ALGEBRA 1: CHAPTER 10-2 to 10-3 ~~TEST~~ REVIEW

Part I

1. Simplify. $\sqrt{250}$

2. Simplify. $3\sqrt{20} + \sqrt{18} - 2\sqrt{32}$

3. Simplify. $\sqrt{3}\,(\sqrt{6} + 4\sqrt{3}\,)$

4. Simplify. $\dfrac{6}{6 - \sqrt{3}}$

5. Simplify. $7\sqrt{13} - 4\sqrt{13}$

6. Simplify. $(\sqrt{3} - \sqrt{14})(\sqrt{7} + \sqrt{6})$

7. Simplify. $5\sqrt{48} - 2\sqrt{27} + \sqrt{63}$

8. Simplify. $\sqrt{\frac{8}{10}}$

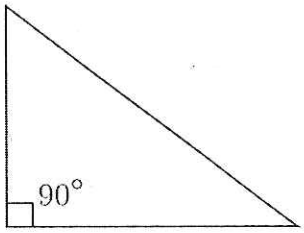
9. Simplify. $2\sqrt{3} \cdot 4\sqrt{6}$

10. Simplify. $\frac{2}{\sqrt{12}+\sqrt{6}}$

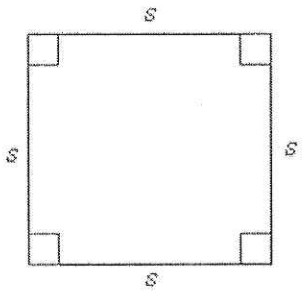
11. Simplify.

$$3\sqrt{5}(2\sqrt{18} + 4\sqrt{27})$$

12. The legs of a right triangle have measures of $4\sqrt{2}$ and $5\sqrt{2}$ units.
Use $A = \frac{1}{2}bh$ to find the *area* of the right triangle.

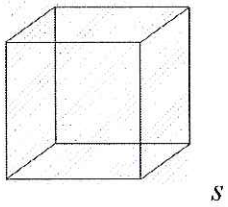


13. A square has a side length of $2\sqrt{5} - 2$ units. Use the formula $A = s^2$ to find the area of the square. Write your answer in simplest radical form.



Area: _____

14. The side length of a cube is $3\sqrt{3}$ units. Use $V = s^3$ to find the volume of the cube.
Write the volume in simplest radical form.



Volume: _____

15. When an object is dropped, and air resistance is not a factor, we can use the formula $t = \frac{1}{4}\sqrt{h}$ to find how many seconds, t, it takes the for the object to fall h feet.

Find how long it would take for an object to fall 80 feet.
Write your answer in simplest radical form.

Simplified: _____

16. To estimate how long a thunderstorm will last, meteorologists can use the formula $t = \sqrt{\frac{d^3}{216}}$ where t is time in seconds, and d is the diameter of the storm in miles.

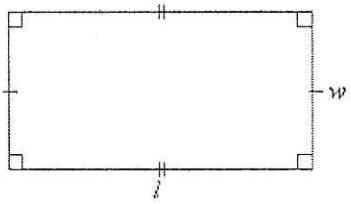
Use the formula to estimate the duration of a thunderstorm with a diameter of 8 miles.
Record your answer in simplest radical form.

Simplified: _____

17. Scientists can use the formula $V = \sqrt{16d}$ to approximate the velocity, V, in feet per second of a tsunami in water of depth d feet. Use the formula to estimate the velocity of a tsunami in 450 feet of water. Record your answer in simplest radical form, and as a decimal rounded to the nearest tenth.

Simplified: _____

18. A rectangle has a length of $(6 + \sqrt{3})$ units, and a width of $(6 - \sqrt{3})$ units.
Use the formulas to find the area and perimeter of the rectangle.
$A = lw \qquad P = 2(l + w)$



Area: _____ and Perimeter: _____

ALGEBRA 1: CHAPTER 10-2 to 10-3 ~~TEST~~ REVIEW

Key

Part I

1. Simplify. $\sqrt{250} = \sqrt{25 \cdot 10} = \sqrt{25} \cdot \sqrt{10} = \boxed{5\sqrt{10}}$

2. Simplify. $3\sqrt{20} + \sqrt{18} - 2\sqrt{32} = 3\sqrt{5 \cdot 4} + \sqrt{9 \cdot 2} - 2\sqrt{16 \cdot 2}$

$= 3 \cdot \sqrt{4} \cdot \sqrt{5} + \sqrt{9} \cdot \sqrt{2} - 2 \cdot \sqrt{16} \cdot \sqrt{2}$

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

$= 6\sqrt{5} + 3\sqrt{2} - 8\sqrt{2} = \boxed{6\sqrt{5} - 5\sqrt{2}}$

3. Simplify. $\sqrt{3}\,(\sqrt{6} + 4\sqrt{3}) = \sqrt{18} + 4\sqrt{9} = \sqrt{9 \cdot 2} + 4 \cdot 3$

$= \boxed{3\sqrt{2} + 12}$

4. Simplify. $\left(\frac{6}{6 - \sqrt{3}}\right) \cdot \frac{6 + \sqrt{3}}{(6 + \sqrt{3})} = \frac{36 + 6\sqrt{3}}{36 - 3} = \frac{36 + 6\sqrt{3}}{33}$

$= \boxed{\frac{12 + 2\sqrt{3}}{11}}$

5. Simplify. $7\sqrt{13} - 4\sqrt{13} = \boxed{3\sqrt{13}}$

6. Simplify. $(\sqrt{3}-\sqrt{14})(\sqrt{7}+\sqrt{6})$

FOIL

$\sqrt{21}+\sqrt{18}-\sqrt{98}-\sqrt{84}$

$= \sqrt{21}+3\sqrt{2}-7\sqrt{2}-2\sqrt{21}$

$\boxed{-4\sqrt{2}-\sqrt{21}}$

7. Simplify. $5\sqrt{48}-2\sqrt{27}+\sqrt{63}$

$5\sqrt{16\cdot 3}-2\sqrt{9\cdot 3}+\sqrt{9\cdot 7}$

$20\sqrt{3}-6\sqrt{3}+3\sqrt{7}$

$\boxed{14\sqrt{3}+3\sqrt{7}}$

8. Simplify. $\sqrt{\frac{8}{10}} = \frac{\sqrt{8}}{\sqrt{10}} = \frac{\sqrt{4\cdot 2}}{\sqrt{10}} = \frac{2\sqrt{2}}{\sqrt{10}}\cdot\frac{\sqrt{10}}{\sqrt{10}} =$

$\frac{2\sqrt{20}}{10} = \frac{2\sqrt{5\cdot 4}}{10} = \frac{2\sqrt{5}}{10} = \boxed{\frac{\sqrt{5}}{5}}$

9. Simplify. $2\sqrt{3}\cdot 4\sqrt{6} = 8\sqrt{18} = 8\sqrt{9\cdot 2} = \boxed{24\sqrt{2}}$

10. Simplify. $\left(\frac{2}{\sqrt{12}+\sqrt{6}}\right)\cdot\frac{(\sqrt{12}-\sqrt{6})}{(\sqrt{12}-\sqrt{6})} = \frac{2\sqrt{12}-2\sqrt{6}}{6} = \frac{2\sqrt{4}\sqrt{3}-2\sqrt{6}}{6}$

FOIL

$12-6=6$

$= \frac{4\sqrt{3}-2\sqrt{6}}{6} = \boxed{\frac{2\sqrt{3}-\sqrt{6}}{3}}$

11. Simplify.

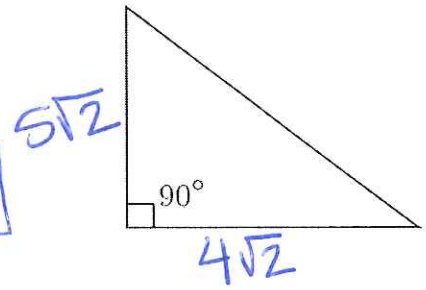
$$3\sqrt{5}(2\sqrt{18} + 4\sqrt{27})$$

$6\sqrt{90} + 12\sqrt{135}$

$6\sqrt{9}\,10 + 12\sqrt{9}\,15$

$\boxed{18\sqrt{10} + 36\sqrt{15}}$

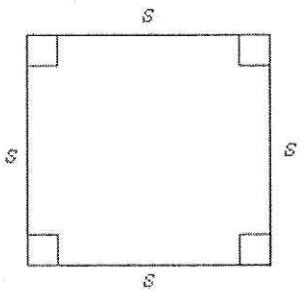
12. The legs of a right triangle have measures of $4\sqrt{2}$ and $5\sqrt{2}$ units. Use $A = \frac{1}{2}bh$ to find the *area* of the right triangle.



$A = \frac{1}{2}(4\sqrt{2})(5\sqrt{2})$

$A = \frac{1}{2}(20 \cdot 2) = \frac{1}{2}(40) = \boxed{20 \text{ units}}$

13. A square has a side length of $2\sqrt{5} - 2$ units. Use the formula $A = s^2$ to find the area of the square. Write your answer in simplest radical form.



$A = (2\sqrt{5} - 2)^2 = (2\sqrt{5} - 2)(2\sqrt{5} - 2)$

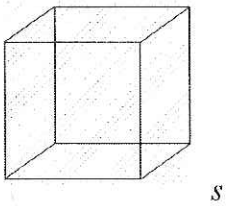
$4\sqrt{25} - 4\sqrt{5} - 4\sqrt{5} + 4 = 20 - 8\sqrt{5} + 4$

$4 \cdot 5$

$= \boxed{24 - 8\sqrt{5}}$

Area: $24 - 8\sqrt{5}$ units^2

14. The side length of a cube is $3\sqrt{3}$ units. Use $V = s^3$ to find the volume of the cube. Write the volume in simplest radical form.



$V = (3\sqrt{3})^3 = (3\sqrt{3})(3\sqrt{3})(3\sqrt{3})$

$= (3\sqrt{3})(81) = \boxed{243\sqrt{3}}$

$9 \cdot \sqrt{9} = 9 \cdot 9$

Volume: $243\sqrt{3}$ units^3

15. When an object is dropped, and air resistance is not a factor, we can use the formula $t = \frac{1}{4}\sqrt{h}$ to find how many seconds, t, it takes the for the object to fall h feet.

Find how long it would take for an object to fall 80 feet. $= h$ $\quad t = \frac{1}{4}\sqrt{80}$

Write your answer in simplest radical form.

$t = \left(\frac{1}{4}\right)\left(\sqrt{16 \cdot 5}\right) = \left(\frac{1}{4}\right) \cdot 4\sqrt{5}$

$= 1\sqrt{5}$

$\boxed{= \sqrt{5}}$

Simplified: $\sqrt{5}$ seconds

16. To estimate how long a thunderstorm will last, meteorologists can use the formula $t = \sqrt{\frac{d^3}{216}}$ where t is time in seconds, and d is the diameter of the storm in miles.

Use the formula to estimate the duration of a thunderstorm with a diameter of 8 miles. $= d$

Record your answer in simplest radical form.

$t = \sqrt{\frac{8^3}{216}} = \sqrt{\frac{512}{216}} = \frac{\sqrt{512}}{\sqrt{216}}$ $\quad \sqrt{256 \cdot 2}$ $\quad \sqrt{36 \cdot 6}$

$= \frac{16\sqrt{2}}{6\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{16\sqrt{12}}{6 \cdot \sqrt{36}} = \frac{16\sqrt{4 \cdot 3}}{6 \cdot 6} = \frac{32\sqrt{3}}{36}$

$\frac{32\sqrt{3}}{36} = \boxed{\frac{8\sqrt{3}}{9}}$

Simplified: $\frac{8\sqrt{3}}{9}$ seconds

17. Scientists can use the formula $V = \sqrt{16d}$ to approximate the velocity, V, in feet per second of a tsunami in water of depth d feet. Use the formula to estimate the velocity of a tsunami in 450 feet of water. $= d$ Record your answer in simplest radical form, and as a decimal rounded to the nearest tenth.

$V = \sqrt{16(450)} = \sqrt{7200} = \sqrt{100 \cdot 72} = 10\sqrt{72} = 10\sqrt{36 \cdot 2} =$

$\boxed{60\sqrt{2}}$

Simplified: $60\sqrt{2}$ ft/s

18. A rectangle has a length of $(6 + \sqrt{3})$ units, and a width of $(6 - \sqrt{3})$ units.

Use the formulas to find the area and perimeter of the rectangle.

$A = lw \qquad P = 2(l + w)$

$A = (6+\sqrt{3})(6-\sqrt{3})$

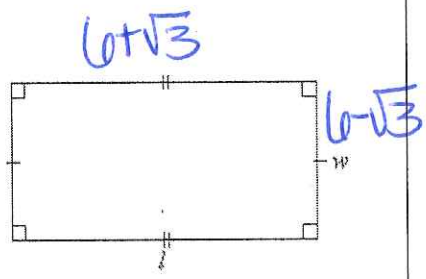
$A = 36 - 9$

$\boxed{A = 27}$

$P = 2(6+\sqrt{3} + 6-\sqrt{3})$

$P = 12 + \cancel{2\sqrt{3}} + 12 - \cancel{2\sqrt{3}}$

$\boxed{P = 24}$



Area: 27 units and Perimeter: 24 units