Minitest 4A - MTH 2010

Dr. Graham-Squire, Spring 2017

Name: Key

I pledge that I have neither given nor received any unauthorized assistance on this exam.

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(*signature*)

DIRECTIONS

1. Show all of your work and use correct notation, even on multiple choice questions! A correct answer with insufficient work or incorrect notation will lose points.
2. Clearly indicate your answer by putting a box around it.
3. Calculators, cell phones and computers are not allowed on this test.
4. Make sure you sign the pledge.
5. Number of questions = 6. Total Points = 30.

1. (a) (2 points) Solve the equation $\frac{1}{2}x + 3 = \frac{2}{3}x - 2$ for x.

$-\frac{1}{2}x + 2 \quad -\frac{1}{2}x + 2$

$5 = \frac{2}{3}x - \frac{1}{2}x$

common denom.

$\frac{2}{3} \times \frac{2}{2} = \frac{4}{6}$

$\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$

$5 = \frac{4}{6}x - \frac{3}{6}x$

$6 \cdot 5 = \frac{1}{6}x \cdot 6$

$30 = x$

(b) (2 points) The height of a bottle rocket in feet above ground is given by $h = 16(t - 12)(t + 2)$, where $t = 0$ is when the rocket launched and t is time in seconds. How long was the rocket in the air for? Explain your reasoning.

Hits ground when $h = 0 \Rightarrow 0 = 16(t-12)(t+2)$

$\Rightarrow$ either $16 = 0$, $t - 12 = 0$ or $t + 2 = 0$

$16 = 0$: can't happen ✗

$t = 12$

$t = -2$: negative time makes no sense ✗

(c) (1 point) Is the number

$$0.01001000100001000001\ldots$$

rational or irrational? Explain.

irrational b/c it goes on forever .... but the pattern does not repeat (added a zero each time)

2. (5 points) Which of the numbers below is a fraction equivalent to $0.\bar{6} = 0.66666\ldots$? Show/explain your work!

(A) $\frac{1}{6}$ $= 0.1\bar{6}$ ✗

(B) $\frac{6}{10}$ $= 0.6$ ✗

(C) $\frac{3}{5}$ $= 0.6$ ✗

(D) $\frac{4}{6} = \frac{2}{3} = 0.\overline{66}$

$$
\begin{array}{r}
0.16 \\
6\overline{)1.00} \\
-\,6 \\
\hline
40
\end{array}
$$

$$
\begin{array}{r}
0.6 \\
5\overline{)3.0} \\
-\,30 \\
\hline
0
\end{array}
$$

3. (5 points) Write two word problems, one that corresponds to each equation:

(a) $\frac{2}{3}x - 15 = 60$

(b) $\frac{2}{3}(x - 15) = 60$

(a) Bob had x cups of flour. He poured $\frac{2}{3}$ of the flour into a bowl. He then removed 15 cups of flour from the bowl, and there are now 60 cups of flour in the bowl. How much did Bob have initially?

1.5

(b) Box had x cups of flour. He dumps 15 cups in the trash, and then takes $2/3$ of the remaining flour to put in a bowl. The bowl has 60 cups of flour. How many cups did Bob have initially?

.5

-0.5 for each wrong fraction

4. (5 points) The formula $L = \pi(r_1 + r_2) + 2d$ calculates the length L of a belt around two pulleys whose radii are r_1 and r_2 if the distance between their centers is d. Which of the following formulas could be used to calculate r_1, the radius of one of the pulleys?

(A) $r_1 = \pi(L - 2d) - r_2$

(B) $r_1 = \dfrac{L - 2d}{\pi} - r_2$

(C) $r_1 = \dfrac{L - 2d - r_2}{\pi}$

(D) $r_1 = \dfrac{L - 2d}{\pi r_2}$

$L = \pi(r_1 + r_2) + 2d$

$\dfrac{L - 2d}{\pi} = \dfrac{\pi(r_1 + r_2)}{\pi}$

4

$\dfrac{L - 2d}{\pi} = r_1 + r_2$

$-r_2 \qquad -r_2$

$\dfrac{L - 2d}{\pi} - r_2 = r_1$

3.5 if mostly correct solving, wrong answer.

5. (5 points) Use the problem below to answer the question that follows.

Dominic bought some SuperCat dolls at the toy store. The store charged 4% sales tax and the total came to \$156. Without the tax, Dominic could have bought 3 more SuperCat dolls. How many SuperCat dolls did Dominic buy?

If p represents the price of one SuperCat doll, in which of the following equations does x represent the answer to the question above?

(A) $1.04p(x+3) = 156$

(B) $0.96px = p(x+3)$

(C) $0.96p(x+3) = 156$

(D) $1.04px = p(x+3)$ ✓✓

Total cost before tax is (price) × (# of SuperCat dolls)

Total = $p \cdot x$ ☆

So after tax is $1.04px = \$156$ ✓0.5

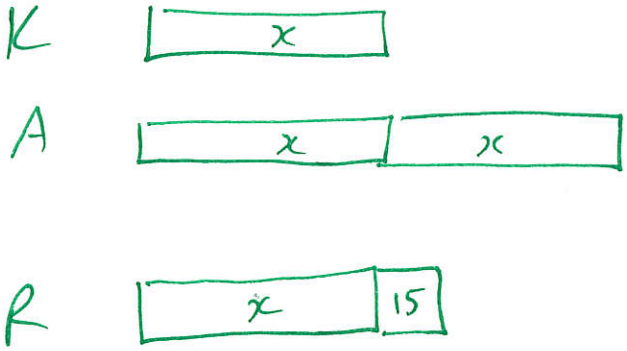
Without tax could have bought three more (than x) ⇒

$p(x+3) = 156$ ✓0.5 ☆☆

Since both ☆ and ☆☆ are = 156

can say $\boxed{1.04px = p(x+3)}$

6. (5 points) Ava picked twice as many roses as Kinsley. Rafi picked 15 more roses than Kinsley did. Total, the three children picked 207 roses. How many roses did each of them pick? Explain your reasoning and/or show your work!



$$\Rightarrow 4x + 15 = 207$$

$$4x = 207 - 15$$

$$\frac{4x}{4} = \frac{192}{4}$$

$$x = 48$$

$$\begin{array}{r} 48 \\ 4\overline{)192} \\ -16 \\ \hline 32 \end{array}$$

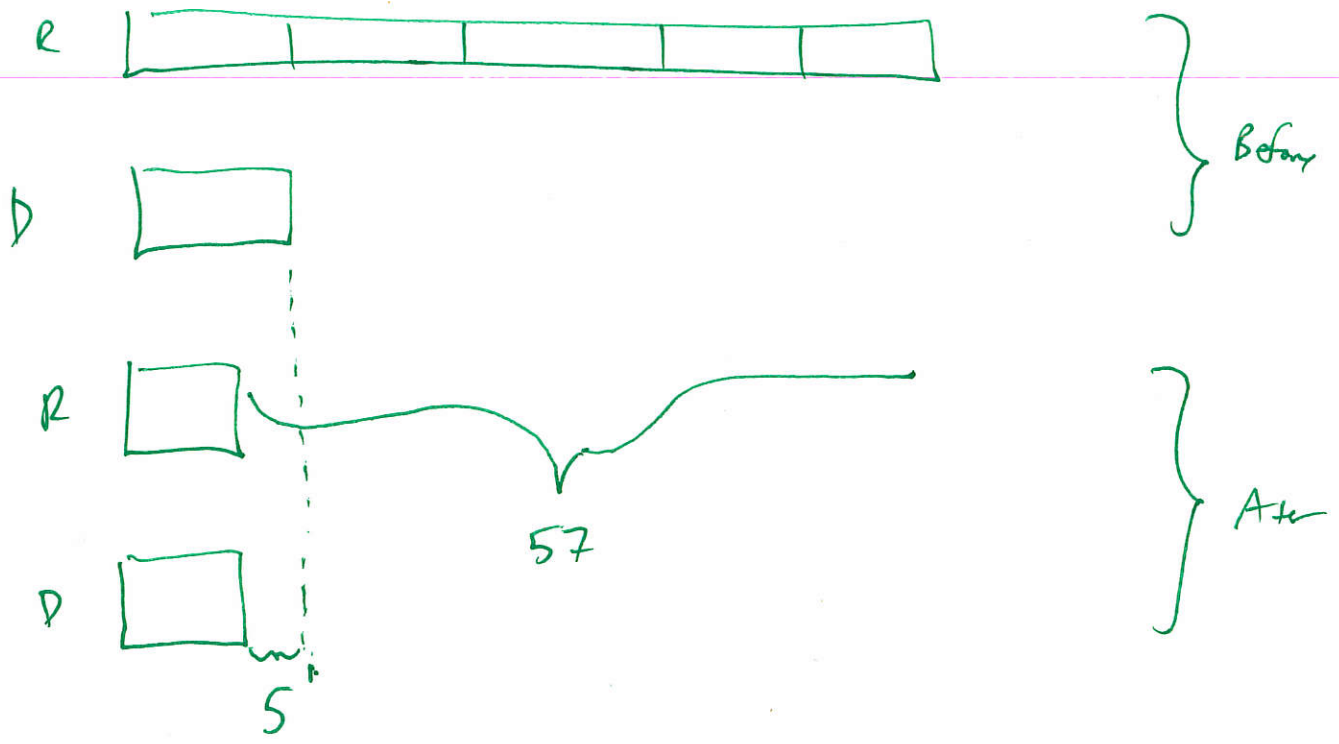
$K = 48$

$A = 96$

$R = 63$

Extra Credit(2 points) Originally, Ronan had 5 times as many balls as Dominic had. Then Ronan threw 57 balls of his balls into the ball pit, and Dominic threw 5 of his balls into the ball pit. Now they have the same number of balls. How many did Ronan have initially? For 1 point, solve this problem. For two points, set it up as a strip diagram *and* solve the problem.

On back



$\Rightarrow$

↳ $= 57 - 5 = 52$

$\Rightarrow$ 52 corresponds to 4 blocks

$\Rightarrow$ 1 Block $= \frac{52}{4} = 13$ balls

$\Rightarrow$ initially Roman has $5(13) = 65$ balls

Minitest 4B - MTH 2010

Dr. Graham-Squire, Spring 2017

10:23 ⇒ 35 m

Key

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DIRECTIONS

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2. Clearly indicate your answer by putting a box around it.
3. Calculators, cell phones and computers are not allowed on this test.
4. Make sure you sign the pledge.
5. Number of questions = 6. Total Points = 30.

1. (a) (2 points) The height (in feet) of a bottle rocket above ground is given by $h = 20(t-18)(t+2)$, where $t = 0$ is when the rocket launched and t is time in seconds. How long was the rocket in the air for? Explain your reasoning.

For $t = 18$ seconds because we want h to equal $0 \Rightarrow 20 = 0$, $t - 18 = 0$ or $t + 2 = 0$

↳ This is $t = 18$, and it is the only one that makes sense

(b) (1 point) Is the number

$$0.01001000100001000001\ldots$$

rational or irrational? Explain.

Irrational because it goes on forever but does not have a repeating pattern (the # of zeroes is increasing between each 1)

(c) (2 points) Solve the equation $\frac{2}{3}x + 1 = \frac{3}{4}x - 2$ for x.

$+2 \qquad +2 \qquad \cdot 12$

$$\frac{2}{3}x + 3 = \frac{3}{4}x$$

$$-\frac{2}{3}x \qquad -\frac{2}{3}x$$

$$3 = \frac{3}{4}x - \frac{2}{3}x$$

$$3 = \frac{9}{12}x - \frac{8}{12}x$$

$$12 \cdot 3 = \frac{1}{12}x \cdot 12$$

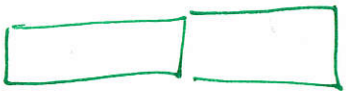
$$36 = x$$

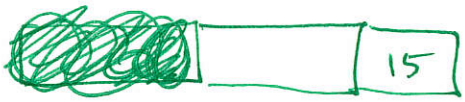
$\frac{3}{4} \cdot \frac{3}{3} = \frac{9}{12}$

$\frac{2}{3} \cdot \frac{4}{4} = \frac{8}{12}$

2. (5 points) Ava picked twice as many roses as Kinsley. Rafi picked 15 more roses than Kinsley did. Total, the three children picked 207 roses. How many roses did each of them pick? Explain your reasoning and/or show your work!

K 

A 

R 

$\Rightarrow$ 4 boxes $+ 15 = 207$

$- 15 \quad -15$

$\Rightarrow$

$\frac{4 \text{ boxes}}{4} = \frac{192}{4}$

$\Rightarrow 1 \text{box} = 48$

$$\begin{array}{r} 48 \\ 4\overline{)192} \\ -16 \\ \hline 32 \\ 32 \end{array}$$

$\Rightarrow$ Kinsley = 48

Ava = 96

Rafi = 63

$48 + 96 + 63 = 207$ ✓

3. (5 points) Use the problem below to answer the question that follows.

Dominic bought some SuperCat dolls at the toy store. The store charged 4% sales tax and the total came to \$156. Without the tax, Dominic could have bought 3 more SuperCat dolls. How many SuperCat dolls did Dominic buy?

If p represents the price of one SuperCat doll, in which of the following equations does x represent the answer to the question above?

(A) $1.04p(x+3) = 156$

(B) $1.04px = p(x+3)$

(C) $0.96px = p(x+3)$

(D) $0.96p(x+3) = 156$

$p \cdot x$ = cost of dolls before tax

$\Rightarrow (1.04)px = 156$ ★★

b/c + 4% tax is 156

3 more Supercat dolls means

$p \cdot x + 3p = 156$ ★

★ and ★★ together mean

$1.04px = px + 3p$

$\Rightarrow 1.04px = p(x+3)$

4. (5 points) Which of the numbers below is a fraction equivalent to $0.\bar{6} = 0.66666\ldots$? Show/explain your work!

(A) $\frac{3}{5} = 0.6$

(B) $\frac{4}{6} = 0.\overline{6}$

(C) $\frac{1}{6} = 0.1\overline{6}$

(D) $\frac{6}{10} = 0.6$

$$
\begin{array}{r}
0.66 \\
6\overline{)4.000} \\
-36 \\
\hline
40 \\
-36 \\
\hline
4 \ldots \text{ etc.}
\end{array}
$$

5. (5 points) The formula $L = \pi(r_1 + r_2) + 2d$ calculates the length L of a belt around two pulleys whose radii are r_1 and r_2 if the distance between their centers is d. Which of the following formulas could be used to calculate r_1, the radius of one of the pulleys?

(A) $r_1 = \dfrac{L - 2d - r_2}{\pi}$

(B) $r_1 = \dfrac{L - 2d}{\pi r_2}$

(C) $r_1 = \pi(L - 2d) - r_2$

(D) $r_1 = \dfrac{L - 2d}{\pi} - r_2$

$L = \pi(r_1 + r_2) + 2d$

$\Rightarrow \dfrac{L - 2d}{\pi} = \dfrac{\pi(r_1 + r_2)}{\pi}$

$\dfrac{L - 2d}{\pi} = r_1 + r_2$

$-r_2 \qquad -r_2$

$\Rightarrow \dfrac{L - 2d}{\pi} - r_2 = r_1$

6. (5 points) Write two word problems, one that corresponds to each equation:

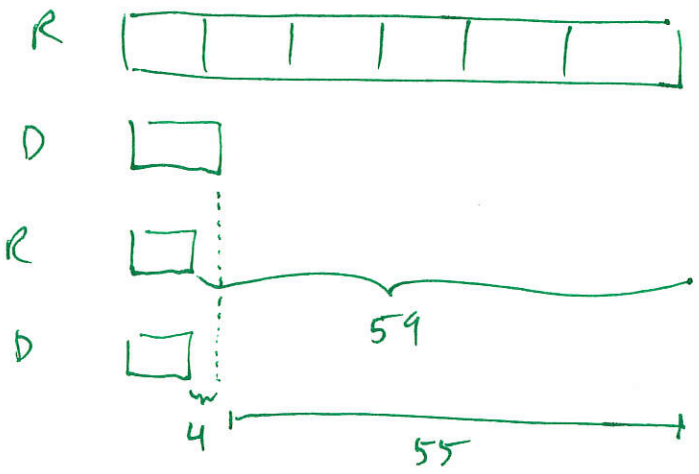
(a) $\frac{3}{5}x - 45 = 40$

(b) $\frac{3}{5}(x - 45) = 40$

(a) Adam had a pile of x dragon cards. He removed $\frac{2}{5}$ of the cards and burned them. Then he removed another 45 cards from pile and burned them. He now has 40 left. How many did he have initially?

(b) Adam had a pile of x dragon cards. He removed 45 cards, and then removed $\frac{2}{5}$ of the remaining cards in the pile. He now has 40 left. How many cards did he start with?

Extra Credit(2 points) Originally, Ronan had 6 times as many balls as Dominic had. Then Ronan threw 59 balls of his balls into the ball pit, and Dominic threw 4 of his balls into the ball pit. Now they have the same number of balls. How many did Ronan have initially? For 1 point, solve this problem. For two points, set it up as a strip diagram *and* solve the problem.



$\Rightarrow$ 5 boxes = 55 balls

$\Rightarrow$ 1 box = 11 balls

$\Rightarrow$ Ronan had 66 initially