

SOLUTION

**KEY**

Name \_\_\_\_\_

Graphing calculator needed.

Simplify.

1.  $(-a)(-a^3)(a^4)$  a<sup>8</sup>

2.  $(\frac{ab}{10})^3$   $\frac{a^3 b^3}{1000}$

3.  $(7a^{-2}b^{-1})^{-2}$   $\frac{a^4 b^2}{49}$

Multiply.

4.  $(5x - x^2 + 6)(3 - 7x)$

$$\begin{array}{r} +x^2 + 5x + 6 \\ -7x \phantom{+} \phantom{+} \phantom{+} \\ \hline 7x^3 - 35x^2 - 42x \\ +3 \phantom{+} \phantom{+} \phantom{+} \phantom{+} \\ \hline -3x^2 + 15x + 18 \end{array}$$

Factor.

5.  $a^2 - 11a + 30$  = (a-6)(a-5)

6.  $2a^2 - 25a - 13$  = (2a+1)(a-13)

Simplify.

7.  $\frac{2}{a^2} + \frac{7}{ab} = \frac{2}{a^2}(\frac{b}{b}) + \frac{7}{ab}(\frac{a}{a}) = \frac{2b + 7a}{a^2 b}$

8.  $\frac{\sqrt{60}}{\sqrt{3}} = \sqrt{\frac{60}{3}} = \sqrt{20} = 2\sqrt{5}$

9.  $(6 + 3i) + (3 - 9i)$  9 - 6i

10.  $(9 + 10i)(2 + i) = 18 + 9i + 20i + 10i^2 = 18 + 29i - 10 = \boxed{8 + 29i}$

11.  $\frac{-4}{-5 + i} = \frac{-4(-5 - i)}{(-5 + i)(-5 - i)} = \frac{+20 + 4i}{25 + 1} = \frac{20}{26} + \frac{4}{26}i = \frac{10}{13} + \frac{2}{13}i$

12.  $\frac{3 + 2i}{1 + i} = \frac{3 + 2i(1 - i)}{1 + i(1 - i)} = \frac{3 - 3i + 2i - 2i^2}{2} = \frac{3 - i + 2}{2} = \frac{5 - i}{2} = \frac{5}{2} - \frac{1}{2}i$

Solve.  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

13.  $3y^2 - y + 5 = 0$   $y = \frac{1 \pm \sqrt{1^2 - 4 \cdot 3 \cdot 5}}{2 \cdot 3} = \frac{1 \pm \sqrt{59}i}{6}$  because  $\sqrt{-59} = \sqrt{59}i$

14.  $y^2 - 3y + 7 = 0$   $y = \frac{3 \pm \sqrt{9 - 4 \cdot 1 \cdot 7}}{2} = \frac{3 \pm \sqrt{9 - 28}}{2} = \frac{3 \pm \sqrt{19}i}{2}$

15. Solve for p:  $p^2 - 6pq + 9q^2 = 1$   $p^2 - 2p(3q) + (3q)^2 = 1$   $(p - 3q)^2 = 1$   $p - 3q = \pm 1$  PERFECT SQUARE p = 3q ± 1

16. Find two numbers whose sum is 346 and whose square roots differ by 4.

Graph.  $x + y = 346$ ,  $\sqrt{x} - \sqrt{y} = 4$ . Set  $a = \sqrt{x}$  and  $b = \sqrt{y}$

17.  $(x - 2)^2 + (y + 9)^2 = 36$  SUBSTITUTE  $\begin{cases} a^2 + b^2 = 346 \\ a - b = 4 \end{cases}$   $(b + 4)^2 + b^2 = 346$   
 $2b^2 + 8b + 16 = 346$   
 $b^2 + 4b - 165 = 0$

18. Find the equation of the circle with center (-3, -2) and radius  $r = 4\sqrt{6}$ .  $(b + 15)(b - 11) = 0$   
 $b = -15, b = 11$

19. LINE (1, 6), (-2, -9)  
 $m = \frac{-9 - 6}{-2 - 1} = \frac{-15}{-3} = 5$  y - 6 = 5(x - 1)  $r^2 = 16 \cdot 6$  y = 121  
x = 225

