

8.1 Foundations of Math II

P. 458 #1-11, 13

1. a) store A: $\frac{\$68}{8 \text{ kg}} = \8.50 per kg

store B: $\frac{\$88.20}{12 \text{ kg}} = \$7.35 \text{ per kg} \leftarrow \text{Lower rate}$

b) station A: $\frac{\$41.36}{44 \text{ L}} = \$0.94 \text{ per L} \leftarrow \text{Lower rate}$

station B: $\frac{\$31.36}{32 \text{ L}} = \0.98 per L

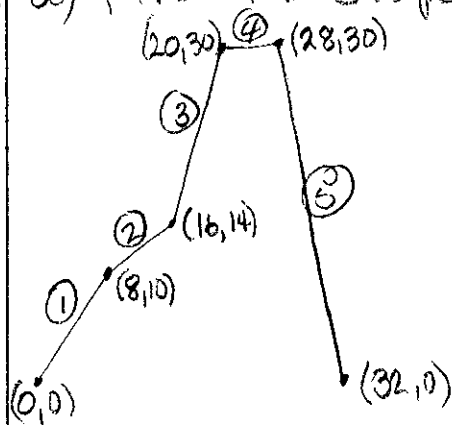
2. a) tank A: $4 \text{ h } 15 \text{ min} = 4 \cdot 60 + 15 = 255 \text{ min}$
 $\frac{300 \text{ L}}{255 \text{ min}} = 1.176 \text{ L/min} \leftarrow \text{greater rate}$

tank B: $2 \text{ h } 10 \text{ min} = 2 \cdot 60 + 10 = 130 \text{ min}$
 $\frac{150 \text{ L}}{130 \text{ min}} = 1.154 \text{ L/min}$

b) person A: $1 \text{ min } 15 \text{ s} = 60 + 15 = 75 \text{ sec}$
 $\frac{400 \text{ m}}{75 \text{ sec}} = 5.333 \text{ m/sec} \leftarrow \text{greater rate}$

person B: $5 \text{ min } 20 \text{ s} = 5 \cdot 60 + 20 = 320 \text{ sec}$
 $1 \text{ km} = 1000 \text{ m}$
 $\frac{1000 \text{ m}}{320 \text{ sec}} = 3.125 \text{ m/sec}$

3. a) find the slope of each line segment: $\text{slope} = \frac{\text{rise}}{\text{run}}$



① slope = $\frac{10-0}{8-0} = \frac{10}{8} = \frac{5}{4}$

② slope = $\frac{14-10}{16-8} = \frac{4}{8} = \frac{1}{2}$

③ slope = $\frac{30-14}{20-16} = \frac{16}{4} = 4$

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next
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3. a) cont.

$$\textcircled{4} \text{ slope} = \frac{30-30}{28-20} = \frac{0}{8} = 0$$

$$\textcircled{5} \text{ slope} = \frac{0-30}{32-28} = \frac{-30}{4} = -\frac{15}{2}$$

To compare the slopes you need a common denominator or change them to a decimal

$$\textcircled{1} \frac{5}{4} = 1.25$$

$$\textcircled{2} \frac{1}{2} = 0.5$$

$$\textcircled{3} 4$$

$$\textcircled{4} 0$$

$$\textcircled{5} \frac{-15}{2} = -7.5$$

The slowest interval is $\textcircled{4}$ 20-28 sec.

The fastest interval is $\textcircled{3}$ 28-32 sec.

b) It starts to return to its start when the slope goes negative; at 28 sec. It arrives when the distance is 0; at 32 sec.

c) On this graph a zero slope means that the distance stays the same so the speed is zero.

$$4. \text{ a) } 1\text{L} = 1000\text{ml} \quad \frac{\$1.75}{1000\text{ml}} = \$0.00175 \text{ per ml.}$$

$$15 \cdot 200 = 3000\text{ml} \quad \frac{\$4.99}{3000\text{ml}} = \$0.00166 \text{ per ml.}$$

b) Lower cost is the 15 boxes.

$$5. \quad \frac{\$20.09}{925\text{ml}} = \$0.0217 \text{ per ml}$$

$$\frac{\$52.99}{354\text{L}} = \frac{\$52.99}{3540} = \$0.0150 \text{ per ml} \leftarrow \text{Lower cost}$$

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6. aerobics: $\frac{140 \text{ cal}}{20 \text{ min}} = 7 \text{ cal/min}$

hockey: $\frac{720 \text{ cal}}{1.5 \text{ hr}} = \frac{720 \text{ cal}}{1.5(60) \text{ min}} = \frac{720 \text{ cal}}{90 \text{ min}} = 8 \text{ cal/min}$

7. a) $\$3.61/\text{kg}$ ← lower rate

$$\frac{\$17.40}{10 \text{ lb}} \cdot \frac{2.2 \text{ lb}}{1 \text{ kg}} = \frac{\$37.22}{10 \text{ kg}} = \$3.72/\text{kg}$$

b) 5 mi/hr ← lower rate

$$\frac{2 \text{ km}}{10 \text{ min}} \cdot \frac{1 \text{ mi}}{1.6 \text{ km}} = \frac{2 \text{ mi}}{16 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = \frac{120 \text{ mi}}{16 \text{ hr}} = 7.5 \text{ mi/hr}$$

c) $\frac{10.6 \text{ L}}{100 \text{ km}} = \frac{0.106 \text{ L}}{1 \text{ km}}$

$\frac{35.1 \text{ L}}{450 \text{ km}} = \frac{0.078 \text{ L}}{1 \text{ km}}$ ← lower rate

lower rate

d) 30 m/s

$$\frac{100 \text{ km}}{1 \text{ hr}} = \frac{100 \cdot 1000 \text{ m}}{1 \text{ hr}} = \frac{100000 \text{ m}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \cdot 60 \text{ sec}} = \frac{100000 \text{ m}}{3600 \text{ s}} = 27.8 \text{ m/sec}$$

8. Co-op: $\frac{\$21.30}{25 \text{ lb}} = \$0.85/\text{lb}$

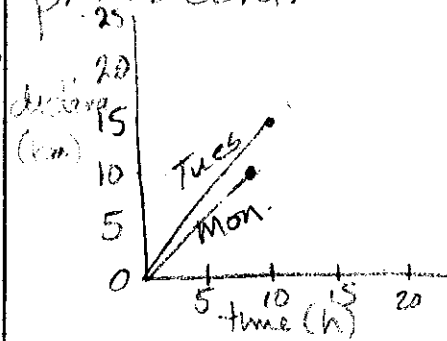
petstore: $\frac{\$24.69}{18 \text{ kg}} \cdot \frac{1 \text{ kg}}{2.2 \text{ lb}} = \frac{\$24.69}{39.60} = \$0.62/\text{lb}$ ← lower cost

9. telephone company: $\frac{4¢}{1 \text{ min}} \cdot 50 \text{ min} = 200¢ = \$2.$
↑ (cheaper)

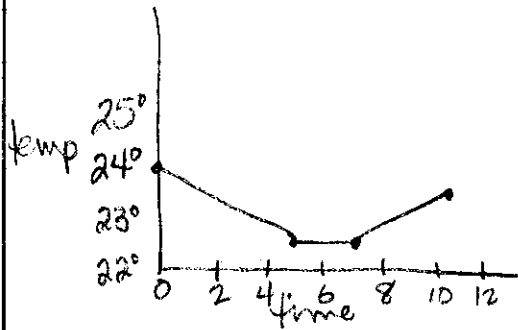
Internet: $\$19.95 + 50(1.5¢)(12 \text{ mon}) = \$19.95 + (75¢)(12)$
 $= \$19.95 + \$75(12)$
 $= \$19.95 + \$9 = \$28.95$

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10.



11.



13. a) represents a steady rise and gets deep quickly
graduated cylinder
- b) fills more slowly at first (wide bottom) and
then more quickly (narrow top)
flask
- c) steady rise but not too quick - so wider than
beaker
- d) starts filling quickly but the depth slows so
top is wider than bottom
drinking glass