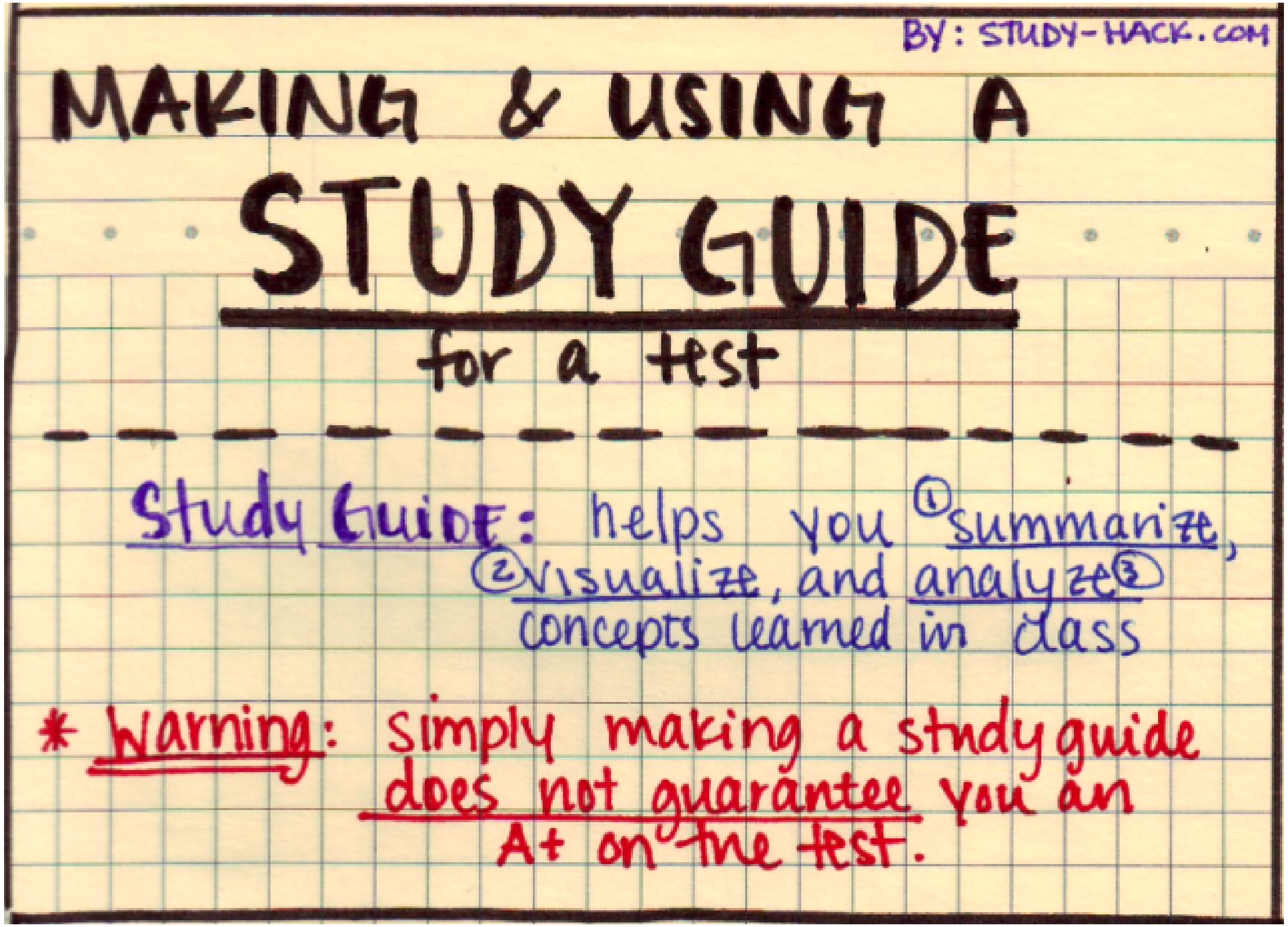
L.O.: Students will take detailed constructive notes on Exam-1: Rational Exponents, Radicals, & Complex Numbers. Students will practice over the weekend on HMH Player (my.hrw.com) to deepen their understanding of each concept for Exam-1 that is in class on Monday.



Coursework will be weighted as follows:							
1. Homework	20%						
2. Quizzes			10%				
3. Chapter Test			60%				
4. Final Exam					10%		
Total:	20%	+	70%	+	10%	=	100%

Exam grade = Class grade

Did Not Finish  or FAILED IT

= RETAKE IT TILL YOU MAKE IT! @ LUNCH TIME

#1. Add the complex numbers.

$(18 + 15i) + (-9 - 11i) = \boxed{9} + \boxed{4}\, i$

Rearrange to group like terms together.

$$\begin{array}{rr} 18 & +\ 15i \\ -9 & -\ 11i \\ \hline 9 & +\ 4i \end{array}$$

Combine like terms.

#2. Add the complex numbers.

$$(-7 - 2i) + (-11 + 9i) = \boxed{-18} + \boxed{7}\,i$$

Rearrange to group like terms together.

$$\begin{array}{r} -7 - 2i \\ -11 + 9i \\ \hline -18 + 7i \end{array}$$

Combine like terms.

#3. Subtract.

Distribute the "negative sign"

$$(2+4i) - 1(11-i)$$

$$2 + 4i \quad -11 + i$$

Rearrange to group like terms together.

$$\begin{array}{rr} \$2 & +4i \\ -\$11 & +1i \\ \hline -9 & +5i \end{array}$$

Combine like terms.

The difference is $\boxed{-9+5i}$.

#4. **Subtract.**

$$(-8-2i)-(-10-5i)$$

$-8-2i+10+5i$ Distribute the "negative sign"

Rearrange to group like terms together.

$$\begin{array}{r} -8-2i \\ 10+5i \\ \hline 2+3i \end{array}$$

Combine like terms.

The difference is $\boxed{2+3i}$.

#5. Subtract.

$$(6+6i)-(6-6i)$$

$6+6i-6+6i$ Distribute the "negative sign"

Rearrange to group like terms together.

$$\begin{array}{r} \cancel{6}+6i \\ -\cancel{6}+6i \\ \hline 12i \end{array}$$

Combine like terms.

The difference is $\boxed{12i}$.

#6. Multiply the complex numbers.

$(2-3i)(5-11i) = \boxed{-23} - \boxed{37}\, i$

$i^2 = -1$

Use the "Box method" (FOIL)

	2	$-3i$
5	10	$-15i$
$-11i$	$-22i$	$33i^2$

Add Combine like terms.

change to -33 Substitute -1 for i^2.

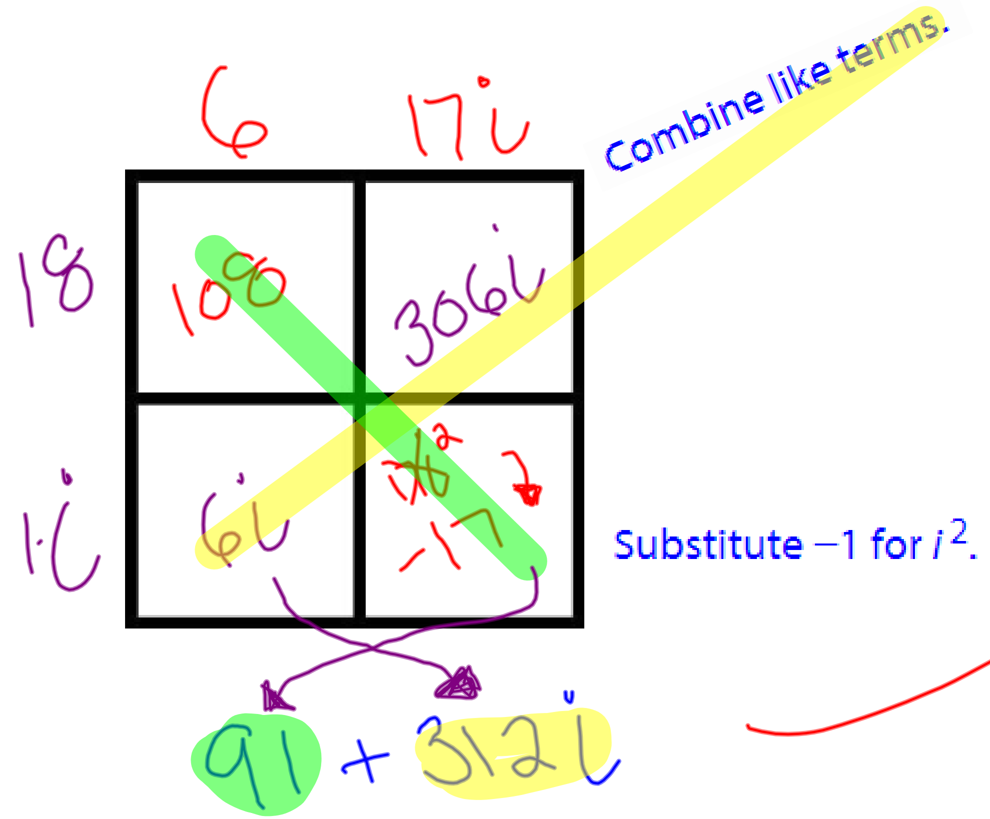
$-23 - 37i$

*Multiply the edges, but add on the diagonals

#7. Multiply the complex numbers.

$(6+17i)(18+i) = \boxed{91} + \boxed{312}\, i$

Use the "Box method" (FOIL)



*Multiply the edges, but add on the diagonals

#8. Multiply $4+5i$ and $2+i$.

$(4+5i)(2+i) = \boxed{3} + \boxed{14}\, i$.

Use the "Box method" (FOIL)

	4	$5i$
2	8	$10i$
i	$4i$	$\cancel{5i^2}$ -5

Combine like terms.

Add

Substitute -1 for i^2.

$3 + 14i$

*Multiply the edges, but add on the diagonals

#9. Evaluate the expression for the given value of the variables.

$7a + b^2$ for $a = -2$ and $b = 6$.

$7(-2) + (6)^2$ Substitue -2 for a and 6 for b

same as $6 \cdot 6$

$-14 + 36$ Multiply

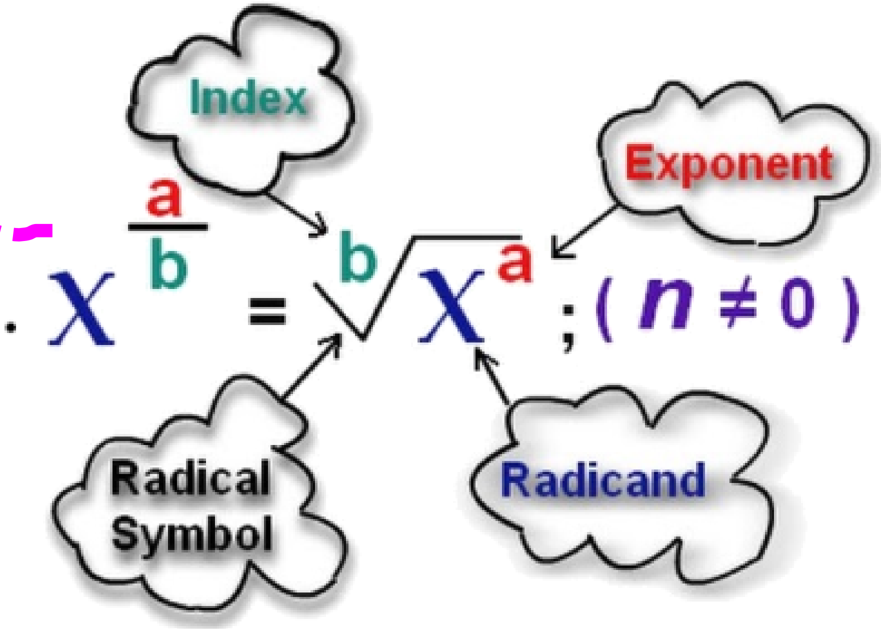
$\boxed{22}$ Add

The value of the expression is 22.

#10. Find the root and simplify the expression.

$625^{\frac{1}{4}}$

The radical is $\boxed{\sqrt[4]{625}}$.



$625^{\frac{1}{4}} = \boxed{5}$

Definition of n^{th} root.

$$\sqrt[4]{5 \cdot 5 \cdot 5 \cdot 5} = \sqrt[\cancel{4}]{5^{\cancel{4}}} = 5$$

*same index and exponent cancel out each other

#11. Simplify expressions with fractional exponents.

$$1{,}024^{\frac{4}{5}} = \boxed{256}$$

$$\left(\sqrt[5]{1024}\right)^4$$

Rewrite radicand as a power.

rewrite the base as multiplication

$$\left(\sqrt[5]{4\cdot4\cdot4\cdot4\cdot4}\right)^4 = \left(\sqrt[\cancel{5}]{4^{\cancel{5}}}\right)^4 = 4^4$$

Definition of n^{th} root.

$$= 4\cdot4\cdot4\cdot4 = 256$$

#12. Evaluate the expression.

$$\left(\frac{1}{4}\right)^{-4} = \boxed{256}$$

Take the reciprocal "Flip"

Exponent changes sign to opposite

$$(4)^{4} = 4 \cdot 4 \cdot 4 \cdot 4$$

$$16 \cdot 16$$

$$256$$

#13. Evaluate the expression.

$(-9)^0 = \boxed{\text{ONE !}}$

Note

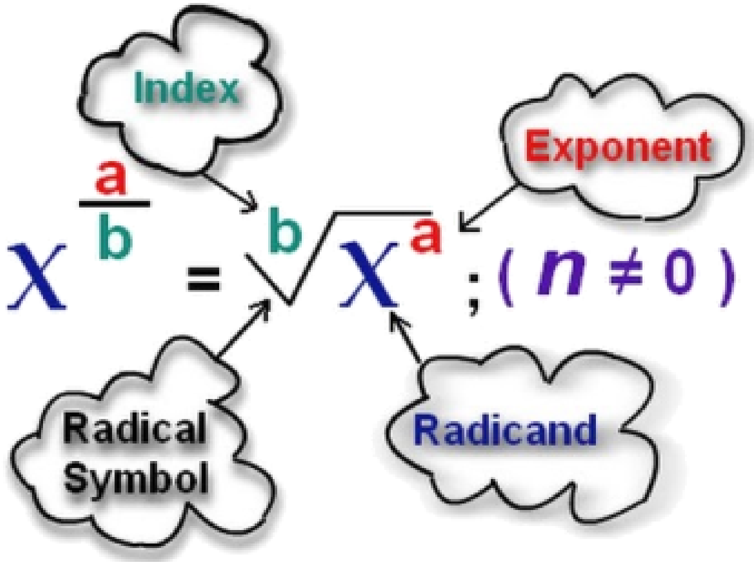
Any non-zero number raised to the power of 0 is 1.

$x^0 = 1$ for $x \neq 0$.

#14. Find the root(s) and simplify the expression.

$$625^{\frac{1}{4}} + 16^{\frac{1}{2}}$$

The radical is $\sqrt[4]{625} + \sqrt[2]{16}$



$$625^{\frac{1}{4}} + 16^{\frac{1}{2}} = \boxed{9}$$

$\sqrt[4]{5 \cdot 5 \cdot 5 \cdot 5} + \sqrt{16}$

Rewrite radicands as powers.

$\sqrt[4]{5^4} + \sqrt{16}$

$5 + 4 = 9$

#15. Simplify the expression.

$$(1)^{-\frac{2}{3}} = \boxed{\text{ONE}}$$

Take the reciprocal "Flip" Exponent changes sign to opposite

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

*Any number with base one to the power is always one, expect zero.

#16. Simplify the expression.

$$\left(\frac{1}{16}\right)^{-\frac{5}{2}} = \boxed{1024}$$

Take the Reciprocal (Flip)

Same thing

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

$$(16)^{\frac{5}{2}}$$

Convert to radical.

$$\left(\sqrt[2]{16}\right)^5 = (4)^5 = 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$$

$$= 16 \cdot 16 \cdot 4$$

$$= 256 \cdot 4 = 1024$$

Same as Square Root

#17. **Simplify each expression. Assume all variables are positive.**

Distribute the power

$(x^5y)^5\,\sqrt[\cancel{6}]{y^{\cancel{6}}} = x^{\boxed{25}}\,y^{\boxed{6}}$

$x^{5\cdot 5}\,y^{1\cdot 5}\quad y$

$x^{25}\cdot y^{5}\cdot y^{1}$ like base $x^m\cdot x^n = x^{m+n}$

$x^{25}\cdot y^{6}$

#18. Simplify each expression. Assume all variables are positive.

$$\frac{\sqrt[2]{x^6}}{\sqrt[2]{x^4}} = x^{\boxed{1}}$$

$$\frac{x^{\frac{6}{2}}}{x^{\frac{4}{2}}}$$

reduce

reduce

Rewrite using rational exponents.

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

When you divide by the same base, subtract the exponents: $\frac{a^m}{a^n} = a^{m-n}$

#19. Simplify the expression. Assume all variables are positive.

$$\left(\frac{1}{4x^4}\cdot x^{20}\right)^{-\frac{1}{2}} = \frac{2}{x^8}$$

Cross cancel the x's

$$\left(\frac{x^{16}}{4}\right)^{-\frac{1}{2}}$$

Take the Reciprocal (Flip)

$$\left(\frac{4}{x^{16}}\right)^{\frac{1}{2}} = \text{Square Rt TOP|BOTTOM} = \frac{2}{x^8}$$

Exponent changes sign to opposite

#20. Simplify the given expression.

Distribute the power, cancel the x's...

$$\left((3x)^{\cancel{x}}(3x)^{\cancel{2x}}\right)^{\frac{1}{\cancel{x}}} = \boxed{27}\,x^{\boxed{3}}$$

$$(3x)^1\cdot(3x)^2 = (3x)^3 = 3^3x^3 = 27x^3$$

$3\cdot3\cdot3$

$$a^m \bullet a^n = a^{m+n}$$

#21. Simplify the expression.

$216^{\frac{1}{3}} - 125^{\frac{1}{3}} = \boxed{1}$

Convert to radicals.

$\sqrt[3]{216} - \sqrt[3]{125}$

Rewrite radicands as powers.

$\sqrt[\cancel{3}]{6^{\cancel{3}}} - \sqrt[\cancel{3}]{5^{\cancel{3}}}$

$6 - 5 = 1$

#22.

A baker sells bread for $5 a loaf and rolls for $1 each. The baker needs to sell $55 worth of baked goods by the end of the day.

Enter a linear equation that describes the problem.

$ 5b + $ 1·r

An equation for the value of the baked goods is $\boxed{}$ = $55, where b is the number of loaves of bread sold, and r is the number of rolls sold.

$\boxed{5b+r}$

Notes

Do not put one in front of r.

#23.

A movie theater sells tickets to a new show for $12 each. The theater also sells small containers of popcorn for $5 each. The theater needs to make $3167 in order to break even on the show.

Equal

Enter a linear equation that describes the problem.

An equation for the amount of money earned by the movie theater is

$\square$ = $3167, where t is the number of tickets sold, and p is the number of popcorn buckets sold.

$\$12t + \$5p$

#24. Simplify $7vw^3 \cdot 3v^4$.

$7v^1w^3 \cdot 3v^4 = \square$

$7 \cdot 3 \cdot v^5 \cdot w^7$

Add exponents when multiplying.

$= 21v^5w^7$

#25. Find the slope and y-intercept.

$$y - \cancel{6} = 2x + 4$$
$$\quad + \cancel{6} \qquad\quad + 6$$

$$y = 2x + 10$$

Slope = 2

y-int = 10

$y = mx + b$

slope

y-intercept

$m = \frac{y_2 - y_1}{x_2 - x_1}$ (0, b)

moving the constants to one side.