$2x+1=5$, $1-x=3+2x$

Linear Equations

$x+y=1$

$x+2y=2$

Math 110- 8.1

Solving equations with 1 term

$2x^4+3x^3+x=0$

4 degree equation

$2x^2+x+1=0$

Quadratic Eqn.

$ax^2+bx+c=0$

where $a\neq 0$

1. $x^2=9 \Rightarrow x=\pm\sqrt{9}$

$\Rightarrow x=\pm 3$

2. $x^2=16 \Rightarrow x=\pm\sqrt{16}$

$\Rightarrow x=\pm 4$

3. $x^2=36$

$\Rightarrow x=\pm\sqrt{36} \Rightarrow x=\pm 6$

Solve:

a. $4x^2=100$

$\Rightarrow \frac{4x^2}{4}=\frac{100}{4}$

$\Rightarrow x^2=25$

$\Rightarrow x=\pm\sqrt{25}$

$\Rightarrow x=\pm 5$

b. $3y^2=108$

$\Rightarrow y^2=\frac{108}{3} \Rightarrow y^2=36$

$\Rightarrow y=\pm\sqrt{36} \Rightarrow y=\pm 6$

c. $3x^2-4=0$

$\Rightarrow 3x^2-4+4=0+4$

$\Rightarrow 3x^2=4$

$\Rightarrow x^2=\frac{4}{3}$

$\Rightarrow x=\pm\sqrt{\frac{4}{3}}$

$\Rightarrow x=\pm\frac{\sqrt{4}}{\sqrt{3}} \Rightarrow x=\pm\frac{2}{\sqrt{3}}$

$\Rightarrow x=\pm\frac{2}{\sqrt{3}}\times\frac{\sqrt{3}}{\sqrt{3}} \Rightarrow x=\pm\frac{2\sqrt{3}}{3}$

d. $3x^2-16=0$

$\Rightarrow 3x^2=16 \Rightarrow x^2=\frac{16}{3}$

$\Rightarrow x=\pm\sqrt{\frac{16}{3}} \Rightarrow x=\pm\frac{\sqrt{16}}{\sqrt{3}}$

$\Rightarrow x=\pm\frac{4}{\sqrt{3}}$

$\Rightarrow x=\pm\frac{4}{\sqrt{3}}\times\frac{\sqrt{3}}{\sqrt{3}}$

$\Rightarrow x=\pm\frac{4\sqrt{3}}{3}$

Example 1: to solve quadratic equations set them equal to 0

$\rightarrow x^2+5x+6x+30=0 \Rightarrow x^2+11x+30=0$

1. (x-5)(x+6)=0

$\Rightarrow x+5=0$ or $x+6=0$

$\Rightarrow x=-5$ or $x=-6$ $\Rightarrow x=-5$ or -6

2. (x-9)(x+1)=0

$\Rightarrow x-9=0$ or $x+1=0$

$\Rightarrow x=9$ or $x=-1$ $\Rightarrow x=9$ or -1

3. (x-7)(2x+5)=0

$\Rightarrow x-7=0$ or $2x+5=0$

$\Rightarrow x=7$ or $2x=-5$ $\Rightarrow x=7$ or $\frac{-5}{2}$

$\Rightarrow x=\frac{-5}{2}$

Imaginary Numbers

→ Use when you are taking the square root of a negative number.

$i=\sqrt{-1}$

ex. $\sqrt{-16}=\sqrt{16}\cdot\sqrt{-1}=\sqrt{16}\,i=\boxed{4i}$

Solving by taking square roots

$(x-3)^2-81=0$

$(x-3)^2=81$

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

$x-3=\pm 9$

$x=\pm 9+3$

$x^2=4 \Rightarrow x=\pm\sqrt{4}$

$(x-1)^2-4=0 \Rightarrow (x-1)^2=4 \Rightarrow x-1=\pm\sqrt{4}$

$\Rightarrow x-1=2$ or $x-1=-2$

$\Rightarrow x=2+1$ or $x=-2+1$ $\Rightarrow x=3$ or -1

$9x^2 + 16 = 0$	$16x^2 + 25 = 0$	$(x + 1)^2 = 5$
$9x^2 = -16$ $x^2 = -\frac{16}{9}$ $x = \pm\sqrt{-\frac{16}{9}}$ $x = \pm\sqrt{\frac{16}{9}} \times \sqrt{-1}$ $x = \pm\frac{4}{3}i$	$16x^2 = -25$ $x^2 = -\frac{25}{16}$ $x = \pm\sqrt{-\frac{25}{16}}$ $x = \pm\sqrt{\frac{25}{16}} \times \sqrt{-1}$ $x = \pm\frac{5}{4}i$	$\Rightarrow x + 1 = \pm\sqrt{5}$ $\Rightarrow x + 1 = \sqrt{5}$ or $x + 1 = -\sqrt{5}$ $\Rightarrow x = -1 + \sqrt{5}$ or $x = -1 - \sqrt{5}$ $\Rightarrow x = -1 \pm \sqrt{5}$ $\Rightarrow x = 1.236$ or -3.236

Example 3: To factor a quadratic it must be set equal to zero first .

1. $x^2 - 11x + 19 = -5$ $\Rightarrow x^2 - 11x + 19 + 5 = 0$

$\Rightarrow x^2 - 11x + 24 = 0$

$\Rightarrow x^2 - 3x - 8x + 24 = 0 \Rightarrow x(x-3) - 8(x-3) = 0$

$\Rightarrow (x-8)(x-3) = 0 \Rightarrow x - 8 = 0$ or $x - 3 = 0$

$\Rightarrow x = 8$ or 3

$24 = -1 \times -24$

-2×-12

-3×-8

-4×-6

2. $x^2 + 7x + 15 = 5$

$\Rightarrow x^2 + 7x + 10 = 0$

$\Rightarrow x^2 + 5x + 2x + 10 = 0 \Rightarrow x(x+5) + 2(x+5) = 0$

$\Rightarrow (x+2)(x+5) = 0$

$\Rightarrow x + 2 = 0$ or $x + 5 = 0$

$\Rightarrow x = -2$ or -5

3. $x^2 - 10x + 22 = -2$

$x^2 - 10x + 24 = 0$

$x^2 - 4x - 6x + 24 = 0$

$\Rightarrow x(x-4) - 6(x-4) = 0$

$\Rightarrow (x-6)(x-4) = 0$

$\Rightarrow x - 6 = 0$ or $x - 4 = 0$

$\Rightarrow x = 6$ or $x = 4$

$\Rightarrow x = 6$ or 4

4. $7x^2 - 14x = -7$

$7x^2 - 14x + 7 = 0$

$\Rightarrow 7(x^2 - 2x + 1) = 0$

$\Rightarrow x^2 - 2x + 1 = \frac{0}{7}$

$\Rightarrow x^2 - 2x + 1 = 0$

$\Rightarrow x^2 - x - x + 1 = 0$

$x(x-1) - 1(x-1) = 0$

$(x-1)(x-1) = 0$

$\Rightarrow x - 1 = 0$ or $x - 1 = 0$

$\Rightarrow x = 1$ or $x = 1$

$\Rightarrow x = 1$

5. $x^2 + 8x = -15$

HW $\Rightarrow$ $x = -3$ or -5

Ex.

1. Let $g(x) = 2x^2 + x$ find a so that $g(a) = 28$

$\Rightarrow 2a^2 + a = 28$

$\Rightarrow 2a^2 + a - 28 = 0$

$\Rightarrow 2a^2 - 7a + 8a - 28 = 0$

$a(2a-7) + 4(2a-7) = 0$

$\Rightarrow (a+4)(2a-7) = 0$

$\Rightarrow a + 4 = 0$ or $2a - 7 = 0$

$\Rightarrow a = -4$ or $2a = 7 \Rightarrow a = \frac{7}{2}$

$\Rightarrow a = -4$ or $\frac{7}{2}$

$2x - 28 = -56 = -1 \times 56 = 1x - 56$

$-2 \times 28 = 2x - 28$

$-4 \times 14 = 4x - 14$

$-7 \times 8 = 7x - 8$

2. Let $g(x) = 15x + x^2$ find a so that $g(a) = -56$

$\Rightarrow 15a + a^2 = -56$

$\Rightarrow a^2 + 15a + 56 = 0$

$\Rightarrow a^2 + 7a + 8a + 56 = 0$

$a(a+7) + 8(a+7) = 0$

$\Rightarrow (a+7)(a+8) = 0$

$\Rightarrow a + 7 = 0$ or $a + 8 = 0$

$\Rightarrow a = -7$ or -8

3. Let $f(x) = x^2 - x$ find a so that $g(x) = 36 + 4x$ find all the x-values for which $f(x) = g(x)$

$\Rightarrow x^2 - x = 36 + 4x$

$\Rightarrow x^2 - x - 4x - 36 = 0$

$x^2 - 5x - 36 = 0$

$\Rightarrow x^2 + 4x - 9x - 36 = 0$

$x(x+4) - 9(x+4) = 0$

$\Rightarrow (x-9)(x+4) = 0$

$\Rightarrow x - 9 = 0$ or $x + 4 = 0$

$\Rightarrow x = 9$ or -4

$-36 = -1 \times 36 = 1x - 36$

$= -2 \times 18 = 2x - 18$

$= -3 \times 12 = 3x - 12$

$= -4 \times 9 = 4x - 9$

$= -6 \times 6 = 6x - 6$

Problem Solving

ESSENTIALS

The Compound-Interest Formula: If an amount of money P is invested at interest rate r, compounded annually, in t years it will grow to the amount A given by $A = P(1+r)^t$.

Distance of a Free Fall: $s = 16t^2$ approximates the distance s, in feet, that an object falls freely from rest in t seconds.

INTEREST

$\hookrightarrow$ Investment of P, rate r, t years.

$A = P(1+r)^t$

final amount

4 % $\Rightarrow r = \frac{4}{100}$

$r = 0.04$

Grady invested $5000 at interest rate r, compounded annually. In 2 years, it grew to $5304.50. Find the interest rate.

$5304.50 = 5000(1+r)^2 \Rightarrow (r+1)^2 = \frac{5304.50}{5000}$

$\Rightarrow r+1 = \pm\sqrt{\frac{5304.50}{5000}} = \pm 1.03 \Rightarrow r = 1.03-1$ or $-1.03-1$

$\Rightarrow r = 0.03$ or ~~-2.03~~ $\Rightarrow r = 0.03$ = 3%

Betsy invested $10,000 at interest rate r, compounded annually. In 2 years, it grew to $11,236. Find the interest rate.

$11236 = 10000(1+r)^2 \Rightarrow (r+1)^2 = \frac{11236}{10000}$

$\Rightarrow r+1 = \pm\sqrt{1.1236} = \pm 1.06 \Rightarrow r = 1.06-1$ or $-1.06-1$

$\Rightarrow r = 0.06$ or ~~-2.06~~ $\Rightarrow r = 0.06 = 6\%$

FREE FALLLLLINNN

Brenna dropped a stone from a bridge 2000 ft above a river. How long did it take the stone to reach the river? Round to the nearest tenth of a second.

$2000 = 16t^2 \Rightarrow t^2 = \frac{2000}{16} = 125 \Rightarrow t^2 = 125$

$\Rightarrow t = \pm\sqrt{125} \Rightarrow t = \sqrt{125} \Rightarrow t = 11.18$

Gav dropped a penny from a bridge 500 ft above a river. How long did it take the penny to reach the river? Round to the nearest tenth of a second.

$16t^2 = 500$. HW

$t = 5.59$

Math 110- 8.2

Solving Using the Quadratic Formula

ESSENTIALS

The Quadratic Formula: The solutions of $ax^2+bx+c=0$, $a\neq 0$, are given by

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

$x^2+2x=1$

$x^2+2x-1=0$

Example

- Solve: $2x^2-5x-3=0$.

$a=2,\ b=-5,\ c=-3$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-(-5)\pm\sqrt{(-5)^2-4(2)(-3)}}{2(2)}=\frac{5\pm\sqrt{49}}{4}=\frac{5\pm 7}{4}$$

$$x=\frac{12}{4}\ \text{or}\ x=\frac{-2}{4}$$

$$x=3\ \text{or}\ x=-\frac{1}{2}$$

Solve the quadratic

$f(x)=4x^2+2x-3$

$\sqrt{52}=\sqrt{4\times 13}=2\sqrt{13}$

$a=4,\ b=2,\ c=-3$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-2\pm\sqrt{2^2-4(4)(-3)}}{2(4)}$

$=\frac{-2\pm\sqrt{4+48}}{8}=\frac{-2\pm\sqrt{52}}{8}$

$=\frac{-2\pm 2\sqrt{13}}{8}=\frac{-1\pm\sqrt{13}}{4}$. $x=\frac{-2+7.2}{8}$ or $\frac{-2-7.2}{8}$

$x=0.65$ or -1.15

$f(x)=3x^2+5x-3$

$a=3,\ b=5,\ c=-3$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-5\pm\sqrt{5^2-4(3)(-3)}}{2(3)}$

$=\frac{-5\pm\sqrt{25+36}}{6}=\frac{-5\pm\sqrt{61}}{6}$

$\Rightarrow x=0.468$ or -2.1

$x^2+4x=-2\Rightarrow x^2+4x+2=0$

$a=1,\ b=4,\ c=2$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-4\pm\sqrt{4^2-4(1)(2)}}{2(1)}$

$=\frac{-4\pm\sqrt{16-8}}{2}=\frac{-4\pm\sqrt{8}}{2}=\frac{-4\pm 2\sqrt{2}}{2}$

$=-2\pm\sqrt{2}=-2\pm 1.414$

$\Rightarrow x=-0.586$ or -3.414

$x^2+8x=-3\Rightarrow x^2+8x+3=0$

$a=1,\ b=8,\ c=3$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-8\pm\sqrt{8^2-4(1)(3)}}{2(1)}$

$=\frac{-8\pm\sqrt{64-12}}{2}=\frac{-8\pm\sqrt{52}}{2}$

$=\frac{-8\pm 2\sqrt{13}}{2}=-4\pm\sqrt{13}$

$x=-0.395$ or -7.60

Practice Exercises

Readiness Check

Classify each statement as either true or false.

1. The quadratic formula is derived by completing the square to solve a general quadratic equation, $ax^2+bx+c=0$. True
2. The quadratic formula cannot be used if the solutions to the equation are complex numbers. False
3. Solutions to quadratic equations are always rational numbers. False
4. The quadratic formula works to solve any quadratic, but it is not always the fastest method to use. True

Solving Using the Quadratic Formula

Solve. (Find all complex number solutions.)

5. $2x^2-11x-6=0$

6. $y^2+4y-1=0$

$u=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-(-6)\pm\sqrt{(-6)^2-4(1)(10)}}{2(1)}$

$\Rightarrow u=\frac{6\pm\sqrt{36-40}}{2}=\frac{6\pm\sqrt{-4}}{2}=\frac{6\pm\sqrt{4}\sqrt{-1}}{2}=\frac{6\pm 2i}{2}$

$u=\frac{6+2i}{2}$ or $\frac{6-2i}{2}\Rightarrow u=\frac{2(3+i)}{2}$ or $\frac{2(3-i)}{2}$

$\Rightarrow u=3+i$ or $3-i$

7. $t(2t+5)=5$

$2t^2+5t-5=0$

$a=2, b=5, c=-5$

$t=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-5\pm\sqrt{5^2-4(2)(-5)}}{2(2)}=\frac{-5\pm\sqrt{25+40}}{4}=\frac{-5\pm\sqrt{65}}{4}$

↓ Calculate

8. $u^2-6u=-10$

$\Rightarrow u^2-6u+10=0$

$a=1, b=-6, c=10$

9. Let $g(x)=-4x^2+5x-3$. Find all x such that $g(x)=0$.

HW.

$x^2 \neq 0$

10. Let $f(x)=\frac{8}{x}-4$ and $g(x)=\frac{2}{x^2}$. Find all x such that $f(x)=g(x)$.

$\frac{8}{x}-4=\frac{2}{x^2}$ Multiply by x^2 $\Rightarrow x^2\left(\frac{8}{x}-4\right)=x^2\times\frac{2}{x^2}$

$\Rightarrow x^2\times\frac{8}{x}-x^2\times 4=2 \Rightarrow 8x-4x^2=2 \Rightarrow 8x-4x^2-2=0$

$\Rightarrow -4x^2+8x-2=0 \Rightarrow x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-8\pm\sqrt{8^2-4(-4)(-2)}}{2(-4)}$

$a=-4,\ b=8,\ c=-2$

$=\frac{-8\pm\sqrt{64-32}}{-8}=\frac{-8\pm\sqrt{32}}{-8}$ → Calculate

Approximating Solutions

Solve using the quadratic formula. Then use a calculator to approximate, to three decimal places, the solutions as rational numbers.

11. $x^2-6x+3=0$

HW.

12. $3x^2+4x-1=0$

HW.

Quiz 12

(1) write $\dfrac{\sqrt[3]{x}\,\sqrt{y}}{8y^2}$ in exponential notation and simplify.

$$= \frac{x^{1/3}\,y^{1/2}}{8y^2} = \frac{x^{1/3}\,y^{1/2-2}}{8}$$

$$= \frac{x^{1/3}\,y^{-3/2}}{8} = \frac{x^{1/3}}{8y^{3/2}}$$

$$\sqrt[n]{x} = x^{1/n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$\frac{1}{2} - \frac{2}{1} = \frac{1}{2} - \frac{4}{2} = \frac{-3}{2}$$

(2) Simplify: a) $\sqrt[3]{27(t+1)^3} = \sqrt[3]{27}\,\sqrt[3]{(t+1)^3}$

$= 3(t+1) = 3t+3$

b) $\sqrt{16t^2} = \sqrt{16}\,\sqrt{t^2} = 4|t|$

Test 2

↓

Thursday, June 1 to Tuesday, June 6

40% Tests → 1, 2, 3 best 2.

30% Final Exam

Testing Center → SLOTO

Syllabus: Sections 4.1, 4.2, 4.4, 5.1 – 5.5, 7.1 – 7.4, 8.1, 8.2

Ch5 Test#10

Subtract $(9y^2 - 2y - 5y^3) - (4y^2 - 2y - 6y^3)$

Ch5 Test#11

Multiply $(-4x^2y^3)(-16xy^5)$

Ch5 Test#12

Multiply $(6a - 5b)(2a + b)$

$= 6a(2a+b) - 5b(2a+b)$

$= (6a)(2a) + (6a)(b) + (-5b)(2a) + (-5b)(b)$

$= 12a^2 + 6ab - 10ab - 5b^2$

$= 12a^2 - 4ab - 5b^2$

Ch5 Test#14

Multiply $(4t - 3)^2$

$(a-b)^2 = a^2 - 2ab + b^2$

$= (4t)^2 - 2(4t)(3) + (3)^2$

$= 16t^2 - 24t + 9$

Ch5 Test#16

Multiply $(x - 2y)(x + 2y)$

$(a-b)(a+b) = a^2 - b^2$

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

$= x^2 - 4y^2$

Ch5 Test #17

Factor $x^2 - 10x + 25$ $\longrightarrow$ $x^2 + 5^2 - 2 \times x \times 5 = (x-5)^2$

$a^2 - 2ab + b^2 = (a-b)^2$

Ch5 Test #18

Factor $y^3 + 5y^2 - 4y - 20$

$= y^2(y+5) - 4(y+5) = (y^2-4)(y+5)$

$y^2 - 8y + 12$

$= (y^2 - 2^2)(y+5)$

$= (y-2)(y+2)(y+5)$

Ch5 Test #19

Factor $p^2 - 12p - 28$

Ch5 Test #20

Factor $t^7 - 3t^5$

$(x^2+4x-4xy-7)+(-4x^2-x+4y^2+4)$

$x^2+4x-4xy-7-4x^2-x+4y^2+4$

$x^2-4x^2+4x-x-4xy+4y^2-7+4$

$-3x^2+3x-4xy+4y^2-3$

$-3x^2-4xy+4y^2+3x-3$

Ch5 Test #21

Factor $12m^2 + 20m + 3$

Ch5 Test #22

Factor $9y^2 - 25$

Ch5 Test #24

Factor $45x^2 + 20 + 60x$

Ch5 Test #25

Factor $3x^4 - 48y^4$

Ch5 Test #27

Factor $x^2 + 3x + 6$

Ch7 Test #1

Simplify $\sqrt{50}$

Ch7 Test #3

Simplify $\sqrt{81a^2}$

Ch7 Test #5

Write an equivalent expression using exponential notation: $\sqrt{7xy}$

$(7xy)^{1/2} = 7^{1/2} x^{1/2} y^{1/2}$

Ch7 Test #6

Write an equivalent expression using radical notation: $(4a^3b)^{\frac{5}{6}}$

$(4a^3b)^{5/6} = (4a^3b)^{5 \times \frac{1}{6}} = \left[(4a^3b)^5\right]^{1/6} = \sqrt[6]{(4a^3b)^5}$

$(4a^3b)^{1/6 \times 5} = \left[(4a^3b)^{1/6}\right]^5 = \left(\sqrt[6]{4a^3b}\right)^5$

Ch7 Test #7

If $f(x) = \sqrt{2x - 10}$, determine the domain of f.

Ch7 Test #13

Simplify $\sqrt[4]{x^3}\sqrt{x}$ $= (x^3)^{\frac{1}{4}} \; x^{1/2} = x^{3/4} x^{1/2} = x^{\frac{3}{4}+\frac{1}{2}}$

$= x^{5/4} = x^{5 \times \frac{1}{4}} = (x^5)^{\frac{1}{4}}$

$\frac{3}{4} + \frac{1}{2} = \frac{3}{4} + \frac{2}{4}$

$= \frac{5}{4}$

$= \sqrt[4]{x^5}$

Ch7 Test #14

Simplify $\frac{\sqrt{y}}{\sqrt[10]{y}}$

$$\frac{\sqrt{y}}{\sqrt[10]{y}} = \frac{y^{1/2}}{y^{1/10}} = y^{\frac{1}{2}-\frac{1}{10}} = y^{\frac{5}{10}-\frac{1}{10}} = y^{\frac{4}{10}} = y^{\frac{2}{5}} = (y^2)^{\frac{1}{5}} = \sqrt[5]{y^2}$$

Ch7 Test #18

Rationalize the denominator: $\frac{\sqrt[3]{x}}{\sqrt[3]{4y}}$

$$\rightarrow \frac{\sqrt[3]{x}}{\sqrt[3]{4y}} \times \frac{\left(\sqrt[3]{4y}\right)^2}{\left(\sqrt[3]{4y}\right)^2} = \frac{\sqrt[3]{x}\,(4y)^{2/3}}{\left(\sqrt[3]{4y}\right)^3} = \frac{\sqrt[3]{x}\left[(4y)^2\right]^{\frac{1}{3}}}{(4y)^{\frac{1}{3}\times 3}} = \frac{\sqrt[3]{x}\ \sqrt[3]{16y^2}}{4y} = \frac{\sqrt[3]{16xy^2}}{4y}$$

Chapter 8 Questions

Ch8 Test #1

Solve $25x^2 - 7 = 0$

Ch8 Test #3

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

Ch8 Test #4

Solve $2x + 5 = x^2$

Ch8 Test #6

Solve $x^2 + 3x = 5$

Ch8 Test #7

Let $f(x) = 12x^2 - 19x - 21$. Find x such that $f(x) = 0$

Rationalize the denominator.

$$\frac{\sqrt[3]{x}}{\sqrt[3]{2y^2}} \times \frac{\left(\sqrt[3]{2y^2}\right)^2}{\left(\sqrt[3]{2y^2}\right)^2} = \frac{\sqrt[3]{x}\,(2y^2)^{2/3}}{\left(\sqrt[3]{2y^2}\right)^3} = \frac{\sqrt[3]{x}\left[(2y^2)^2\right]^{\frac{1}{3}}}{(2y^2)^{\frac{1}{3}\times 3}} = \frac{\sqrt[3]{x}\ \sqrt[3]{4y^4}}{2y^2} = \frac{\sqrt[3]{4xy^4}}{2y^2}$$

Ch8 Test #10

Solve $x^2 + 10x + 15 = 0$

Rationalize the denominator of $\frac{\sqrt[3]{x}}{\sqrt[3]{y}} \times \frac{\left(\sqrt[3]{y}\right)^2}{\left(\sqrt[3]{y}\right)^2}$

$$= \frac{\sqrt[3]{x}\times\left(\sqrt[3]{y}\right)^2}{\left(\sqrt[3]{y}\right)^{1+2}} = \frac{\sqrt[3]{x}\ \sqrt[3]{y^2}}{\left(\sqrt[3]{y}\right)^3} = \frac{\sqrt[3]{xy^2}}{y}$$

(*) $\left(\sqrt[3]{a}\right)^3 = a = \sqrt[3]{a^3}$