Association of Mathematics Teachers of New Jersey
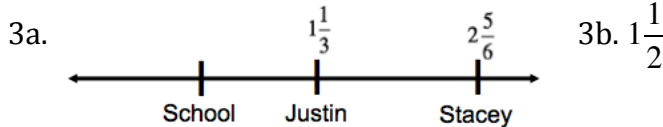## 3rd Annual Middle School Mathematics Contest of New Jersey
Wednesday, December 10, 2014

ANSWERS

1. $85\dfrac{5}{9}$

$$9\frac{7}{9}\times 8\frac{3}{4}=\frac{88}{9}\times\frac{35}{4}=\frac{22}{9}\times\frac{35}{1}=\frac{770}{9}=85\frac{5}{9}$$

2. No; 3 cups

$$12\div 3=4:4\times 1\frac{3}{4}=7:3\text{ oz. short}$$

3a. See diagram

3a.

3b. $1\dfrac{1}{2}$

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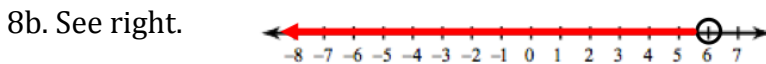
4. 224

$$56{,}000\times 0.004=224$$

5. Store B

The rate at Store A is $3.90 (*e.g.*, $15.60/4 = $3.90 or $27.30/7 = $3.90); the rate at store B = $3.80 (compute slope = $3.80/1); the rate at Store C is given at $3.85. Store B is lowest.

6. 21.5

Rank order data to: 27, 30, 31, 33, 42, 42, 45, 49, 53, 54, 60, 61. Determine the median and then Q_1 and Q_3: 27 30 31 | 33 42 42 | 45 49 53 | 54 60 61. Q_1 = 32, M = 43.5, and Q_3 = 53.5. IQR = $Q_3 - Q_1$ = 53.5 – 32 = 21.5.

7. $\angle 6$ and $\angle 7$; $\angle 2$ and $\angle 5$

Corresponding angles fall on the same side of the line and the same side of the transversal. Angles cannot be combined to form corresponding angles.

8a. $x<6$
8b. See right.

$$-4x+5>-19:-4x>-24:x<6$$

9. $4\dfrac{7}{12}$

$$1:1\frac{1}{4}=3\frac{2}{3}:1\times x=1\frac{1}{4}\times 3\frac{2}{3}=\frac{5}{4}\times\frac{11}{3}=\frac{55}{12}=4\frac{7}{12}$$

10. *Line a* and *Line c*; $-\dfrac{3}{4}$

Lines with the same rate of change are parallel. *Line a* and *Line c* are parallel. Compute the slope: (*e.g.*, on *Line a* has points (–3, 6) and (1, 3).)

$$m=\frac{y_2-y_1}{x_2-x_1}=\frac{(3)-(6)}{(1)-(-3)}=\frac{-3}{4}=-\frac{3}{4}$$

11. $y=18x+45$

$18.00 / month = rate of change (slope).

$81.00 - (2\times\$18.00)$ = starting value (y-intercept) = $45.00.

12. 225,000

Linear growth @ 2,000/year. Number of years = 2020 – 1995 = 25 years.
$$f(x)=2000x+175{,}000$$
$$f(25)=2000(25)+175{,}000=225{,}000.$$

13. 163.584

$480 \times 1.42 = 681.6$

$681.6 \times 0.24 = 163.584$

14. 4 sundaes & 8 banana splits

$x =$ sundaes $y =$ banana splits

$x + y = 12$; $2.50x + 4.00y = \$42.00$; $y = 12 - x$; $2.50x + 4.00(12 - x) = \$42.00$

$2.50x + 48.00 - 4.00x = \$42.00$; $-1.50x = -\$6.00$; $x = 4 \Longrightarrow y = 8$

15. 2.2%

$i = P \times r \times t$; $(\$1,056) = (\$6,000) \times r \times (8)$; $\$1,056 = \$48,000r$; $r = .022 = 2.2\%$

16. AC = 11.25; AB = 6.75

$\triangle ABC \sim \triangle EDF$; $AC:EF = BC:DF$; $AC:7.0 = 9:5.6$; $AC = 11.25$

$AB:ED = BC:DF$; $AB:4.2 = 9:5.6$; $AB = 6.75$

17. 15 meters

The diagonal of a rectangle forms a right triangle. The diagonal is the hypotenuse. $x^2 + 8^2 = 17^2$; $x^2 + 64 = 289$; $x^2 = 225$; $x = 15$

18. 91 feet

$28:20 = x:65$; $20x = (28) \times (65)$; $20x = 1820$; $x = 91$

19. 6.2 lb.

$\$1.05:1\ lb = \$6.51:x\ lb$; $1.05x = 6.51$; $x = 6.2$

20. 92%

$$\frac{88 + 74 + 94 + 78 + 82 + 98 + 90 + 78 + 82 + 92 + 100 + 93 + 91 + x)}{14} = 88$$

$1140 + x = (14) \times (88)$; $1140 + x = 1232$; $x = 92$