

3.3 Proportions

- 1) Several proportions can be set up from the given information: $\frac{50}{2} = \frac{150}{6}$ or $\frac{2}{50} = \frac{6}{150}$ or $\frac{2}{6} = \frac{50}{150}$ or $\frac{6}{2} = \frac{150}{50}$. From each of these proportions we can verify that the cross multiplication property holds by noting $50 \cdot 6 = 150 \cdot 2 = 300$.

- 3) Let h be the height of the flagpole in feet.

$$\frac{4 \text{ actual ft}}{3 \text{ shadow ft}} = \frac{h \text{ actual ft}}{36 \text{ shadow ft}}$$

By the cross multiplication property of proportions, we have

$$3h = (4)(36)$$

$$h = \frac{4}{3}(36) \text{ ft}$$

$$h = 48 \text{ ft}$$

- 5) Proportion C—(solution: $x = \frac{1}{2}$).

- 7) Let t be the time (in min) required to burn off a 600-calorie meal.

$$\frac{8 \text{ min}}{120 \text{ calories burned}} = \frac{t \text{ min}}{600 \text{ calories burned}}$$

$$(8)(600) = 120t$$

$$120t = 4800$$

$$t = 40 \text{ min}$$

- 9) Let p denote the approximate number of penguins in the region.

$$\frac{50 \text{ tagged penguins in sample}}{200 \text{ total penguins in sample}} = \frac{400 \text{ tagged penguins in region}}{p \text{ total penguins in region}}$$

$$50p = (400)(200)$$

$$50p = 80,000$$

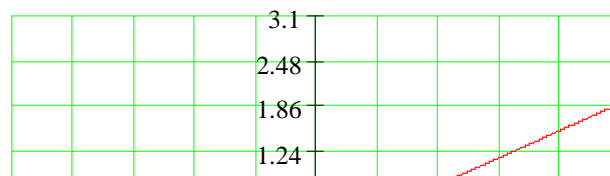
$$p = 1600$$

There are around 1600 penguins in the region.

- 11)

a)

3.1



b) Answers will vary. Three pairs of numbers that satisfy the equation $y = \frac{2}{5}x$ are (5, 2), (-5, -2), and (1, 0.4).

c) For (5, 2): $\frac{y}{x} = \frac{2}{5}$
For (-5, -2): $\frac{y}{x} = \frac{-2}{-5} = \frac{2}{5}$
For (1, 0.4): $\frac{y}{x} = \frac{0.4}{1} = 0.4 = \frac{2}{5}$

13) Since similar triangles have proportional corresponding sides, from the figure we see that we can set up the ratio $\frac{2}{3} = \frac{7}{l}$, where l is the length of segment AD.

$$\frac{2}{3} = \frac{7}{l}$$

$$2l = 21$$

$$l = \frac{21}{2} \text{ cm} = 10.5 \text{ cm}$$

15) The width of the 7-foot long table is $\frac{1}{2}$ (7 ft) = 3.5 ft .

Skill and Review

17) $6(x - \frac{9}{2}) - (4 - 1)$
 $= 6(x - \frac{9}{2}) - 3$
 $= 6x - 27 - 3$
 $= 6x - 30$

19) Let l = length of rectangle = 21.4 m.
Let w = width of rectangle = 8.3 m.
Area = $l w = (21.4 \text{ m})(8.3 \text{ m}) = 177.62 \text{ m}^2$
Perimeter = $2 l + 2 w = 2 (21.4 \text{ m}) + 2 (8.3 \text{ m}) = 42.8 \text{ m} + 16.6 \text{ m} = 59.4 \text{ m}$