

Name \_\_\_\_\_

Date \_\_\_\_\_

8A: Algebra 1

Period \_\_\_\_\_

Radicals Quiz Extra Review

\*\*\*1-26: Simplify

\*\*\*All answers should be in simplest radical form

1) $5x\sqrt{3} + 2x\sqrt{3} - 6x\sqrt{3}$	2) $-\sqrt{128}$
3) $4\sqrt{21} \cdot 2\sqrt{3}$	4) $\frac{20\sqrt{50}}{4\sqrt{2}}$
5) $\frac{14\sqrt{150}}{7\sqrt{2}}$	6) $3\sqrt{2} + 2\sqrt{32}$
7) $(6\sqrt{5})^2$	8) $5\sqrt{2}(3\sqrt{150} - 2\sqrt{24})$

9) $-5\sqrt{x^4} \cdot 3\sqrt{12x^3}$	10) $(5+\sqrt{2})(6+\sqrt{2})$
11) Simplify: $\sqrt{1200}$	12) Simplify: $-\sqrt{288}$
13) $2x\sqrt{5} + x\sqrt{5}$	14) $10\sqrt{24} \div \frac{1}{2}\sqrt{3}$
15) $\frac{\sqrt{45}}{\sqrt{80}}$	16) $\frac{6\sqrt{20}}{3\sqrt{5}}$
17) $\sqrt{72} - 3\sqrt{2}$	18) Simplify: $\sqrt{27x^5y^4z^3}$

19) Simplify:  $4\sqrt{500x^6y^2z^7}$

20)  $\frac{8\sqrt{8}}{2\sqrt{10}}$

21)  $\frac{2}{2\sqrt{7}}$

22)  $\frac{6}{\sqrt{3}}$

23) If the sides of a rectangle measure  $2\sqrt{6}$  and  $5\sqrt{15}$ , what is the area of the rectangle?

24) What is the perimeter of a rectangle with length  $4\sqrt{3}$  and width  $\sqrt{48}$ ?

25)  $2\sqrt{x^5} \cdot -6\sqrt{20x^4}$

26)  $\frac{\sqrt{500x^8y^{10}}}{\sqrt{10x^2y^9}}$

Name Key

Date \_\_\_\_\_

8A; Algebra 1

Period \_\_\_\_\_

Radicals Quiz Extra Review

<p>1) <math>5x\sqrt{3} + 2x\sqrt{3} - 6x\sqrt{3}</math></p> <p><math>x\sqrt{3}</math> or <math>1x\sqrt{3}</math></p> <p>* Don't add/sub the radicands</p>	<p>2) <math>-\sqrt{128}</math></p> <p><math>-1 \cdot \sqrt{64} \cdot \sqrt{2}</math></p> <p><math>-1 \cdot 8\sqrt{2}</math></p> <p><math>-8\sqrt{2}</math></p> <p>Calc trick:  <math>y = 128/x</math>            2nd <math>y =</math> choose 2 factors where one # is a perfect square</p>
<p>3) <math>4\sqrt{21} \cdot 2\sqrt{3}</math></p> <p>* multiply like terms 1st then simplify</p> <p><math>8\sqrt{63}</math></p> <p><math>8 \cdot \sqrt{9} \cdot \sqrt{7}</math></p> <p><math>8 \cdot 3\sqrt{7}</math></p> <p><math>24\sqrt{7}</math></p>	<p>4) <math>\frac{20\sqrt{50}}{4\sqrt{2}}</math></p> <p>* Divide like terms 1st then simplify</p> <p><math>5\sqrt{25}</math></p> <p><math>5 \cdot 5</math></p> <p><math>25</math></p>
<p>5) <math>\frac{14\sqrt{150}}{7\sqrt{2}}</math></p> <p>* Divide like terms 1st then simplify.</p> <p><math>2\sqrt{75}</math></p> <p><math>2 \cdot \sqrt{25} \cdot \sqrt{3}</math></p> <p><math>2 \cdot 5 \cdot \sqrt{3}</math></p> <p><math>10\sqrt{3}</math></p>	<p>6) <math>3\sqrt{2} + 2\sqrt{32}</math></p> <p><math>3\sqrt{2} + 2 \cdot \sqrt{16} \cdot \sqrt{2}</math></p> <p><math>3\sqrt{2} + 2 \cdot 4\sqrt{2}</math></p> <p><math>3\sqrt{2} + 8\sqrt{2}</math></p> <p><math>11\sqrt{2}</math></p> <p>* must have like radicands in order to add.            * Don't add the radicands</p>
<p>7) <math>(6\sqrt{5})^2 = (6\sqrt{5})(6\sqrt{5}) = 36\sqrt{25}</math></p> <p>* Must write twice first and then multiply like terms</p> <p><math>36 \cdot 5</math></p> <p><math>180</math></p>	<p>8) <math>5\sqrt{2}(3\sqrt{150} - 2\sqrt{24})</math></p> <p><math>15\sqrt{300} - 10\sqrt{48}</math></p> <p><math>15 \cdot \sqrt{100} \sqrt{3} - 10 \cdot \sqrt{16} \sqrt{3}</math></p> <p><math>15 \cdot 10\sqrt{3} - 10 \cdot 4\sqrt{3}</math></p> <p><math>150\sqrt{3} - 40\sqrt{3}</math></p> <p><math>110\sqrt{3}</math></p> <p>* Distribute (multiply like terms)            * Don't subtract the radicands</p>

9)  $-5\sqrt{x^4} \cdot 3\sqrt{12x^3}$   
 $-15\sqrt{12x^7}$   
 $-15 \cdot \sqrt{12} \cdot \sqrt{x^7}$   
 $-15 \cdot \sqrt{4} \cdot \sqrt{3} \cdot \sqrt{x^6} \cdot \sqrt{x}$   
 $-15 \cdot 2 \cdot \sqrt{3} \cdot x^3 \cdot \sqrt{x}$   
 $-30x^3\sqrt{3x}$

\* Add exponents of variables when multiplying  
 \* always 'x' as 2nd  $\sqrt{\quad}$  for odd exponents  
 \* to simplify even exponents, just take half of the exponent

10)  $(5+\sqrt{2})(6+\sqrt{2})$   
 $30 + 5\sqrt{2} + 6\sqrt{2} + \sqrt{4}$   
 $(30) + 5\sqrt{2} + 6\sqrt{2} + (2)$  → combine like terms  
 $(11\sqrt{2} + 32)$   
 or  
 $(32 + 11\sqrt{2})$

\* Double Distribute

11) Simplify:  $\sqrt{1200}$   
 $\sqrt{400} \cdot \sqrt{3}$   
 $(20\sqrt{3})$

Calc. Trick  
 $y = 1200/x$   
 (2nd) graph look for 2 whole #'s that multiply to 1200 when one factor is a perfect square

12) Simplify:  $-\sqrt{288}$   
 $-1 \cdot \sqrt{144} \cdot \sqrt{2}$   
 $-12\sqrt{2}$   
 $(-12\sqrt{2})$

Calc. trick  
 $4 = 288/x$   
 (2nd)  $4 =$   
 choose 2 factors where one # is a perfect square

13)  $2x\sqrt{5} + x\sqrt{5}$   
 $(3x\sqrt{5})$

\* x is 1x  
 \* Don't add radicals

14)  $10\sqrt{24} \div \frac{1}{2}\sqrt{3}$   
 $20\sqrt{8}$   
 $20 \cdot \sqrt{4} \cdot \sqrt{2}$   
 $20 \cdot 2\sqrt{2}$   
 $(40\sqrt{2})$

\* Divide like terms then simplify

15)  $\frac{\sqrt{45}}{\sqrt{80}} \cdot \frac{\sqrt{80}}{\sqrt{80}} = \frac{\sqrt{3600}}{\sqrt{6400}}$   
 $\frac{\text{Num}}{\sqrt{3600}} \mid \frac{\text{Denom}}{\sqrt{6400}}$   
 $(60) \mid (80)$   
 $\frac{60}{80} = \left(\frac{3}{4}\right)$

\*  $45 = 81 \cdot 5$  not a whole # so you must rationalize the denominator instead in order to simplify

16)  $\frac{6\sqrt{20}}{3\sqrt{5}}$   
 $2\sqrt{4}$   
 $2 \cdot 2$   
 $(4)$

\* Divide like terms then simplify

17)  $\sqrt{72} - 3\sqrt{2}$   
 $\sqrt{36} \sqrt{2} - 3\sqrt{2}$   
 $6\sqrt{2} - 3\sqrt{2}$   
 $(3\sqrt{2})$

\* Don't subtract radicals

18) Simplify:  $\sqrt{27x^5y^4z^3}$   
 $\sqrt{27} \cdot \sqrt{x^5} \cdot \sqrt{y^4} \cdot \sqrt{z^3}$   
 $\sqrt{9} \cdot \sqrt{3} \cdot \sqrt{x^4} \cdot \sqrt{x} \cdot y^2 \cdot \sqrt{z^2} \cdot \sqrt{z}$   
 $(3\sqrt{3}) \cdot (x^2\sqrt{x}) \cdot (y^2) \cdot (z\sqrt{z})$   
 $(3x^2y^2z\sqrt{3xz})$

\* separate 1st, then simplify  
 \* just take 1/2 of the even exponents  
 \* Odd exponents; 2nd  $\sqrt{\quad}$  is always 'x'

19) Simplify:  $4\sqrt{500x^6y^2z^7}$

$4 \cdot \sqrt{500} \cdot \sqrt{x^6} \cdot \sqrt{y^2} \cdot \sqrt{z^7}$   
 $4 \cdot \sqrt{100 \cdot 5} \cdot x^3 \cdot y \cdot \sqrt{z^6 \cdot z}$   
 $(4 \cdot 10 \cdot \sqrt{5}) \cdot (x^3) \cdot (y) \cdot (z^3 \sqrt{z})$

$40x^3y z^3\sqrt{5z}$

\* Separate 1st then simplify  
 \* Take 1/2 of the even exponents  
 \* odd exponents: 2nd  $\sqrt{}$  is always  $x^*$

20)  $\frac{8\sqrt{8}}{2\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{8\sqrt{80}}{2\sqrt{100}}$

\*  $80 \div 10$  is not a whole #  
 So you must rationalize the denom. instead to simplify  
 \* you can't simplify the 5's b/c they are not like terms!

Num	Denom
$8\sqrt{80}$	$2\sqrt{100}$
$8 \cdot \sqrt{16 \cdot 5}$	$2 \cdot 10$
$8 \cdot 4 \sqrt{5}$	$(20)$
$(32\sqrt{5})$	

$\frac{32\sqrt{5}}{20} = \frac{8\sqrt{5}}{5}$

21)  $\frac{2}{2\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{2\sqrt{7}}{2\sqrt{49}}$

\* Rationalize the denominator

Num	Denom
$(2\sqrt{7})$	$2\sqrt{49}$
	$2 \cdot 7$
	$14$

$\frac{2\sqrt{7}}{14} = \frac{\sqrt{7}}{7}$

\* you can't simplify the 7's any further b/c they are not like terms

22)  $\frac{6}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{\sqrt{9}}$

\* Rationalize the denominator

Num	Denom
$(6\sqrt{3})$	$\sqrt{9}$
	$(3)$

$\frac{6\sqrt{3}}{3} = 2\sqrt{3}$

23) If the sides of a rectangle measure  $2\sqrt{6}$  and  $5\sqrt{15}$ , what is the area of the rectangle?

$A = L \cdot w$   
 $A = (5\sqrt{15})(2\sqrt{6})$  \* multiply then simplify  
 $A = 10\sqrt{90}$   
 $A = 10 \cdot \sqrt{9 \cdot 10}$   
 $A = 10 \cdot 3\sqrt{10}$   
 $A = 30\sqrt{10}$

24) What is the perimeter of a rectangle with length  $4\sqrt{3}$  and width  $\sqrt{48}$ ?

$P = 2L + 2w$   
 $P = 2(4\sqrt{3}) + 2(\sqrt{48}) \rightarrow$  multiply like terms  
 $P = 8\sqrt{3} + 2\sqrt{48}$   
 $P = 8\sqrt{3} + 2\sqrt{16 \cdot 3}$   
 $P = 8\sqrt{3} + 2 \cdot 4\sqrt{3}$   
 $P = 8\sqrt{3} + 8\sqrt{3} \rightarrow$  don't add the radicals  
 $P = 16\sqrt{3}$

25)  $2\sqrt{x^3} \cdot -6\sqrt{20x^4}$

$-12\sqrt{20x^9}$   
 $-12\sqrt{20} \cdot \sqrt{x^9}$   
 $-12 \cdot \sqrt{4 \cdot 5} \cdot \sqrt{x^8 \cdot x}$  \* 2nd  $\sqrt{}$  always  $x^*$   
 $(-12 \cdot 2 \cdot \sqrt{5}) \cdot (x^4 \sqrt{x})$  \* take 1/2 of even exponents  
 $-24x^4\sqrt{5x}$

\* multiply like terms  
 \* Add exponents when multiplying variables  
 \* split up and simplify separately

26)  $\frac{\sqrt{500x^8y^{10}}}{\sqrt{10x^2y^9}}$

\* Divide like terms  
 \* Subtract exponents when dividing variable  
 \* split up and simplify separately

$\sqrt{500x^6y^1}$   
 $\sqrt{25 \cdot 2} \cdot \sqrt{x^6} \cdot \sqrt{y}$  \* can't simplify any further  
 $(5 \cdot 2 \cdot x^3) \cdot \sqrt{y}$   
 $5x^3\sqrt{2y}$