Acc Alg I/Geo A **Unit 1 Review** **Name:** Key

Explain why each term is rational or irrational number.

1. $\sqrt{8}+7$

irrational
it cannot be written as a fraction (ratio)

2. $(\sqrt{5})^2 = \sqrt{5}\cdot\sqrt{5} = 5$

rational: it can be written as a ratio

3. $0.\overline{2}$

rational: it has a repeating pattern

True or False (explain your reasoning).

4. The sum of two irrational numbers is always irrational.

False: Any number + its opposite = 0, which is a rational #.
ex. $\sqrt{5} + -\sqrt{5} = 0$; $\pi + -\pi = 0$

5. The product of a rational and an irrational is never rational.

False: Any number multiplied by 0 is 0, a rational #.
However, the product of a non-zero rational # and an irrational IS always irrational.

Add or Subtract:

6. $(5x^2-8x-6)+(7x^2-9x-3)$

$5x^2-8x-6+7x^2-9x-3$

$12x^2-17x-9$

7. $(3x^2+5x-9)-(6x^2+5x-11)$

$3x^2+5x-9-6x^2-5x+11$

$-3x^2+2$

Multiply:

8. $7y^2(9y^3-8y+4y^2)$

$63y^5-56y^3+28y^4$

9. $(x-4)^2$

$x^2-8x+16$

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10. $(-2x+1)(3x-7)$

$= -6x^2+14x+3x-7$

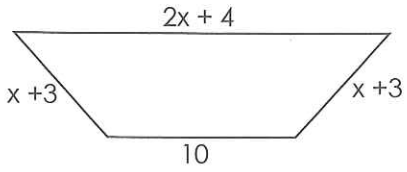
$= -6x^2+17x-7$

11. $(x+4)(6x^2-3x-7)$

$6x^3-3x^2-7x+24x^2-12x-28$

$6x^3+21x^2-19x-28$

12. Give the perimeter of the deck shown below.



$2x+4+x+3+10+x+3$

$= 4x+20$

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13. Find the area of the figures

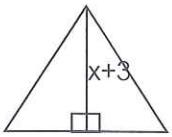
a)

$A = lw$

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

$4x^2+2x+8x+4 = 4x^2+10x+4$

b)



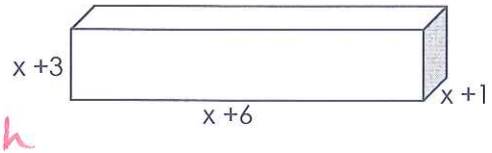
$A = \frac{1}{2}bh$

$A = \frac{1}{2}(2x+6)(x+3)$

$= \frac{1}{2}(2x^2+12x+18)$

$A = x^2+6x+9$

14. Find the volume of the rectangular prism.



$V = lwh$

$V = (x+3)(x+6)(x+1) = (x^2+9x+18)(x+1) = x^3+9x^2+18x+x^2+9x+18$

$= x^3+10x^2+27x+18$

Simplify each radical expression

15. $-3\sqrt{40} =$

$-3\sqrt{4\cdot 10} =$

$2\cdot -3\sqrt{10} = -6\sqrt{10}$

16. $11x\sqrt{120x^5y^6} =$

$11x\sqrt{4\cdot 30\cdot x^4\cdot x\cdot y^6} =$

$2\cdot x^2\cdot y^3\cdot 11x\sqrt{30x} =$

$22x^3y^3\sqrt{30x}$

17. $4ab\sqrt{250a^3b^2} =$

$4ab\sqrt{25\cdot 10\cdot a^2\cdot a\cdot b^2} =$

$5\cdot a\cdot b\cdot 4ab\sqrt{10a} =$

$20a^2b^2\sqrt{10a}$

Add/Subtract

18. $\sqrt{18}-2\sqrt{27}+3\sqrt{3}-6\sqrt{8} =$

$3\sqrt{2}-6\sqrt{3}+3\sqrt{3}-12\sqrt{2} =$

$-9\sqrt{2}-3\sqrt{3}$

19. $4\sqrt{63}-6\sqrt{28}+9\sqrt{5} =$

$12\sqrt{7}-12\sqrt{7}+9\sqrt{5} =$

$9\sqrt{5}$

Multiply

20. $(3m\sqrt{8})^2 =$

$(3m\sqrt{8})(3m\sqrt{8}) =$

$9m^2\cdot 8 =$

$72m^2$

21. $4\sqrt{10}(5\sqrt{2}-\sqrt{8}) =$

$20\sqrt{20}-4\sqrt{80} =$

$40\sqrt{5}-16\sqrt{5} =$

$24\sqrt{5}$

22. $(1+\sqrt{2})(3-\sqrt{2}) =$

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

$1+2\sqrt{2}$

Write an algebraic expression for each.

Write a verbal expression for the algebraic expression $7p - 11q$.

The difference between the product of 7 and p, and the product of 11 and q.

one-third the square of a number

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

. Write an algebraic expression for the sum of five times r and s. $5r+s$

Write an equation to represent "A number divided by six is 102." and solve it.

$\frac{n}{6} = 102 \quad 6 \cdot \frac{n}{6} = 102 \cdot 6 \quad n = 612$

Convert each using dimensional analysis.

26. A helicopter flying at a speed of 120 miles per hour. How fast is it traveling in feet per second?

$\frac{120 \text{ miles}}{1 \text{ hr.}} \cdot \frac{5280 \text{ ft.}}{1 \text{ mile}} \cdot \frac{1 \text{ hr.}}{60 \text{ min.}} \cdot \frac{1 \text{ min.}}{60 \text{ sec.}} = 176 \text{ ft./second}$

27. Bill Gates owns 3850 square kilometers of land. Convert this to square meters.

$\frac{3850 \text{ km}^2}{1} \cdot \frac{1000 \text{ m}^2}{\text{km}^2} = 3{,}850{,}000 \text{ square meters}$

28. How many liters of gasoline are needed to fill a 13.2-gallon tank? There are about 1.06 quarts per 1 liter and 4 quarts to 1 gallon.

$\frac{13.2 \text{ gallons}}{1} \cdot \frac{4 \text{ qts.}}{\text{gallon}} \cdot \frac{1 \text{ liter}}{1.06 \text{ qts.}} = 12.45 \text{ liters}$

29. Shane bikes 5 miles to the park in 30 minutes. What is his average speed in feet per second?.

$\frac{5 \text{ miles}}{30 \text{ min.}} \cdot \frac{5280 \text{ ft.}}{1 \text{ mile}} \cdot \frac{1 \text{ min.}}{60 \text{ sec.}} = 14.67 \text{ ft./second}$