



St. Andre Students' Council is travelling from Knoxtown to Harperville for the Students' Council National Conference. From the travel budget allowed for the trip, the St. Andre Students' Council has two options. They can leave tonight by bus, or they can save three hours by leaving tomorrow morning and using the express train which travels 25 km/hr faster than the bus.

If the distance between Knoxtown and Harperville is 1500 km, determine how long it would take to travel by express train.

Complete Assignment Questions #1 - #11

Assignment

1. Evan drove 308 km in the same time that Meghan drove 329 km. If Meghan drove on average 6 km/h faster than Evan, calculate her average speed and the time taken for the journey.

	d	s	t
Evan	308	x	$\frac{308}{x}$
Meg	329	x + 6	$\frac{329}{x+6}$

$$s = \frac{d}{t} \quad t = \frac{d}{s}$$

$$\frac{308}{x} = \frac{329}{x+6}$$

$$\begin{aligned} 308x + 1848 &= 329x \\ 1848 &= 21x \\ 188 &= x \end{aligned}$$

→ 3.5 hrs., speed = 94 km/hr

2. Erin Airlines has a fleet of airplanes whose average speed is 4 times the average speed of the Derailer passenger train. A Derailer train requires 12 hours more than an Erin airplane to travel a distance of 2000km. Calculate the average speed of each mode of transport.

	d	s	t
Erin Airplane	2000	4x	$\frac{2000}{4x}$
Train	2000	x	$\frac{2000}{x}$

$t_{\text{train}} - 12 \text{ hrs} = t_{\text{plane}}$
 $\frac{2000}{x} - 12 = \frac{2000}{4x}$
 $\frac{8000}{x} - 48x = \frac{2000}{x}$
 $8000 - 48x^2 = 2000$
 $-48x^2 = -6000$
 $x^2 = 125$
 $x = 125 \text{ km/hr}$
 $x = -125$
 train = 125 km/hr.
 plane = 500 km/hr.

3. On average, Exante Express trains are 50 km/hr faster than Paral passenger trains. A Paral train requires 60% more time than an Exante train to travel 1800 km from Matsay to Rawindi.

a) Calculate the average speed of each train.

b) Calculate the time it takes each train for the journey.

4. Two consecutive even whole numbers are selected. The difference between the reciprocals of the two numbers is $\frac{1}{60}$. Determine the numbers.

$$\frac{1}{60} - \frac{1}{x} = \frac{1}{x+2} + \frac{1}{x}$$

$$\frac{1}{x} - \frac{1}{x+2} = \frac{1}{60}$$

$$60(x+2) - 60x = x^2$$

$$60x + 120 - 60x = x^2$$

$$0 = x^2 - 120$$

$$(x+12)(x-10)$$

$$x = 10$$

$$x+2 = 12$$

$(60x) \frac{1}{x+2} - \frac{1}{x} = \frac{1}{60}$
 $\frac{60x}{x+2} - \frac{1}{x} = \frac{1}{60}$
 $60x^2 - 60x - 120 = x^2 + 2x$
 $0 = x^2 + 2x - 120$
 $(x+12)(x-10)$
 $x = 10$
 $x+2 = 12$

5. Al and Bob, who live in North Vancouver, are Seattle Mariners fans. They regularly drive the 264 km from their home to the ballpark in Seattle. On one particular day, Bob drove to the game. On the return journey Al was able to increase their average speed by 10% and save 18 minutes on the travelling time.

a) Calculate the average speed at which Bob drove to the game.

Al's time + 18 = Bob

	d	s	t
Bob	264	x	$\frac{264}{x}$
Al	264	1.1x	$\frac{264}{1.1x}$

$$\frac{264}{x} - 0.3 = \frac{264}{1.1x}$$

$$290.4 - 0.33x = 264$$

$$-0.33x = -26.4$$

$$x = 80$$

Bob = 80 km/hr.

b) Calculate the time it took Al to drive back from the game.

$$\frac{264}{1.1(80)} = 3 \text{ hrs}$$

6. To prevent grounding, a cruise ship anchors 18 km away from a river port. To transport the passengers to the port, the crew uses smaller boats. The smaller boats travel 12 km downstream the same time it takes them to travel 8 km upstream.

a) If the speed of the current is 6 km/hr, write expressions for the speed of the boat travelling upstream and travelling downstream.

b) Calculate the time it takes for the small boats to travel upstream from the cruise ship to the port.

	d	s	t
upstream			
downstream			

7. Part of a student's midterm Mathematics report card is shown. Before her mother could analyze the report, she spilled some coffee over it and could not read one of the figures.

Quiz	Actual Mark	Total Possible Mark
Polynomials	21	30
Factoring	38	50
Radicals	15	40
Exponents	29	40

The student's mother asked her if she could calculate the mark possible for the quiz on radicals. Show how she could calculate the possible mark for the radical quiz if the quizzes are equally weighted.

Average mark for quizzes is 64%

$$\frac{15}{x} = 0.375$$

$$\frac{15}{0.375} = x$$

$$x = 40$$

$\frac{15}{40}$ on radicals

$$\frac{\frac{21}{30} + \frac{38}{50} + \frac{15}{x} + \frac{29}{40}}{4} = \frac{64}{100}$$

$$\frac{\frac{21}{30} + \frac{38}{50} + \frac{15}{x} + 0.725}{4} = 0.64$$

$$0.70 + 0.76 + \frac{15}{x} + 0.725 = 2.56$$

8. A rectangular flower bed at a garden centre has an area of 144 m^2 . During a redesign of the garden centre, the dimensions of the rectangular flower bed are altered but the area is unchanged. The width is doubled and the length is decreased by 12 m . Calculate the dimensions of the redesigned flower bed.

$$144 = xy \quad y = \frac{144}{x}$$

$$144 = 2x(y-12)$$

$$144 = 2x\left(\frac{144}{x} - 12\right)$$

$$144 = 288 - 24x$$

$$-144 = -24x$$

$$6 = x$$

$A = 144$
 y

$\frac{144}{6} = 24$

$2x$ | 144 |
 $y-12$ | $24-12$ |
 width = 12
 length = 12

9. A plane flew from Victoria to Calgary, a flying distance of 1260 km . On the return journey, due to a strong head wind, the average flying speed was 90 km/hr slower than on the outward journey. The time taken for the return journey was 20 minutes more than for the outward journey.

- a) Calculate the time taken for the journey from Victoria to Calgary.
 b) Calculate the average speed of the journey from Calgary to Victoria.

	d	s	t
V → C	1260	x	$\frac{1260}{x}$
C → V	1260	x-90	$\frac{1260}{x-90}$

$+20$

$$\frac{1260}{x} + \frac{20}{60} = \frac{1260}{x-90}$$

Use the following information to answer questions 10 and 11.

Kelcie drove from Edmonton Airport to downtown Calgary, a distance of 340 km, in the same time that Nick drove from Calgary Airport to downtown Edmonton, a distance of 360 km. Nick's average speed was 6 km/h faster than Kelcie's average speed.

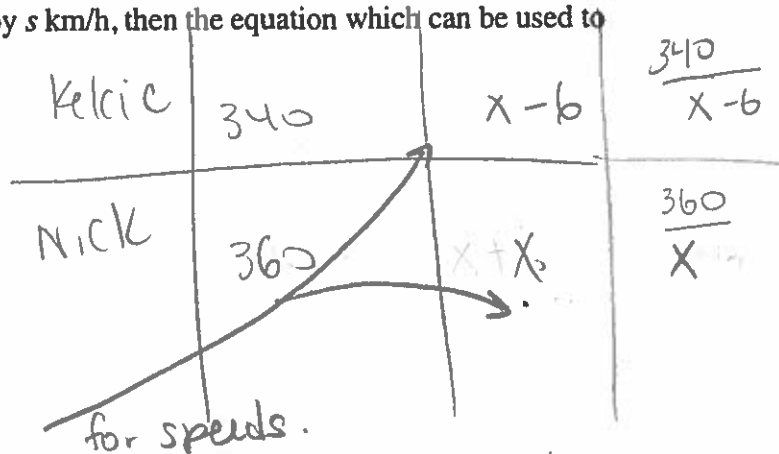
$$t = \frac{d}{s}$$

Multiple Choice 10.

If Nick's average speed is denoted by s km/h, then the equation which can be used to determine the value of s is

- A. $\frac{340}{s} = \frac{360}{s-6}$
- B. $\frac{340}{s} = \frac{360}{s+6}$
- C. $\frac{340}{s-6} = \frac{360}{s}$
- D. $\frac{340}{s+6} = \frac{360}{s}$

	d	s	t
Kelcie	340	x	$\frac{340}{x}$
Nick	360	$x+6$	$\frac{360}{x+6}$



not an option so could also use for speeds.

Numerical Response 11.

The number of minutes taken for each journey, to the nearest minute, is _____.

(Record your answer in the numerical response box from left to right.)

2	0	0	
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$$\frac{340x}{x-6} = \frac{360(x-6)}{x}$$

$$340x + 2040 = 360x - 2160$$

$$-20x = -2160$$

$$x = 108$$

$$\text{time} = \frac{360}{x}$$

$$= \frac{360}{108}$$

$$= 3.3333 \text{ hours}$$

$$3 \text{ hrs} = 180 \text{ mins}$$

$$0.3333 \text{ of } 60 \text{ mins} = 20 \text{ mins}$$

Answer Key

- 1. 94 km/hr, and 3.5 hours
- 2. Erin airplane 500 km/h, Derailer train 125 km/h
- 3. a) Paral $83\frac{1}{3}$ km/hr; Exante $133\frac{1}{3}$ km/hr.
b) Paral 21 hours 36 minutes; Exante 13 hours 30 minutes
- 4. 10, 12
- 5. a) 80 km/hr b) 3 hours
- 6. a) $s - 6$ km/h, $s + 6$ km/h b) 45 minutes
- 7. 40
- 8. 12m x 12m
- 9. a) 2 hours b) 540 km/hr

10.C

11.

2	0	0	
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