

Due the day we take the test.

Name \_\_\_\_\_

Test Review 10.3 You must show work.

Date \_\_\_\_\_ Period \_\_\_\_\_

Simplify the expression to  $a + bi$  form.

• 1)  $1(7 - 8i) + 1(-3 + 4i)$   
 $\underline{7 - 8i - 3 + 4i}$   
 $\underline{4 - 4i}$

• 2)  $1(-5 + 3i) - 1(2 + 8i)$   
 $\underline{-5 + 3i - 2 - 8i}$   
 $\underline{-7 - 5i}$

3)  $(1 + 3i) - (5 + i)$

4)  $(6 - 4i) + (6 - 6i)$

• 5)  $(-4 + 3i)^2$   $(-4 + 3i)(-4 + 3i)$

$16 - 12i - 12i + 9i^2$   
 $9(-1)$

$16 - 24i - 9$

7)  $(8 + i)(5 + i)$   $\underline{7 - 24i}$

6)  $(-6 - 4i)^2$

• 8)  $(4 - 2i)(-5 - 8i)$

$-20 - 32i + 10i + 16i^2$   
 $16(-1)$

$-20 - 22i - 16$

$\underline{-36 - 22i}$

Express as a complex number in simplest  $a + bi$  form.

• 9)  $\frac{(-5 - i)i}{(-8i)i} = \frac{-5i - i^2}{-8i^2}$   
 $= \frac{-5i - (-1)}{-8(-1)} = \frac{-5i + 1}{8}$

10)  $\frac{-9 - 9i}{4i}$

• 11)  $\frac{6(5 + i)}{(5 - i)(5 + i)}$

$\frac{30 + 6i}{25 + 5i - 5i - i^2}$

$\frac{30 + 6i}{25 - (-1)}$

$\frac{30 + 6i}{25 + 1} = \frac{30 + 6i}{26}$

÷ by 2

$\frac{15 + 3i}{13}$

12)  $\frac{8}{-6 + 3i}$

$$\begin{aligned} & \cdot 13) \begin{matrix} (7+10i)(7-5i) \\ (7+5i)(7-5i) \end{matrix} \\ & \underline{49 - 35i + 70i - 50i^2} \\ & \underline{49 - 35i + 35i - 25i^2} \\ & \frac{49 + 35i + 50}{49 + 25} = \boxed{\frac{99 + 35i}{74}} \end{aligned}$$

$$14) \frac{-4 + 8i}{10 - 6i}$$

Cake Method  
 $\div$  by 2, 3, 5, 7

Simplify. You must show work.

$$\begin{aligned} & \cdot 15) \sqrt[3]{-18} \\ & 3(3) \cdot \sqrt{2} \\ & \underline{9 \cdot \sqrt{2}} \end{aligned}$$

$$\begin{array}{r} \text{in } 2 \overline{) 18} \\ \underline{3 \overline{) 9}} \\ 3 \end{array}$$

3 out

$$16) 8\sqrt{-48}$$

$$\begin{array}{r} \text{in } 2 \overline{) 54} \\ \underline{3 \overline{) 27}} \\ \underline{3 \overline{) 9}} \\ 3 \end{array}$$

3 in

$$17) 7\sqrt{-32}$$

$$\begin{aligned} & \cdot 18) 2 + 4\sqrt{-54} \\ & 2 + 4(3) \cdot \sqrt{2(3)} \\ & \underline{2 + 12i\sqrt{6}} \end{aligned}$$

$$19) 7 - 3\sqrt{-27}$$

$$20) 8 - 6\sqrt{-45}$$

Solve each equation by taking square roots. Simplify radicals completely.

$$\begin{aligned} & \cdot 21) 5x^2 - 4 = 86 \\ & \quad \quad +4 \quad +4 \\ & \underline{5x^2 = 90} \\ & \sqrt{5x^2} = \sqrt{90} \\ & x = \pm 3\sqrt{2} \end{aligned}$$

$$\begin{array}{r} \text{in } 2 \overline{) 18} \\ \underline{3 \overline{) 9}} \\ 3 \end{array}$$

3 out

$$\begin{aligned} & \cdot 22) 16x^2 - 6 = 19 \\ & \quad \quad +6 \quad +6 \\ & \underline{16x^2 = 25} \\ & \frac{16x^2}{16} = \frac{25}{16} \\ & \sqrt{x^2} = \sqrt{\frac{25}{16}} \\ & x = \pm \frac{5}{4} \end{aligned}$$

$$\begin{aligned} & \cdot 23) 7 - 2x^2 = -34 \\ & \quad \quad -7 \quad -7 \\ & \underline{-2x^2 = -41} \\ & \frac{-2x^2}{-2} = \frac{-41}{-2} \\ & \sqrt{x^2} = \sqrt{\frac{41}{2}} \\ & x = \pm \frac{\sqrt{41} \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} \\ & \underline{x = \pm \frac{\sqrt{82}}{2}} \end{aligned}$$

$$\begin{array}{r} 2 \overline{) 82} \\ \underline{41} \end{array}$$

Find the relative minima and relative maxima of each function by using the graphing calculator.

• 24)  $f(x) = x^2 - 4x - 1$   
 min: (2, -5) max: none

25)  $f(x) = -2x^2 - 12x - 18$   
 min: \_\_\_\_\_ max: \_\_\_\_\_

Approximate the real zeros of each function to the nearest tenth.

• 26)  $f(x) = -x^2 - 4x + 1$   
-4.2 and 0.2

27)  $f(x) = -x^2 + 8x - 10$   
 \_\_\_\_\_ and \_\_\_\_\_

- 28) A company sells widgets. The amount of profit,  $y$ , made by the company, is related to the selling price of each widget,  $x$ , by the given equation. Find the price at which the maximum profit occurs. State the maximum profit. Round to the nearest cent.

price: \$14.72  $y = -44x^2 + 1295x - 5789$   
 maximum profit: \$3739.55

- 29) A company sells widgets. The amount of profit,  $y$ , made by the company, is related to the selling price of each widget,  $x$ , by the given equation. Find the price at which the maximum profit occurs. State the maximum profit. Round to the nearest cent.

price: \_\_\_\_\_  $y = -44x^2 + 2651x - 11284$   
 maximum profit: \_\_\_\_\_

Use your factoring flowchart to factor.

30)  $7x^2 + 50x + 7$

• 31)  $2x^2 - 5x - 7$   
 $\frac{2x^2 - 7x + 2x - 7}{x \quad x}$   
 $x(2x-7) + 1(2x-7)$   
 $(x+1)(2x-7)$

S	P
$-5x$	$-14x^2$
$-7x+2x$	
add	mult

• 32)  $\frac{28x^3 + 21x^2 + 16x + 12}{7x^2 \quad 7x^2 \quad 4 \quad 4}$

$7x^2(4x+3) + 4(4x+3)$   
 $(7x^2+4)(4x+3)$

33)  $7x^3 + 4x^2 + 56x + 32$

Solve each equation by factoring. Hint: First factor by one of the methods shown on the factoring flowchart.

• 34)  $\frac{x^2}{x} - \frac{6x}{x} = 0$

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

$$\boxed{x=0} \quad x-6=0$$

$$\quad \quad \quad +6 \quad +6$$

$$\quad \quad \quad \boxed{x=6}$$

36)  $x^2 - x - 30 = 0$

add mult  
• 35)  $x^2 - 12x + 32 = 0$

$$(x-4)(x-8) = 0$$

$$x-4=0 \quad x-8=0$$

$$\quad +4 \quad +4 \quad \quad +8 \quad +8$$

$$\boxed{x=4} \quad \quad \quad \boxed{x=8}$$

37)  $x^2 + 4x = 0$

Perform the indicated operation.

• 38)  $h(x) = 2x - 3$   
 $g(x) = 2x - 5$   
 Find  $(h \circ g)(8)$

39)  $g(x) = -4x - 5$   
 $h(x) = 3x - 2$   
 Find  $(g \circ h)(-8)$

$$(h \circ g)(8)$$

$$h(g(8))$$

$$\quad \quad \quad 2x-5$$

$$\quad \quad \quad 2(8)-5$$

$$\quad \quad \quad h(11)$$

$$\quad \quad \quad 2x-3$$

$$\quad \quad \quad 2(11)-3$$

$$\quad \quad \quad \boxed{19}$$