(16)

(5)

## Basic Concepts of Algebra

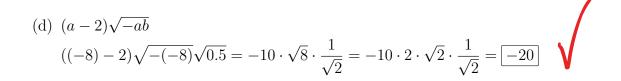
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**Instructions:** Answer all questions to the best of your ability. Show all your work in the space provided for full credit.

- 1. Evaluate each of the following expressions when a = -8 and  $b = \frac{1}{2}$ .
  - (a) ab + 2b + 3a $(-8)(\frac{1}{2}) + 2(\frac{1}{2}) + 3(-8) = -4 + 1 - 24 = \boxed{-27}$



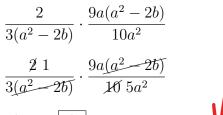
(c) 
$$4(a^2b + b^2a)$$
  
 $4((-8)^2 \cdot (0.5) + (0.5)^2 \cdot (-8)) = 4(32 - 2) = \boxed{120}$ 



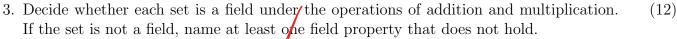
2. Simplify the product as much as possible.

$$\frac{2}{3a^2 - 6b} \cdot \frac{9a^3 - 18ab}{10a^2}$$

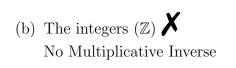
(10)

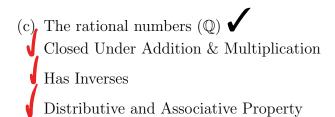


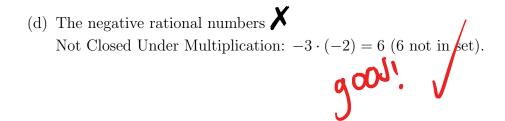
 $\frac{9a}{15a^2} = \boxed{\frac{3}{5a}}$ 



(a) The natural numbers ( $\mathbb{N}$ )  $\boldsymbol{X}$ No Multiplicative Inverse







4. Solve for the variable in each equation.

(a) Find all values of y such that  $\frac{3}{2+\sqrt{y}} + \frac{4}{2+\sqrt{y}} = 1$ .

$$\frac{7}{2 + \sqrt{y}} = 1$$

$$2 + \sqrt{y} = 7$$

$$\sqrt{y} = 5$$

$$y = 25$$

- (b) What values of x satisfy  $\frac{\sqrt{x+1} + \sqrt{x-1}}{\sqrt{x+1} \sqrt{x-1}} = 3$ ?  $\sqrt{x+1} + \sqrt{x-1} = 3\sqrt{x+1} 3\sqrt{x-1}$   $4\sqrt{x-1} = 2\sqrt{x+1}$   $\sqrt{x+1} = 2\sqrt{x-1}$   $\sqrt{x+1} = \sqrt{4}\sqrt{x-1}$  x+1 = 4x-4  $3x = 5; x = \frac{5}{3}$
- 5. (a) Let x be the middle integer of three consecutive integers. What is the sum of these three integers in terms of x?  $(x-1) + x + (x+1) = \boxed{3x}$ 
  - (b) The sum of 23 consecutive integers is 2323. What is the largest of the integers? (Hint: Use the result from the first part.) (x-11) + (x-10) + (x-9)... + x + ...(x+9) + (x+10) + (x+11) = 23x = 2323 2323/23 = 101  $\boxed{x=101}$
- 6. A grocer wants to mix peanuts and cashews to produce 20 lb of mixed nuts worth \$6.20/lb. How many pounds of each kind of nut should she use if peanuts cost \$4.80/lb

and cashews cost \$8.00/lb?

$$4.8x + 8(20 - x) = 20(6.2)$$

$$160 - 3.2x = 124$$

$$3.2x = 36$$

$$16x = 180$$

$$x = \frac{45}{4}$$

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