

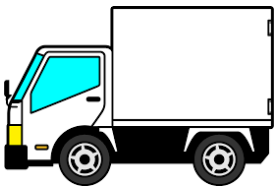
PART A

1. A new motorcycle is priced at \$5380. After 9 years, its value has depreciated to \$376.
 - a) Express the value of the motorcycle as a linear function of the number of years since it was new.
 - b) Interpret the slope and y-intercept.
 - c) What was the value of the motorcycle 3 years after it was new?



2. Tarek bought a hockey card that has appreciated yearly. After 3 years it was worth \$284. After 7 years it was worth \$596.
 - a) Assuming the growth in value was linear, determine the original price of the hockey card and how much its value increases each year.
 - b) Write an equation to model the value of the card after t years.
 - c) Use the equation to determine the value of the card after 15 years.

3. A furniture store charges a fee on all items delivered from the store to the customer. The delivery fee y is computed by a linear equation $y = mx + b$, where x denotes the amount of the purchase. Find the equation the furniture store might use to compute the fee if the store charges \$37.50 to deliver a purchase of \$525 and charges \$54.60 to deliver an \$810 purchase.



4. Kamal bought a gym membership at a local gym. He has to pay a monthly membership fee, plus a set amount for each time he visits. If he goes 15 times in one month his total cost will be \$310. If he goes 24 times in one month his total cost will be \$472.
 - a) Determine the monthly fee and the cost per visit.
 - b) Write an equation to model the monthly cost based on the number of visits.
 - c) Use the equation to determine the cost if he visits the gym 35 times in one month.
 - d) If his monthly cost for December was \$184, use the equation to determine how many times he visited the gym.



5. A college has included its fixed room and board fees for first-year students into its total cost schedule. In a brochure, they list typical costs for tuition and room and board for a semester. The tuition cost for each credit is constant.
 - a) Determine the equation relating total cost and number of credits.
 - b) Interpret the slope and y-intercept.

Credits	Total Cost
12	\$4 810
15	\$5 350
18	\$5 890



6. Halla's family is renting a cottage for a summer vacation. The price includes a fixed fee for the rental plus a daily amount per day. A 14 day rental costs \$2850. A 7 day rental costs \$1625. Create a mathematical model and use it to determine how much a 10 day rental would cost.

PART B

7. A fitness club offers two different types of monthly memberships. Membership A charges \$4 per visit. Membership B charges a flat fee of \$12 per month, plus \$2 per visit.

- Write an equation to model the monthly cost of n visits for each Membership.
- Use your equations to help you determine the conditions under which Membership A is a better choice (ie. cheaper), and the conditions under which Membership B is a better choice.

8. In Earth's atmosphere the speed of sound is approximately 331 m/s at 0°C and approximately 343 m/s at 20°C . Clayton yells out "Hello" in a canyon when the air temperature is -10°C . If it takes 1.4s to hear his echo, how far away is the wall of the canyon?



9. The faster a kangaroo hops, the longer the distance of the hop. Moving at less than 7 km/hour, a kangaroo uses all four feet and its tail. At greater speeds, it hops on its two hind legs. When hopping, the length of stride can be modelled as a function of speed. At 7 km/h, the stride length is about 1 m. The length increases approximately 0.1 m for each increase of 1 km/h in speed.



- What is the stride length for a speed of 10 km/h?
- Write the equation of this line.
- While hiking in the bush, you spot fresh kangaroo tracks. The distance between prints is 2.1 m. About how fast was the kangaroo going?
- If the tracks are 10 minutes old and it has continued hopping at this speed, how far away is the kangaroo now?

ANSWERS:

- a) $y = -556x + 5380$ b) slope: amount it depreciates y-int: price when new c) \$3712
- a) initial \$50, \$78/year b) $V = 78t + 50$ c) \$1220
- a) $y = 0.06x + 6$
- a) \$40 monthly fee, \$18 per visit b) $C = 18x + 40$ c) \$670 d) 8 visits
- a) $y = 180x + 2650$ b) slope: \$180 for each credit y-int: \$2650 is the fixed cost of room and board.
- a) $C = 175d + 400$, \$2150
- a) $C = 4n$, $C = 2n + 12$ b) For 6 visits they cost the same, A is cheaper for less than 6 visits, B is cheaper for more than 6 visits.
- a) 227.5m
- a) 1.3m b) $y = 0.1x + 0.3$ c) 18km/h d) 3km