiply the complex number by its conjugate.

15) $7 + 6i$

16) $-9 + 7i$

Divide.

17) $\frac{8}{7i}$

18) $\frac{3}{7 + 8i}$

19) $\frac{4}{3 + i}$

20) $\frac{21 + 13i}{1 + 3i}$

Simplify.

21) i^{44}

22) i^{10}

23) i^{-55}

Use the square root property to solve the equation.

24) $x^2 = 121$

25) $x^2 - 5 = 0$

26) $x^2 = 90$

27) $(x + 2)^2 = 10$

28) $(x - 3)^2 = -147$

Complete the square for the binomial. Then factor the resulting perfect square trinomial.

29) $x^2 + 10x$

30) $x^2 - 16x$

31) $x^2 - 5x$

32) $x^2 + \frac{4}{7}x$

Solve the equation by completing the square.

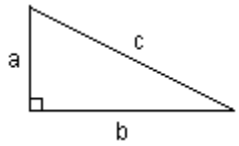
33) $x^2 - 12x + 20 = 0$

34) $9x^2 + 36x + 35 = 0$

35) $8x^2 - 5x + 1 = 0$

36) $16x^2 + 1 = 3x$

Use the right triangle shown and find the missing length. If necessary, round to three decimal places.



37) $c = 13, a = 5$

The lengths of the legs of a right triangle are given. Find the hypotenuse. If necessary, round to three decimal places.

38) $a = 9, b = 12$

Solve.

39) A supporting wire is to be attached to the top of a 29–foot antenna. If the wire must be anchored 29 feet from the base of the antenna, what length of wire is required?

40) A ladder that is 10 feet long is 6 feet from the base of a wall. How far up the wall does the ladder reach?

41) A rectangular park is 12 km long and 16 km wide. How long is a pedestrian route that runs diagonally across the park?

1) $4\sqrt{13}i$
2) $14i$
3) $7i$
4) $2i$
5) $9 + 7i$
6) $0 + 15i$
7) $3 + \sqrt{2}i$
8) $-5 + 3i$
9) $16 + 7i$
10) $8 - 3i$
11) $24 + 24i$
12) $51 + 63i$
13) 31
14) i
15) $7 - 6i;\ 85$
16) $-9 - 7i;\ 130$
17) $-\frac{8}{7}i$
18) $\frac{21}{113} - \frac{24}{113}i$
19) $\frac{6}{5} - \frac{2}{5}i$
20) $6 - 5i$
21) 1
22) -1
23) i
24) $\{-11, 11\}$
25) $\{-\sqrt{5}, \sqrt{5}\}$
26) $\{-3\sqrt{10}, 3\sqrt{10}\}$
27) $\{-2 - \sqrt{10}, -2 + \sqrt{10}\}$
28) $\{3 - 7i\sqrt{3}, 3 + 7i\sqrt{3}\}$
29) $x^2 + 10x + 25 = (x + 5)^2$
30) $x^2 - 16x + 64 = (x - 8)^2$
31) $x^2 - 5x + \frac{25}{4} = \left(x - \frac{5}{2}\right)^2$
32) $x^2 + \frac{4}{7}x + \frac{4}{49} = \left(x + \frac{2}{7}\right)^2$
33) $\{10, 2\}$
34) $\left\{-\frac{5}{3}, -\frac{7}{3}\right\}$
35) $\left\{\frac{5 - i\sqrt{7}}{16}, \frac{5 + i\sqrt{7}}{16}\right\}$
36) $\left\{\frac{3 - i\sqrt{55}}{32}, \frac{3 + i\sqrt{55}}{32}\right\}$
37) 12
38) 15

39) $29\sqrt{2}$ feet
40) 8 ft
41) 20 km