EDT Mini-Test Solutions

Part 1 – Algebra and Arithmetic

1. (a) Express the following as a fraction:

$$\frac{1}{6}\div\frac{2}{3}+\frac{4}{3}\times\frac{3}{8}$$

$$=\frac{1}{6}\times\frac{3}{2}+\frac{4}{3}\times\frac{3}{8}$$

$$=\frac{3}{12}+\frac{12}{24}$$

$$=\frac{6}{24}+\frac{12}{24}$$

$$=\frac{18}{24}=\frac{3}{4}$$

(b) Express the answer from (a) as a decimal.

$$\frac{3}{4}=0.75$$

2. Simplify the following:

(a) $\log_2 4+\log_2 8-\log_3 9$

$=\log_2(2^2)+\log_2(2^3)-\log_3(3^2)$

$=2+3-2$

$=3$

(b) $\sqrt{27}\left(\sqrt{3}+\sqrt{18}\right)$

$=\sqrt{3\cdot 9}\left(\sqrt{3}+\sqrt{3\cdot 6}\right)$

$=\sqrt{3}\sqrt{9}\left(\sqrt{3}+\sqrt{3}\sqrt{6}\right)$

$=3\sqrt{3}\left(\sqrt{3}+\sqrt{3}\sqrt{6}\right)$

$=3\sqrt{3}\sqrt{3}+3\sqrt{3}\sqrt{3}\sqrt{6}$

$=3\sqrt{3\cdot 3}+3\sqrt{3\cdot 3}\sqrt{6}$

$=3\sqrt{9}+3\sqrt{9}\sqrt{6}$

$=9+9\sqrt{6}$

3. Solve for x if $7-8x<2x-3$

$$-8x-2x<-3-7$$

$$-10x<-10$$

$$x>1$$

4. Evaluate $\sum_{i=2}^{4} i^2+5i-6$

$i=2;\quad 2^2+5(2)-6=8$

$i=3;\quad 3^2+5(3)-6=18$

$i=4;\quad 4^2+5(4)-6=30$

$$=56$$

5. (a) Find the equation of the line which passes through the points (3, 4) and (-2, -6)

Equation of a line: $y=mx+b$

$$m=\frac{y_1-y_2}{x_1-x_2}=\frac{4-(-6)}{3-(-2)}=\frac{10}{5}=2$$

$$b=y_1-mx_1=4-2(3)=-2$$

$$\therefore y=2x-2$$

(b) What are the x-intercept, y-intercept and slope of the line in (a)?

$x_{\text{int}}:\quad y=0\rightarrow 0=2x_{\text{int}}-2$

$$-2x_{\text{int}}=-2$$

$$x_{\text{int}}=1$$

$y_{\text{int}}:\quad x=0\rightarrow y_{\text{int}}=-2$

$$m=\frac{y_1-y_2}{x_1-x_2}=\frac{4-(-6)}{3-(-2)}=\frac{10}{5}=2$$

6. What are the solutions to $3x+x^2=-2$

$$x^2+3x+2=0$$

$$(x+1)(x+2)=0$$

$$(x+1)=0 \quad or \quad (x+2)=0$$

$$x=-1 \quad \& \quad x=-2$$

7. In 4 years, Jennifer will be half the age her father was 7 years ago. If Jennifer's father was 27 years old when she was born, how old are father and daughter?

   Let x be Jennifer's age and let y be her father's age.

   $$\therefore x + 4 = \frac{y - 7}{2}; \qquad x + 27 = y$$

   $$\Rightarrow 2x + 8 = y - 7$$

   $$\Rightarrow 2x + 8 = (x + 27) - 7$$

   $$\Rightarrow 2x + 8 = x + 20$$

   $$\Rightarrow x = 12$$

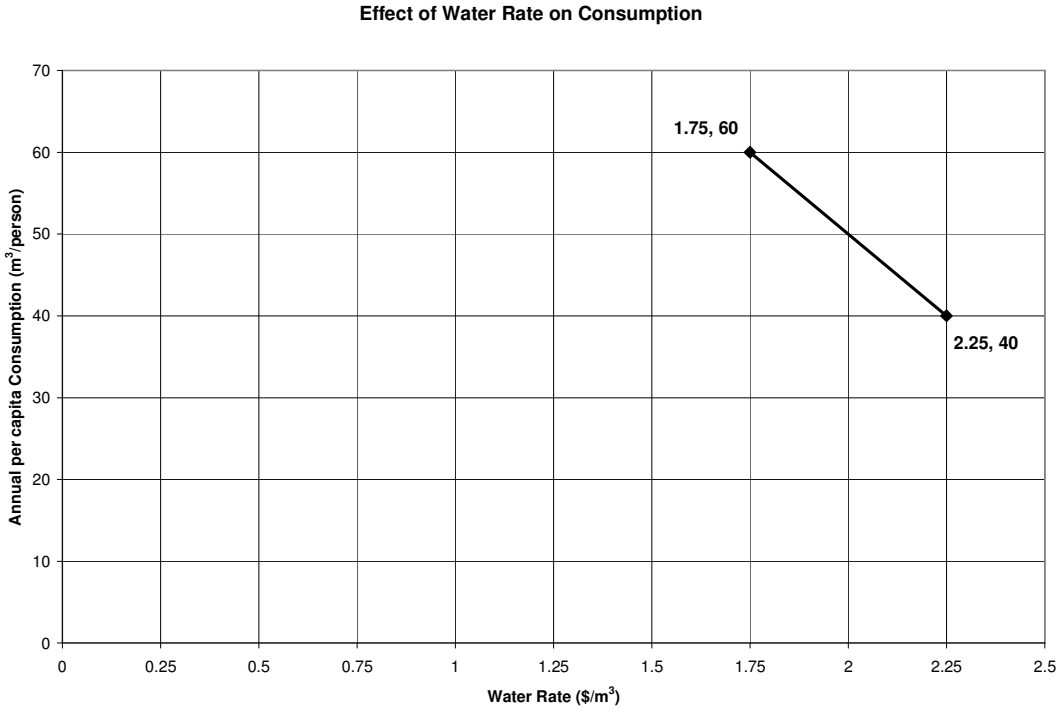
   $$\therefore y = 39$$

   Therefore, Jennifer is 12 years old and her father is 39 years old.

Part 2 – Graphing

8. The local water utility has conducted market research on how changes in the water rate ($/m^3) affect their end user's annual per capita water consumption. The results have shown that when the cost of water is \$1.75/m^3, the annual consumption rate is 60 m^3/person; and when the cost of water is \$2.25/m^3, the annual consumption rate is 40 m^3/person.

   a. Graph the line and state the equation.



Equation of a line: $y = mx + b$

$$m = \frac{y_1 - y_2}{x_1 - x_2} = \frac{60 - (40)}{1.75 - 2.25} = \frac{20}{-0.5} = -40$$

$$b = y_1 - mx_1 = 60 - (-40)(1.75) = 130$$

$$\therefore y = -40x + 130$$

b. If the population in the town is 100,000 and the utility decides to set the water rate at \$2.00/m^3, what would be the utility's expected annual revenue?

From the graph or the equation we find that a water rate of \$2.00/m^3 corresponds to an annual consumption of 50 m^3/person.

Therefore the expected annual revenues would be;

$$= \frac{\$2.00}{m^3} \times \frac{50 m^3}{person} \times 100{,}000\, persons$$

$$= \$10{,}000{,}000$$

Part 3 – Logic and Reasoning

9. Abigail is a camper at an outdoor education day camp and is trying to schedule the activities in which she would like to participate. Her day consists of 2 different activities; one in the morning and a second in the afternoon. The activities available to her are canoeing, rock climbing, wind surfing, hiking, archery and horseback riding. Given the following information, answer the questions below.

She does not want to participate in both wind surfing and canoeing.

Rock climbing and hiking are only available in the morning.

She would like to spend the afternoon on the water if she goes horseback riding in the morning.

Archery is only available in the afternoon.

She thinks it is too cold in the morning for wind surfing.

(a) If her best friend Jason has signed up for the morning canoeing session and she wants to be his partner, what are her options for her afternoon session?

Archery or Horseback Riding

(b) If she wants to try archery, what are the possible activities she can select for her accompanying session?

Canoeing or Rock Climbing or Hiking

(c) What are all her possible schedules if she knows she does not want to participate in archery or canoeing?

Rock Climbing (AM) & Wind Surfing (PM)

Rock Climbing (AM) & Horseback Riding (PM)

Hiking (AM) & Wind Surfing (PM)

Hiking (AM) & Horseback Riding (PM)

Horseback Riding (AM) & Wind Surfing (PM)