

Jun. 9/14 Ch.5 Review

1. $\sqrt{36 \cdot 2 \cdot x^4 \cdot x^1 \cdot y^2 \cdot y^1}$
 $= 6x^2y\sqrt{2xy}$

2. $\sqrt[3]{8 \cdot 4 \cdot a^3 \cdot a^1 \cdot b^3 \cdot b^1}$
 $= 2a^2b\sqrt[3]{4ab}$

3. $2a\sqrt[3]{5a^2}$
 $= \sqrt[3]{5 \cdot 8 \cdot a^2 \cdot a^3} = \sqrt[3]{40a^5}$

4. $\sqrt[3]{18m^3}$
 $\frac{18m^3}{18} \geq \frac{0}{18}$
 $\sqrt[3]{m^3} \geq \sqrt[3]{0}$
 $m \geq 0$

5. $5\sqrt{80} - 3\sqrt{20}$
 $5\sqrt{16 \cdot 5} - 3\sqrt{4 \cdot 5}$
 $20\sqrt{5} - 6\sqrt{5}$
 $14\sqrt{5}$

6. $\frac{\sqrt[3]{2} \cdot \sqrt[3]{3 \cdot 3}}{\sqrt[3]{3^1} \cdot \sqrt[3]{3 \cdot 3}} = \frac{\sqrt[3]{18}}{3}$

7. $\frac{\sqrt{24x^3y^3}}{\sqrt{8x^4y}} = \sqrt{\frac{24x^3y^3}{8x^4y}} = \sqrt{3xy^2}$
 $= y\sqrt{3x}$

8. $(\sqrt{a} + \sqrt{b})(\sqrt{a} + \sqrt{b})$
 $= a + \sqrt{ab} + \sqrt{ab} + b$
 $= a + 2\sqrt{ab} + b$

9. $\rightarrow \sqrt{x} = x - 2$
 ~~$\sqrt{x} = 1 - 2$~~
 ~~$\sqrt{x} = -1$~~
 $\sqrt{x} \cdot \sqrt{x} = (x - 2)(x - 2)$
 $x = x^2 - 4x + 4$
 $0 = x^2 - 5x + 4$
 $0 = (x - 1)(x - 4)$
 ~~$x = 1$~~ $x = 4$

10. $-2\sqrt[3]{4} \cdot -2\sqrt[3]{4} \cdot -2\sqrt[3]{4}$
 $= -8\sqrt[3]{4 \cdot 4 \cdot 4}$
 $= -8(4)$
 $= -32$

$$\begin{aligned}
 11. \quad & \frac{\sqrt[3]{1296}}{3} + \frac{3\sqrt[3]{750}}{5} - \frac{2\sqrt[3]{4374}}{3} \\
 &= \frac{\sqrt[3]{216 \cdot 6}}{3} + \frac{3\sqrt[3]{125 \cdot 6}}{5} - \frac{2\sqrt[3]{729 \cdot 6}}{3} \\
 &= 2\sqrt[3]{6} + 3\sqrt[3]{6} - 6\sqrt[3]{6} \\
 &= \boxed{-1\sqrt[3]{6}}
 \end{aligned}$$

$$12. \quad \frac{4\sqrt{27} - \sqrt{20}}{2\sqrt{3} + 8\sqrt{5}} \cdot \frac{12\sqrt{3} - 2\sqrt{5}}{\sqrt{12} + 2\sqrt{80}}$$

$$\begin{aligned}
 P &= 2(2\sqrt{3} + 8\sqrt{5}) + 2(12\sqrt{3} - 2\sqrt{5}) \\
 &= 4\sqrt{3} + 16\sqrt{5} + 24\sqrt{3} - 4\sqrt{5} \\
 &= \boxed{28\sqrt{3} + 12\sqrt{5}}
 \end{aligned}$$

$$\begin{aligned}
 A &= (2\sqrt{3} + 8\sqrt{5})(12\sqrt{3} - 2\sqrt{5}) \\
 &= 72 - 4\sqrt{15} + 96\sqrt{15} - 80 \\
 &= \boxed{-8 + 92\sqrt{15}}
 \end{aligned}$$

$$\begin{aligned}
 13. \quad & \frac{9 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} - \frac{5(\sqrt{3} + 2)}{(\sqrt{3} - 2)(\sqrt{3} + 2)} \\
 & \frac{9\sqrt{3}}{3} - \frac{5\sqrt{3} + 10}{3 - 4} \\
 & \downarrow \\
 &= \frac{3\sqrt{3}}{1} - \frac{(5\sqrt{3} + 10)}{-1} \\
 &= 3\sqrt{3} + (5\sqrt{3} + 10) \\
 &= 3\sqrt{3} + 5\sqrt{3} + 10 \\
 &= \boxed{8\sqrt{3} + 10}
 \end{aligned}$$

$$14. a) \quad x - \sqrt{3x} = 6$$

$$x - 6 = \sqrt{3x}$$

$$(x-6)(x-6) = \sqrt{3x} \cdot \sqrt{3x}$$

$$\checkmark x^2 - 12x + 36 = 3x$$

$$x^2 - 15x + 36 = 0$$

$$(x-3)(x-12) = 0$$

$$\cancel{x=3} \quad \boxed{x=12} \quad \therefore$$

$$\sqrt{2x-3} = 2 + \sqrt{x-5}$$

$$\sqrt{2x-3} \cdot \sqrt{2x-3} = (2 + \sqrt{x-5})(2 + \sqrt{x-5})$$

$$2x-3 = 4 + 4\sqrt{x-5} + x-5$$

$$x-2 = 4\sqrt{x-5}$$

$$(x-2)(x-2) = 4\sqrt{x-5} \cdot 4\sqrt{x-5}$$

$$x^2 - 4x + 4 = 16(x-5)$$

$$x^2 - 4x - 16x + 4 + 80 = 0$$

$$x^2 - 20x + 84 = 0$$

$$(x-6)(x-14) = 0$$

$$\therefore \boxed{x=6} \quad \boxed{x=14} \quad \therefore$$

2013 - Sample

$$17. \frac{\sqrt{6}(\sqrt{3}-\sqrt{2})}{(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})}$$

$$= \frac{\sqrt{18}-\sqrt{12}}{3-2}$$

$$= \boxed{3\sqrt{2}-2\sqrt{3}}$$

$$18. \frac{\sqrt[3]{2} \cdot \sqrt[3]{6 \cdot 6}}{\sqrt[3]{6} \cdot \sqrt[3]{6 \cdot 6}}$$

$$= \frac{\sqrt[3]{72}}{6} = \frac{\sqrt[3]{9}}{3}$$

$$19. \frac{1(x+6)}{(x)(x+6)} \cdot \frac{2x}{x(x+6)}$$

$$\frac{1x+6-2x}{x(x+6)}$$

$$\frac{-x+6}{x(x+6)} = \frac{(6-x)}{x(x+6)}$$

$$20. \left(\frac{9x-\frac{1}{x}}{1}\right) \div \left(\frac{6}{1} + \frac{2}{x}\right)$$

$$\left(\frac{9x^2-1}{x}\right) \div \left(\frac{6x+2}{x}\right)$$

$$\frac{(9x^2-1) \cdot \cancel{x}}{\cancel{x} \cdot (6x+2)}$$

$$\frac{(3x+1)(3x-1)}{2(3x+1)}$$

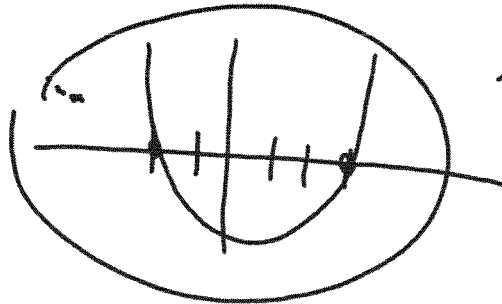
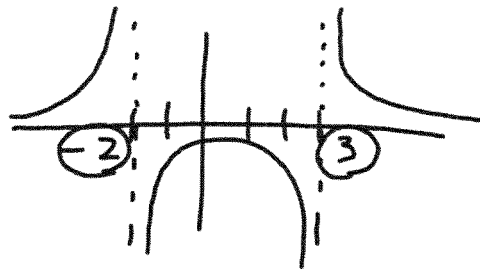
$$\frac{3x-1}{2}$$

$$\frac{25-x^2}{x^2} \cdot \frac{x^2-2x}{x^2+3x-10}$$

$$\frac{(5-x)(5+x) \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot (x-2)(x+5)}$$

$$\boxed{\frac{(5-x)}{x}}$$

22.



$$A) 0 = (x - 2)(x - 3)$$

36. $|x^2 + 5x| = 2x$

visualize $y = x^2 + 5x$
 $y = x(x+5)$

Case 1: $-5 < x < 0$ Case 2: $x \leq -5$ or $x \geq 0$

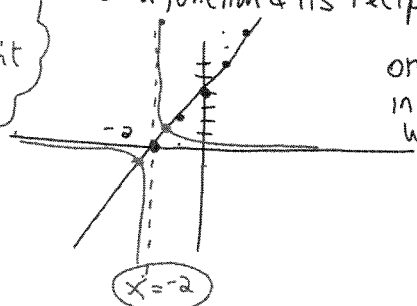
$-(x^2 + 5x) = 2x$
 $-x^2 - 5x = 2x$
 $0 = x^2 + 7x$
 $0 = x(x+7)$
 $\downarrow \quad \downarrow$
 ~~$x = -7$~~ & ~~$x = 0$~~

$x^2 + 5x = 2x$
 $x^2 + 3x = 0$
 $x(x+3) = 0$
 $\downarrow \quad \downarrow$
 $x = 0$ & ~~$x = -3$~~

35. $f(x) = 2x + 4$ & $y = \frac{1}{2x+4}$

2 #'s can be flipped & they won't change...
 1 & -1
 $\frac{1}{100}$

• a function & its reciprocal.



only # in the world that you can not flip...0.

V.A. $\rightarrow x = -2$

H.A. $\rightarrow y = 0$

Invariant $\rightarrow 1 = 2x + 4 \mid -1 = 2x + 4$

Points $\frac{-3}{2} = x \mid \frac{-5}{2} = x$

$(-\frac{3}{2}, 1)$ & $(-\frac{5}{2}, -1)$

x intercept ($y = 2x + 4$)

$(-2, 0)$

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

there isn't one.

y intercept ($y = 2x + 4$)

$(0, 4)$

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

$(0, \frac{1}{4})$

34. $\left[\frac{9x-3}{x^2-x-6} - \frac{6}{x-3} = 2 \right]$

$\left[\frac{(x-3)(x+2)}{1} \cdot \frac{9x-3}{(x-3)(x+2)} - \frac{6}{x-3} = 2 \right]$

$$9x-3 - 6(x+2) = 2(x-3)(x+2)$$

turned into a quadratic!

NPV
3 4 - 2

$$9x-3-6x-12 = 2(x^2-x-6)$$

$$9x-3-6x-12 = 2x^2 - 2x - 12.$$

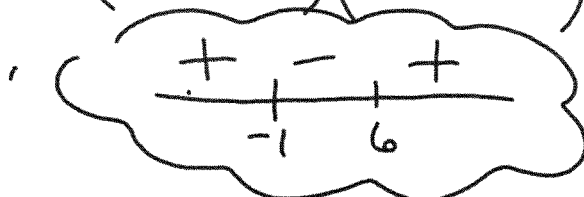
$$0 = 2x^2 - 5x + 3$$

$$0 = (2x-3)(x-1)$$

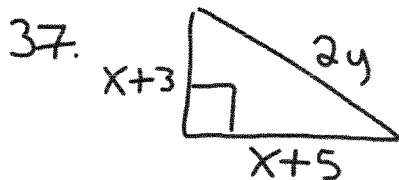
$$\therefore \boxed{x = \frac{3}{2}} \quad \boxed{x = 1} \quad \therefore$$

Exam (Jun. 10)

#38. $x^2 - 4x > x + 6$
 $x^2 - 5x - 6 > 0$
 $(x + 1)(x - 6) > 0$



Sol'n: $(-\infty, -1) \cup (6, \infty)$



$$x+3 + x+5 + 2y = 24$$

$$2x + 2y = 16$$

$$\frac{1}{2} \cdot (x+5)(x+3) = 2y + 14$$

$$(x^2 + 8x + 15) = 2(2y + 14)$$

$$x^2 + 8x + 15 = 4y + 28$$

system!

$$2x = -2y + 16 \rightarrow 4x = -4y + 32$$

$$x^2 + 8x + 15 = 4y + 28 \quad x^2 + 8x + 15 = -4y + 32$$

$$2(3) = -2y + 16$$

$$\frac{6-16}{-2} = y$$

$$5 = y$$

$$x^2 + 12x + 15 = 60$$

$$x^2 + 12x - 45 = 0$$

$$(x - 3)(x + 15) = 0$$

$$x = 3 \quad x = -15$$

$$33. \quad \frac{1}{2}m - \sqrt{13-m} = -1$$

balance out
the eqn

$$\begin{aligned} 13-m &\geq 0 \\ 13 &\geq m \\ \text{or } m &\leq 13 \end{aligned}$$

$$\begin{aligned} \frac{1}{2}m + 1 &= \sqrt{13-m} \\ \left(\frac{1}{2}m + 1\right)\left(\frac{1}{2}m + 1\right) &= \sqrt{13-m} \sqrt{13-m} \end{aligned}$$

$$\frac{1}{4}m^2 + m + 1 = 13 - m$$

$$\frac{1}{4}m^2 + 2m - 12 = 0$$

times by 4.

$$1m^2 + 8m - 48 = 0$$

$$(m - 4)(m + 12) = 0$$

$$\boxed{m=4} \quad \boxed{\cancel{m=-12}}$$

$$16x^2 - 16 = 48x + 24$$

$$16x^2 - 48x - 40 = 0$$

$$8(2x^2 - 6x - 5) = 0$$

$$x = \frac{6 \pm \sqrt{36 - 4(2)(-5)}}{4}$$

$$= \frac{6 \pm \sqrt{76}}{4}$$

$$= \frac{6 \pm \sqrt{4(19)}}{4}$$

$$= \frac{6 \pm 2\sqrt{19}}{4}$$

$$= \frac{3 \pm \sqrt{19}}{2}$$

$$= \cancel{6 \pm 2\sqrt{19}}$$