

7.1 #s 53, 54, 73

$$\textcircled{53} \quad \sqrt{x^2 - 10x + 25} = \sqrt{(x-5)^2} = |x-5|$$

Perfect Square  
Trinomial

BH 119  
OLD TEST REVIEWS

$$x^2 - 10x + 25$$

$$(x - 25)(x - 1)$$

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

Monday Mastery Learning Quiz:  
2 questions from last test. Get them  
perfect, and I'll split the difference.

80% → 90%

50% → 75%

Make mistake(s). Nada.

73

$$\sqrt[n]{x^n} = x \text{ if } x \geq 0$$

$$\sqrt[3]{3^3} = 3$$

$$-\sqrt[3]{\frac{z^{21}}{27x^3}}$$

$$= -\sqrt[3]{\frac{(z^7)^3}{3^3 x^3}}$$

$$= -\sqrt[3]{\frac{(z^7)^3}{(3x)^3}}$$

$$= -\sqrt[3]{\left(\frac{z^7}{3x}\right)^3} = -\frac{z^7}{3x}$$

Techniques we haven't covered.

$$\frac{a^c b^c}{c^c} = \left(\frac{ab}{c}\right)^c$$

$$\frac{a^b}{c^b} = \left(\frac{a}{c}\right)^b$$

$$\sqrt[n]{x^n} = x$$

$$-\sqrt[3]{\frac{z^{21}}{27x^3}} = -\frac{\sqrt[3]{z^{21}}}{\sqrt[3]{27}\sqrt[3]{x^3}} = -\frac{\sqrt[3]{(z^7)^3}}{\sqrt[3]{3^3}\sqrt[3]{x^3}} = -\frac{z^7}{3x}$$

$$= -\frac{z^{\frac{21}{3}}}{27^{\frac{1}{3}}(x^3)^{\frac{1}{3}}} = -\frac{z^7}{3x}$$

$$(x^3)^{\frac{1}{3}} = x^{3 \cdot \frac{1}{3}} = x^{\frac{3}{3}} = x$$

§ 7.2

If  $\sqrt[n]{x}$  is real, then  $\sqrt[n]{x} = x^{\frac{1}{n}}$

we saw this with calculator moves

$$\sqrt[3]{27} = 27^{\frac{1}{3}} = 27^{(1/3)} = 3$$

without parentheses,

$$27^{1/3} = 9$$

0.0.

$$\sqrt{\quad} = \sqrt{\quad}$$

$$4^{\frac{1}{2}} = 2$$

$$\sqrt[2]{4} = 2$$

$$125^{\frac{1}{3}} = 5 \quad \left. \vphantom{125^{\frac{1}{3}} = 5} \right\} 5^3 = 125 \checkmark$$

$$\sqrt[3]{125} = 5$$

write in radical form

$$(7x)^{\frac{1}{3}} = \sqrt[3]{7x}$$

$$7x^{\frac{1}{3}} = 7\sqrt[3]{x}$$

$$\frac{2}{3} = \underline{2} \cdot \frac{1}{3} = \frac{1}{3} \cdot \underline{2}$$

$$8^{\frac{1}{3}} = (2^3)^{\frac{1}{3}} = 2^{\frac{3}{3}} = 2^1 = 2$$

$$8^{\frac{2}{3}} = (8^2)^{\frac{1}{3}} = (8^{\frac{1}{3}})^2$$

$$= (64)^{\frac{1}{3}} = (2)^2 = 4$$

$$\rightarrow = 4, \text{ b/c } 4^3 = 64$$

I like the way on the right, better.  
Usually keeps a better lid on the numbers

In general,

$$\sqrt[n]{x^m} = x^{\frac{m}{n}} = (x^m)^{\frac{1}{n}} = (x^{\frac{1}{n}})^m$$

$$4^{\frac{3}{2}} = (4^{\frac{1}{2}})^3 = 2^3 = 8$$

$$4^{\frac{3}{2}} = (4^3)^{\frac{1}{2}} = (64)^{\frac{1}{2}} = 8$$

$(-4)^{\frac{3}{2}}$  is not real  
 → even  
 → negative

## Properties of Exponents pg 424

Know them.

Know how to produce examples of them

$$(a^b)^c = a^{bc}$$

$$(2^3)^7 = 2^{21}$$

$$(x^a)(x^b) = x^{a+b}$$

$$(x^2)(x^{37}) = x^{39}$$

$$(2^2)(2^{37}) = 2^{39}$$

$$(x^{\frac{1}{3}})(x^{\frac{5}{3}}) = x^{\frac{6}{3}} = x^2$$

$$(x^{\frac{1}{2}})(x^{\frac{2}{3}}) = x^{\frac{5}{6}}$$

$$\frac{1}{2} + \frac{2}{3} =$$

$$* \frac{1}{2} \cdot \frac{3}{3} + \frac{2}{3} \cdot \frac{2}{2} = \frac{3+4}{6} = \frac{7}{6} *$$

$$\frac{9^{\frac{2}{5}}}{9^{\frac{12}{5}}} = 9^{\frac{2}{5} - \frac{12}{5}} = 9^{-\frac{10}{5}} = 9^{-2} = \frac{1}{9^2} = \boxed{\frac{1}{81}}$$

$$\frac{x^b}{x^c} = x^{b-c}$$

$$\left(11^{24}\right)^9 = 11^2 = 121$$

$$\left(-\frac{2}{3}\right)\left(\frac{3}{2}\right) = -2$$

$$\frac{2}{9} \cdot \frac{9}{1} = 2$$

$$\frac{2}{9} \cdot \frac{9}{1} = \frac{2 \cdot 1}{1 \cdot 1} = 2$$

$$\frac{\left(3x^{-\frac{2}{3}}\right)^3}{x^2} = \frac{3^3 \cdot \left(x^{-\frac{2}{3}}\right)^3}{x^2} = \frac{27x^{-2}}{x^2} = \frac{27x^{-2-2}}{x^2} = \frac{27x^{-4}}{x^2} = \frac{27}{x^{2+2}} = \frac{27}{x^4}$$

$(ab)^c = a^c b^c$

$$x^{\frac{3}{4}} \left( x^{\frac{1}{4}} - x^3 \right)$$

$$\left( x^{\frac{3}{4}} \right) \left( x^{\frac{1}{4}} \right) - \left( x^{\frac{3}{4}} \right) \left( x^3 \right)$$

$$x^{\frac{3}{4} + \frac{1}{4}} - x^{\frac{3}{4} + 3}$$

$$\boxed{x - x^{\frac{13}{4}}}$$

Factor  $x^{-\frac{1}{3}}$  from  $7x^{-\frac{1}{3}} - 5x^{\frac{5}{3}}$

$$x^{-\frac{1}{3}} \left( 7 - 5x^2 \right)$$

Check by multiplication

$$7x^{-\frac{1}{3}} - (5x^2)(x^{-\frac{1}{3}}) = 7x^{-\frac{1}{3}} - 5x^{\frac{5}{3}}$$

$$\frac{7x^{-\frac{1}{3}}}{x^{-\frac{1}{3}}} = 7$$

$$\frac{5x^{\frac{5}{3}}}{x^{-\frac{1}{3}}} = 5x^{\frac{5}{3} + \frac{1}{3}} = 5x^2$$

Simplify

$$\sqrt[10]{y^5} = y^{\frac{5}{10}} = y^{\frac{1}{2}} = \sqrt{y}$$

$$\sqrt[4]{9} = \sqrt[4]{3^2} = 3^{\frac{2}{4}} = 3^{\frac{1}{2}} = \sqrt{3}$$

Combine into a single radical.

$$\begin{aligned} & \sqrt{w} \sqrt[3]{w} \\ = & (w^{\frac{1}{2}})(w^{\frac{1}{3}}) = w^{\frac{1}{2} + \frac{1}{3}} = w^{\frac{5}{6}} = \sqrt[6]{w^5} \end{aligned}$$

$$\begin{aligned} & (5^{\frac{1}{2}})(2^{\frac{1}{3}}) = (5^{\frac{3}{6}})(2^{\frac{2}{6}}) \\ = & (5^3)^{\frac{1}{6}} (2^2)^{\frac{1}{6}} = ((5^3)(2^2))^{\frac{1}{6}} = \sqrt[6]{(125)(4)} \\ = & \boxed{\sqrt[6]{500}} \end{aligned}$$

7.2 Due Wednesday

#s 1, 5, 9, 10, 11, 15, 17, 19, 21, 23, 24, 29, 33, 39,  
41, 45, 49, 53, 57, 61, 65, 67, 71, 73, 77,  
85, 89, 93, 97