Name _____ Date _____

Chapter 9 Practice Quiz

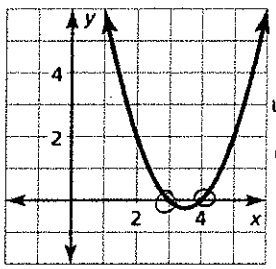
For use after Section 9.3

Simplify the expression.

1. $\sqrt{405x^3}$
2. $\sqrt[3]{-256}$
3. $\frac{6}{\sqrt{54}}$
4. (Extension problem) $\sqrt[3]{\frac{128x^2}{56x^4}}$
5. $\frac{4}{3+\sqrt{2}}$
6. $\sqrt{8}\left(5\sqrt{4}-6\sqrt{9}\right)$

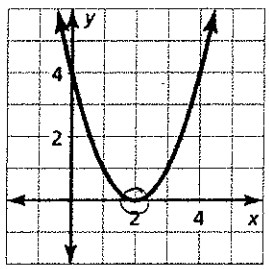
Use the graph to solve the equation.

7. $x^2 - 7x + 12 = 0$



Check
$3^2-7(3)+12=0$
$9-21+12=0$
$0=0$ ✓
$4^2-7(4)+12=0$
$16-28+12=0$
$0=0$ ✓

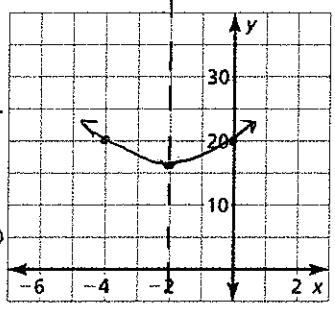
8. $x^2 - 4x + 4 = 0$



Check

Solve the equation by graphing.

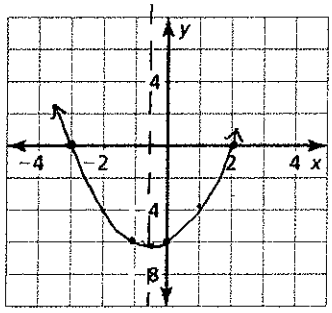
9. $x^2 + 4x + 20 = 0 = y$



$a=1$ $b=4$ $c=20$
AOS $x = \frac{-4}{2} = -2$
$(-2,$ vertex
$(-2)^2+4(-2)+20$
$4-8+20=y$
$16=y$
$x=-2$

10. $x - 6 = -x^2$

$x^2+x-6=0=y$



$a=1$
$b=1$
$c=-6$
$x=\frac{-1}{2}$
$x=-\frac{1}{2}$
$\left(-\frac{1}{2}\right)^2+\left(-\frac{1}{2}\right)-6$
$=\frac{1}{4}-\frac{1}{2}-6=-6\frac{1}{4}$

Guess $x=2$
$(2)^2+2-6=y$
$4+2-6=y$
$0=y$ ✓

Solve the equation using square roots.

11. $3x^2 = 81$
12. $3x^2 - 5 = 22$
13. $(3x+2)^2 = 81$

14. Explain how to determine the number of real solutions of $x^2 = 50$ without solving.

If a squared variable equals a positive number, then there are 2 real solutions because every positive number has 2 square roots.

Answers

1. $9x\sqrt{5x}$
2. $-4\sqrt[3]{4}$
3. $\frac{\sqrt{6}}{3}$
4. $\frac{2\sqrt[3]{98x}}{7x}$
5. $12-4\sqrt{2}$
6. $-16\sqrt{2}$
7. $x=3$ or $x=4$
8. $x=2$
9. See left. No solution
10. See left. $x=2$ or $x=-3$
11. $x=\pm 3\sqrt{3}$
12. $x=\pm 3$
13. $x=\frac{11}{3}$ or $x=-\frac{7}{3}$
14. see below

1. $\sqrt{405x^3} = \sqrt{81}\cdot\sqrt{5}\cdot\sqrt{x^2}\cdot\sqrt{x}$

$= 9\sqrt{5}\cdot x\sqrt{x}$

$= \boxed{9x\sqrt{5x}}$

2. $\sqrt[3]{-256} = \sqrt[3]{-64}\cdot\sqrt[3]{4} = -4\sqrt[3]{4}$

3. $\frac{6}{\sqrt{54}} = \frac{6}{\sqrt{9}\cdot\sqrt{6}} = \frac{\cancel{6}^{2}}{\cancel{3}_{1}\sqrt{6}} = \frac{2}{\sqrt{6}}\cdot\frac{\sqrt{6}}{\sqrt{6}} = \frac{\cancel{2}^{1}\sqrt{6}}{6_{3}} = \boxed{\frac{\sqrt{6}}{3}}$

4. $\sqrt[3]{\frac{128x^2}{56x^4}} = \sqrt[3]{\frac{\cancel{8}\cdot 16\cdot\cancel{x^2}}{\cancel{8}\cdot 7\cdot\cancel{x^2}\cdot x^2}} = \sqrt[3]{\frac{16}{7x^2}} = \frac{\sqrt[3]{16}}{\sqrt[3]{7x^2}} = \frac{\sqrt[3]{8}\cdot\sqrt[3]{2}}{\sqrt[3]{7x^2}} = \frac{2\sqrt[3]{2}}{\sqrt[3]{7x^2}}\cdot\frac{\sqrt[3]{49x}}{\sqrt[3]{49x}} = \frac{2\sqrt[3]{98x}}{\sqrt[3]{343x^3}}$

$= \boxed{\frac{2\sqrt[3]{98x}}{7x}}$

5. $\frac{4}{3+\sqrt{2}}\cdot\frac{(3-\sqrt{2})}{(3-\sqrt{2})} = \frac{12-4\sqrt{2}}{9-\sqrt{4}} = \frac{12-4\sqrt{2}}{9-2} = \boxed{\frac{12-4\sqrt{2}}{7}}$

6. $\sqrt{8}(5\sqrt{4}-6\sqrt{9}) = \sqrt{8}(5\cdot 2-6\cdot 3) = \sqrt{8}(10-18) = -8\sqrt{8} = -8\cdot\sqrt{4}\cdot\sqrt{2}$

$= -8\cdot 2\sqrt{2}$

$= \boxed{-16\sqrt{2}}$

11. $3x^2 = 81$

$x^2 = 27$

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

$x = \pm\sqrt{27}$

$x = \pm\sqrt{9}\cdot\sqrt{3}$

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

12. $3x^2 - 5 = 22$

$+5 \quad +5$

$\frac{3x^2}{3} = \frac{27}{3}$

$\sqrt{x^2} = \pm\sqrt{9}$

$x = \pm 3$

13. $(3x+2)^2 = 81$

$\sqrt{(3x+2)^2} = \pm\sqrt{81}$

$3x+2 = \pm 9$

$3x = 2 \pm 9$

$3x = 2+9$ or $3x = 2-9$

$3x = 11$ $\quad 3x = -7$

$x = \frac{11}{3}$ $\quad x = -\frac{7}{3}$