ra 1: Unit 1, lesson 4 Notes: Solving Multi-Step Equations Name:

outube CheetahvsGazelle: https://www.youtube.com/watch?v=bGKVS1AVVxo

Cheetah that is running 90ft/sec is 120 feet behind a Gazelle that is running 60ft/sec. How long will it ta the Cheetah to catch up to the Gazelle?

time

What do we know/What do we need to find?

- CHEETAHS RUN FAST -
  - 3 STRIDES / SECOND
  - 70 mph
  - DONT NEED TO RUN THAT FAST FOR THAT LONG BECAUSE THEY ARE FASTER THAN THEIR PREY

Picture:

90ft/sec Cheetah

60 ft/sec Gazelle

120ft

$D = r \cdot t$

EQUATION:

distance cheetah can travel: $90c$ = distance gazelle can travel: $60c$ + gazelle's head start: 120

THEY ARE EQUAL WHEN THEY MEET

Work and Solution:

$90c = 60c + 120$

$-60c \quad -60c$

$\frac{30c}{30} = \frac{120}{30}$

$c = 4$ seconds

Find the solution to the equation; show and justify each step using properties, then check your solution.

1. $37 = 9 - 2x$

$-9 \quad -9$

$\frac{28}{-2} = \frac{-2x}{-2}$

$-14 = x$

Property

SUBTRACTION PROPERTY OF EQUALITY.

DIVISION PROPERTY OF EQUALITY

Check:

$37 = 9 - 2(-14)$

$= 9 + 28$

$37 = 37$ ✓

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2. $5x = 26 - 8x$

$+8x \quad +8x$

$\frac{13x}{13} = \frac{26}{13}$

$x = 2$

Property

Addition Property of Equality

Division Property of Equality

Check:

$5(2) = 26 - 8(2)$

$10 = 26 - 16$

$10 = 10$ ✓

3. $\frac{4n-30}{3} = 2n \cdot 3$

$4n - 30 = 6n$ > getting all n's together ✓

$-4n \quad -4n$

$-30 = 2n$

$\frac{-30}{2} = \frac{2n}{2}$

$n = -15$

Property

Multiplication Property of Equality

Subtraction Property of Equality

Division Property of Equality

Check:

$\frac{4(-15)-30}{3} = 2(-15)$

$\frac{-60-30}{3} = -30$

$\frac{-90}{3} = -30$

$-30 = -30$ ✓

4. $\frac{1}{4}(12 - 8x) = 5 + 2x$

$\frac{12}{4} - \frac{8x}{4}$

$3 - 2x = 5 + 2x$

$+2x \quad +2x$

$3 = 5 + 4x$

$-5 \quad -5$

$-2 = 4x$

$\frac{-2}{4} = \frac{4x}{4}$

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

Property

Distributive Property

Addition Property of Equality

Subtraction Property of Equality

Division Property of Equality

Check:

$\frac{1}{4}(12 - 8(-\frac{1}{2})) = 5 + 2(-\frac{1}{2})$

$\frac{1}{4}(12 + 4) = 5 + -1$

$\frac{1}{4}(16) = 5 - 1$

$4 = 4$ ✓

Notes 1.4

5. $5(1-x) = -2(2x-4)$

$5 - 5x = -4x + 8$

$+5x \quad +5x$

$5 = x + 8$

$-8 \quad -8$

$-3 = x$

Property

Distributing Property of Equality

Addition Property of Equality

Subtraction Property of Equality

Check:

$5(1--3) = -2(2 \cdot -3 - 4)$

$5(1+3) = -2(-6-4)$

$5(4) = -2(-10)$

$20 = 20$ ✓

Problems 1-5 all had one solution. Could an equation have no solution? Could it have more than one solution? What would this look like? (WE WILL FINISH ON WED, 9/4.)

6. $3(1-x)+5x = 2(x+1)$

7. $\frac{1}{3}(12x-21) = 4x-7$

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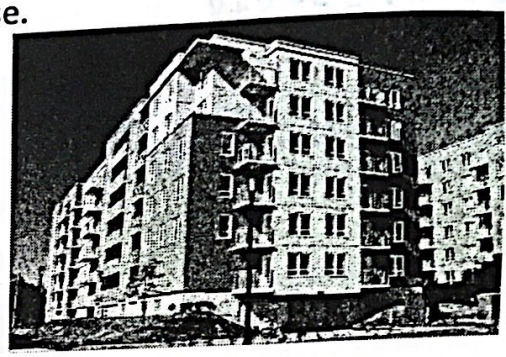
Colleen is going away to college and has two different living options. The apartments off campus are $600 a month with a $1,500 one time deposit. The on campus apartments are $850 a month with no deposit. After how many months would the cost of living be the same? Identify units please.



months

OFF CAMPUS = ON CAMPUS

no deposit

$600m + 1500 = 850m$

$-600m \quad\quad -600m$

$\frac{1500}{150} = \frac{150m}{150}$

$10 = m$

months

If she only lives there for 8 months where should she live? How much money will she save living in one apartment over another in 8 months?

$m = 8$

She will save $500

Off campus =

$= 600(8) + 1500$

$= 4800 + 1500$

$= \$6300$

On Campus

$= 850(8)$

$= \$6800$

Ticket out the Door

A Cheetah can run at top speed for only about 20 seconds. If a Gazelle is too far away for the Cheetah to catch in 20 seconds, the Gazelle is probably safe. Your friend claims the Gazelle will not be safe if the Cheetah starts running 650 feet behind the Gazelle. Is your friend correct? Explain. Show work. (Remember Cheetah runs 90ft/sec and Gazelle run 60ft/sec.)