

Review Lessons 4.6 & 4.7 Worksheet

Name: LEY

Solve the equation.

1.) $x^2 = -40$

$$x = \pm \sqrt{-40}$$

$$\sqrt{-1} \sqrt{4} \sqrt{10}$$

$$x = \pm 2i\sqrt{10}$$

2.) $4x^2 = -1024$

$$x^2 = -256$$

$$x = \pm \sqrt{-256}$$

$$\sqrt{-1} \sqrt{256}$$

$$x = \pm 16i$$

3.) $\frac{1}{2}x^2 - 15 = -55$

$$\frac{1}{2}x^2 = -40$$

$$x^2 = -80$$

$$x = \pm \sqrt{-80}$$

$$\sqrt{-1} \sqrt{16} \sqrt{5}$$

$$x = \pm 4i\sqrt{5}$$

4.) $3x^2 + 18 = 3$

$$3x^2 = -15$$

$$x^2 = -5$$

$$x = \pm \sqrt{-5}$$

$$\sqrt{-1} \sqrt{5}$$

$$x = \pm i\sqrt{5}$$

5.) $(x+2)^2 = -27$

$$x+2 = \pm \sqrt{-27}$$

$$x = -2 \pm \sqrt{-27}$$

$$\sqrt{-1} \sqrt{9} \sqrt{3}$$

$$x = -2 \pm 3i\sqrt{3}$$

6.) $-2(x-5)^2 = 36$

$$(x-5)^2 = -18$$

$$x-5 = \pm \sqrt{-18}$$

$$x = 5 \pm \sqrt{-18}$$

$$\sqrt{-1} \sqrt{9} \sqrt{2}$$

$$x = 5 \pm 3i\sqrt{2}$$

Write the expression as a complex number in standard form.

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

$$9+8+8i-9i$$

$$17-i$$

8.) $(8+20i) - (-8+12i)$

$$8-(-8)+20i-12i$$

$$16+8i$$

9.) $(-1+i) - (7-5i)$

$$-1-7+i-(-5i)$$

$$-8+6i$$

10.) $4i(3-2i)$

$$12i-8i^2$$

$$12i-8(-1)$$

$$12i+8$$

$$8+12i$$

11.) $(5+3i)(4-4i)$

$$20-20i+12i-12i^2$$

$$20-8i-12(-1)$$

$$20-8i+12$$

$$32-8i$$

12.) $(7-i)(-3-4i)$

$$-21-28i+3i+4i^2$$

$$-21-25i+4(-1)$$

$$-21-25i-4$$

$$-25-25i$$

$$13.) \frac{7i}{8+i} \cdot \frac{8-i}{8-i}$$

$$\frac{56i - 7i^2}{64 - i^2}$$

$$\frac{56i + 7}{64 + 1}$$

$$\frac{56i + 7}{65}$$

$$\boxed{\frac{7}{65} + \frac{56i}{65}}$$

$$14.) \frac{2-2i}{4-3i} \cdot \frac{4+3i}{4+3i}$$

$$\frac{8 + 6i - 8i - 6i^2}{16 - 9i^2}$$

$$\frac{8 - 2i + 6}{16 + 9}$$

$$\frac{14 - 2i}{25}$$

$$\boxed{\frac{14}{25} - \frac{2}{25}i}$$

$$15.) \frac{6-4i}{2-i} \cdot \frac{2+i}{2+i}$$

$$\frac{12 + 6i - 8i - 4i^2}{4 - i^2}$$

$$\frac{12 - 2i + 4}{4 + 1}$$

$$\frac{16 - 2i}{5}$$

$$\boxed{\frac{16}{5} - \frac{2}{5}i}$$

Use the properties of exponents to write the complex number in standard form.

$$16.) 13 + i^{16} \quad \begin{array}{r} 4 \times 20 \\ 16 \\ -16 \\ 0 \end{array}$$

$$13 + 1$$

$$\boxed{14}$$

$$17.) -9 + i^{21} \quad \begin{array}{r} 5 \times 21 \\ 21 \\ -20 \\ 1 \end{array}$$

$$\boxed{-9 + i}$$

$$18.) 17 - 5i^{54} \quad \begin{array}{r} 13 \times 22 \\ 54 \\ -40 \\ 14 \\ -2 \end{array}$$

$$17 - 5(-1)$$

$$17 + 5$$

$$\boxed{22}$$

$$19.) 6 - 3i^{45} \quad \begin{array}{r} 11 \times 21 \\ 45 \\ -40 \\ 5 \\ -4 \\ 1 \end{array}$$

$$\boxed{6 - 3i}$$

- i⁰
- i¹
- i²
- i³

Solve the equation by finding square roots.

$$20.) x^2 - 6x + 9 = 25$$

$$(x-3)^2 = 25$$

$$x-3 = \pm \sqrt{25}$$

$$x-3 = \pm 5$$

$$x = 3 \pm 5$$

$$\boxed{x = 8} \quad \boxed{x = -2}$$

$$21.) x^2 - 12x + 36 = 48$$

$$(x-6)^2 = 48$$

$$x-6 = \pm \sqrt{48}$$

$$\sqrt{16} \sqrt{3}$$

$$\boxed{x = 6 \pm 4\sqrt{3}}$$

$$22.) \frac{2x^2 + 16x + 32}{2} = \frac{14}{2}$$

$$x^2 + 8x + 16 = 7$$

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

$$x+4 = \pm \sqrt{7}$$

$$\boxed{x = -4 \pm \sqrt{7}}$$

Solve the equation by completing the square.

$$23.) x^2 - 10x = -10 \quad \left(\frac{-10}{2}\right)^2 \rightarrow (-5)^2 \rightarrow 25$$

$$x^2 - 10x + \boxed{25} = -10 + \boxed{25}$$

$$(x-5)^2 = 15$$

$$x-5 = \pm \sqrt{15}$$

$$\boxed{x = 5 \pm \sqrt{15}}$$

$$24.) x^2 + 6x + 10 = 0$$

$$\left(\frac{6}{2}\right)^2 \rightarrow (3)^2 \rightarrow 9$$

$$x^2 + 6x + \boxed{9} + 10 = \boxed{9}$$

$$(x+3)^2 + 10 = 9$$

$$(x+3)^2 = -1$$

$$x+3 = \pm \sqrt{-1}$$

$$\boxed{x = -3 \pm i}$$

$$\left(\frac{12}{2}\right)^2 \rightarrow (6)^2 \rightarrow 36$$

$$25.) \frac{3x^2 + 36x}{3} = \frac{-42}{3}$$

$$x^2 + 12x = -14$$

$$x^2 + 12x + \boxed{36} = -14 + \boxed{36}$$

$$(x+6)^2 = 22$$

$$x+6 = \pm \sqrt{22}$$

$$\boxed{x = -6 \pm \sqrt{22}}$$

$$26.) \frac{3x^2 + 6x + 9}{3} = \frac{0}{3}$$

$$\left(\frac{2}{2}\right)^2 \rightarrow (1)^2 \rightarrow 1$$

$$x^2 + 2x + 3 = 0$$

$$x^2 + 2x + \boxed{1} + 3 = \boxed{1}$$

$$(x+1)^2 + 3 = 1$$

$$(x+1)^2 = -2$$

$$x+1 = \pm \sqrt{-2}$$

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

Write the quadratic function in vertex form. Then identify the vertex.

$$27.) y = x^2 + 14x + 11$$

$$\left(\frac{14}{2}\right)^2 \rightarrow (7)^2 \rightarrow 49$$

$$\boxed{49} + y = x^2 + 14x + \boxed{49} + 11$$

$$49 + y = (x+7)^2 + 11$$

$$\boxed{y = (x+7)^2 - 38}$$

$$\boxed{\text{Vertex: } (-7, -38)}$$

$$28.) y = x^2 - 8x + 10$$

$$\left(\frac{-8}{2}\right)^2 \rightarrow (-4)^2 \rightarrow 16$$

$$\boxed{16} + y = x^2 - 8x + \boxed{16} + 10$$

$$16 + y = (x-4)^2 + 10$$

$$\boxed{y = (x-4)^2 - 6}$$

$$\boxed{\text{Vertex: } (4, -6)}$$

$$29.) y = x^2 - 10x + 3$$

$$\left(\frac{-10}{2}\right)^2 \rightarrow (-5)^2 \rightarrow 25$$

$$\boxed{25} + y = x^2 - 10x + \boxed{25} + 3$$

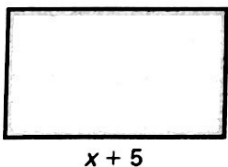
$$25 + y = (x-5)^2 + 3$$

$$\boxed{y = (x-5)^2 - 22}$$

$$\boxed{\text{Vertex: } (5, -22)}$$

Find the value of x.

$$30.) \text{Area of rectangle} = 84 \text{ units}^2$$



$$\left(\frac{5}{2}\right)^2 \rightarrow \frac{25}{4}$$

$$x(x+5) = 84$$

$$x^2 + 5x = 84$$

$$x^2 + 5x + \boxed{\frac{25}{4}} = 84 + \boxed{\frac{25}{4}}$$

$$\left(x + \frac{5}{2}\right)^2 = \frac{361}{4}$$

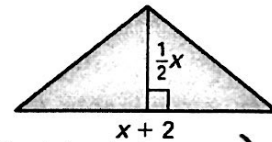
$$x + \frac{5}{2} = \pm \sqrt{\frac{361}{4}}$$

$$x = -\frac{5}{2} \pm \frac{19}{2}$$

$$\cancel{x = 12}$$

$$\boxed{x = 7}$$

$$31.) \text{Area of triangle} = 20 \text{ units}^2$$



$$\left(\frac{2}{2}\right)^2 \rightarrow (1)^2 \rightarrow 1$$

$$\frac{1}{2} \left(\frac{1}{2}x\right)(x+2) = 20$$

$$\frac{1}{4}x(x+2) = 20$$

$$\frac{1}{4}x^2 + \frac{1}{2}x = 20$$

$$4\left(\frac{1}{4}x^2 + \frac{1}{2}x\right) = (20)4$$

$$x^2 + 2x = 80$$

$$x^2 + 2x + \boxed{1} = 80 + \boxed{1}$$

$$(x+1)^2 = 81$$

$$x+1 = \pm \sqrt{81}$$

$$x = -1 \pm 9$$

$$\cancel{x = 10}$$

$$\boxed{x = 8}$$