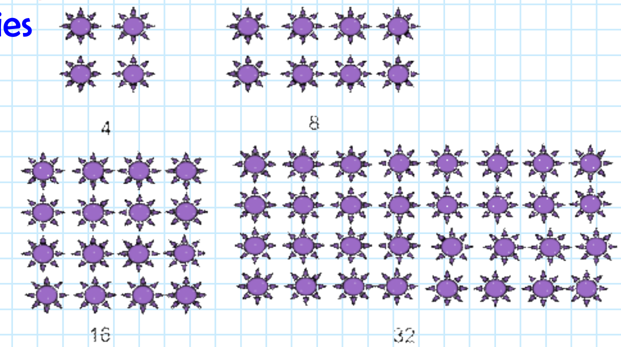
Thursday, Nov. 30th

Plan For Today:

1. Any questions from 9.3?
2. Finish 9.3 practice and word problems.
   - Do 9.3 Check-in Quiz
   - Finish working on project and practice questions
3. Start Topic 10: Geometric Sequences & Series
   - **10.1 Geometric Sequences**
   - **10.2 Geometric Series**
   - 10.3 Infinite Geometric Series
   - 10.4 Sigma Notation
4. Work on Practice Questions



Plan Going Forward:

- **CH9 PROJECT DUE TUESDAY, DEC. 5TH**
- **CH9 TEST ON TUESDAY, DEC. 5TH**

1. Finish going through 10.1 practice questions handout and extra review pages.

   - **10.1-10.2 CHECK-IN QUIZ ON TUESDAY, DEC. 5TH**

   - **TOPIC10 PROJECT DUE TUESDAY, DEC. 12TH**
   - **UNIT 4 EXAM ON THURSDAY, DEC. 14TH**
     - **REWRITE UNIT 4 EXAM ON TUESDAY, DEC. 19TH (LAST DAY)**

2. We will continue Topic 10 (Geometric Sequences & Series) next Tuesday.

Please let me know if you have any questions or concerns about your progress in this course. The notes from today will be posted at anurita.weebly.com after class. Anurita Dhiman = adhiman@sd35.bc.ca

Thursday, Nov. 30th In-Class Notes

p.319
3

b) $\dfrac{x^2-4}{x^2-1}=\dfrac{x}{x+3}$

$(x^2-4)(x+3) = x(x^2-1)$

FOIL

$\cancel{x^3}+3x^2-4x-12 = x^3-x$

$-\cancel{x^3} \quad +x$

GCF $\quad 3x^2-3x-12=0$

$3(x^2-x-4)=0$

$x=\dfrac{-(-1)\pm\sqrt{(-1)^2-4(1)(-4)}}{2(1)}$

R

$(x+1)(x-1)(x+3)$

$x\neq\pm1,\ x\neq-3$

$$\boxed{x=\dfrac{1\pm\sqrt{17}}{2}}$$

LCD

$(x+1)(x-1)(x+3)\left[\dfrac{x^2-4}{\cancel{(x+1)(x-1)}}=\dfrac{x}{\cancel{x+3}}\right]$

$(x^2-4)(x+3) = x(x+1)(x-1)$

(x^2-1)

Recall: $\sqrt{32}$

$2\cdot16$

$4\sqrt{2}$

Review Solving Rationals and Do Word Problems

Solve a Problem Using a Rational Equation

In basketball, a player's free-throw percentage is given by dividing the total number of successful free-throw baskets by the total number of attempts. So far this year, Larry has attempted 19 free-throws and has been successful on 12 of them. If he is successful on every attempt from now on, how many more free-throws does he need to attempt before his free-throw percentage is 80%?

Solution

Let x represent the number of free-throws Larry takes from now on.

Let P represent Larry's new free-throw percentage, as a decimal.

$$P = \frac{\text{successes}}{\text{attempts}}$$

$$P = \frac{12 + x}{19 + x}$$

Why is x used in both the numerator and the denominator?

Since the number of free-throws is discrete data, the continuous model is only valid in the domain $\{x \mid x \in W\}$.

Determine the value of x when P is 80%, or 0.8. Substitute 0.8 for P and solve the resulting equation.

$$P = \frac{12 + x}{19 + x}$$

$$0.8 = \frac{12 + x}{19 + x}$$

Multiply both sides of the equation by $19 + x$:

$$0.8 = \frac{12 + x}{19 + x}$$

$$0.8(19 + x) = \frac{12 + x}{\cancel{19 + x}_{1}}(\cancel{19 + x})$$

$$15.2 + 0.8x = 12 + x$$

$$3.2 = 0.2x$$

$$x = 16$$

Is there a non-permissible value of x for this situation? Explain.

Larry will have a free-throw percentage of 80% after 16 more free-throw attempts if he is successful on all of them.

Your Turn

Megan and her friends are organizing a fundraiser for the local children's hospital. They are asking local businesses to each donate a door prize. So far, they have asked nine businesses, but only one has donated a prize. Their goal was to have three quarters of the businesses donate. If they succeed in getting every business to donate a prize from now on, how many more businesses do they need to ask to reach their goal?

$$\frac{1 + x}{9 + x} = \frac{3}{4}$$

$$4(1 + x) = 3(9 + x)$$

$$4 + 4x = 27 + 3x$$

$$-3x \qquad -4$$

$$\boxed{x = 23}$$

$x \neq -9$

$x \geq 0$

* applications

Next 

$D = ST$

$S = \frac{D}{T}$

$\boxed{T = \frac{D}{S}}$

p.320

5. Amber and Matteo are travelling separately from their home in Calgary to a wedding 400 km away. Amber leaves 1 h earlier than Matteo, but Matteo drives at an average speed 20 km/h faster than Amber. If they arrive at the wedding at the exact same time, what was the average speed at which each of them travelled?

a) Let x represent the time it takes Amber to travel to the wedding. Write an expression for the average speed that each person travels.

b) Write and solve an equation that represents the difference in their average speeds.

$t = \frac{d}{s}$ or $t = \frac{d}{v}$

speed or velocity

$A_t - 1 = M_t$

$x(x+20)\left[\frac{400}{\cancel{x}} - 1 = \frac{400}{\cancel{x+20}}\right]$

$x > 0$

$400(x+20) - x(x+20) = 400x$

$400x + 8000 - x^2 - 20x - 400x = 0$

$-x^2 - 20x + 8000 = 0$

$-(x^2 + 20x - 8000) = 0$

$-(x+100)(x-80) = 0$

$x \neq -100$ $\quad$ $x = 80$ km/hrs.

$\boxed{\begin{array}{l} A = 80 \text{ km/hrs} \\ M = 100 \text{ km/hr.} \end{array}}$

4. Bronwyn rides her electric bicycle 10 km/h faster than Aaron. Bronwyn can travel 60 km in the same time that it takes Aaron to travel 40 km. Determine Bronwyn's average speed and Aaron's average speed.
An equation that represents this situation is: $\frac{60}{s+10} = \frac{40}{s}$, where s is Aaron's average speed in kilometres per hour.
Solve the equation to solve the problem.

Non-permissible values: $s = -10$ and $s = 0$
Common denominator: $s(s + 10)$

$$\frac{60}{s+10} = \frac{40}{s}, s > 0$$
$$\cancel{s}\cancel{(s+10)}\left(\frac{60}{\cancel{s+10}}\right) = \cancel{s}(s+10)\left(\frac{40}{\cancel{s}}\right)$$
$$60s = 40s + 400$$
$$20s = 400$$
$$s = 20$$

Aaron's average speed is 20 km/h.
Bronwyn's average speed is (20 + 10) km/h, or 30 km/h.

8. A boat travels 4 km upstream in the same time that it takes the boat to travel 10 km downstream. The average speed of the current is 3 km/h. What is the average speed of the boat in still water?

Let the average speed of the boat in still water be s kilometres per hour.
Average speed downstream: $(s + 3)$ km/h
Distance downstream: 10 km
Time downstream: $\frac{10}{s+3}$ hours
Average speed upstream: $(s - 3)$ km/h
Distance upstream: 4 km
Time upstream: $\frac{4}{s-3}$ hours
It takes the same time to travel upstream as it does to travel downstream.
So, an equation is: $\frac{10}{s+3} = \frac{4}{s-3}, s > 3$
$s = 3$ and $s = -3$ are non-permissible values.
A common denominator is: $(s + 3)(s - 3)$

$$\cancel{(s+3)}(s-3)\left(\frac{10}{\cancel{s+3}}\right) = (s+3)\cancel{(s-3)}\left(\frac{4}{\cancel{s-3}}\right)$$
$$10s - 30 = 4s + 12$$
$$6s = 42$$
$$s = 7$$

The average speed of the boat in still water is 7 km/h.

11. The average speed of an airplane is 10 times that of a car. It takes the airplane 18 h less than the car to travel 1000 km. Determine the average speeds of the airplane and the car.

The average speed of the car is 50 km/h and the average speed of the airplane is 10(50 km/h), or 500 km/h.

t_c $\quad$ t_p

$$\frac{1000}{x} - \frac{1000}{10x} = 18$$

OR $10x\left[\frac{1000}{x} - 18 = \frac{1000}{10x}\right]$

$$10000 - 180x = 1000$$
$$-10000$$
$$-180x = -9000$$
$$\div -180 \quad \div -180$$
$$x = 50 \text{ km/hr} \quad \text{Car.}$$
$$10x = 50 \times 10$$
$$\rightarrow 500 \text{ km/hr} \quad \text{Plane.}$$