

Math 5a HW 8.

#1.

$$a. \quad x = 0.\overline{52}$$

$$100x = 52.\overline{52}$$

$$100x - x = 52.\overline{52} - 0.\overline{52} = 52$$

$$99x = 52$$

$$x = \frac{52}{99}$$

$$b. \quad x = 0.5\overline{2}$$

$$10x = 5.\overline{2}$$

$$100x = 52.\overline{2}$$

$$100x - 10x = 52.\overline{2} - 5.\overline{2} = 47.$$

$$90x = 47$$

$$x = \frac{47}{90}$$

$$c. \quad 0.52 = \frac{52}{100} = \frac{13}{25}$$

$$d. \quad x = 0.\overline{125}$$

$$10x = 1.\overline{25}$$

$$1000x = 125.\overline{25}$$

$$1000x - 10x = 125.\overline{25} - 1.\overline{25} = 124.$$

$$990x = 124$$

$$x = \frac{124}{990} = \frac{62}{495}$$

$$\#2. \quad \frac{5}{2} = \frac{x}{450} \quad x = \frac{5 \cdot 450}{2} = 1125g.$$

Or $450 : 2 = 225g$ is one part out of total 7 parts.

$$225 \cdot 5 = 1125$$

#3.

1. $2x > 70$ **F**

2. $x < 100$ **T**

3. $3x > 25$

4. $x \geq 10$ **F**

5. $x > 5$.

If #1 is true, $2x > 70$.
 $x > 35$.

Therefore #3, #4, #5 are
also true.

But we know that only 3 statements
are true.

$2x > 70$ is false

$$2x \leq 70, \quad x \leq 35.$$

#2 is true, if $x \leq 30$, it's < 100 .

If #4 is true, then #5 and #3 are also true.

But one out of #4, #5 and #3 should be false.

So #4 is false.

So, $x < 10$, $x > 5$ and $3x > 25$.

$$6 \cdot 3 = 18 < 25$$

$$7 \cdot 3 = 21 < 25$$

$$8 \cdot 3 = 24 < 25$$

$$x = 9.$$

#4 $a+1$ is divisible by 3,

$$a+1 = 3 \cdot k.$$

$$4 + 7a = 3 + 1 + 4a + 3a = 3 + 3a + 4a + 1 =$$

$$= 3 + 3a + 3a + a + 1$$

$$= 3(a+1) + 3a + (a+1)$$

$$= 3(a+1) + 3a + 3k = 3(a+1+a+k).$$

k can be any n.n.

#5.

a. 127^{23} 513^{18} .

$$127^{23} < 128^{23} = (2^7)^{23} = 2^{161}.$$

$$513^{18} > 512^{18} = (2^9)^{18} = 2^{162}$$

$$127^{23} < 128^{23} = 2^{161} < 2^{162} = 512^{18} < 513^{18}.$$

$$127^{23} < 513^{18}.$$

b. $9997^{10} < 10000^{10} = (10^4)^{10} = 10^{40}$

$$100003^8 > 100000^8 = (10^5)^8 = 10^{40}.$$

$$9997^{10} < 10000^{10} = 10^{40} = 100000^8 < 100003^8$$

$$9997^{10} < 100003^8.$$

$$c. \quad 5^{300} = (5^3)^{100}$$

$$3^{500} = (3^5)^{100}$$

$$5^3 = 125$$

$$3^5 = 243$$

$$5^{300} = (125)^{100}$$

$$3^{500} = (243)^{100}$$

$$125^{100} < 243^{100}$$

$$5^{300} < 3^{500}$$

6.

a. $10 = 10^1$, $100 = 10^2$, $1000 = 10^3$, $10000 = 10^4$
 $100000 = 10^5$, $1000000 = 10^6$

b. $0.1 = 10^{-1}$, $0.01 = 10^{-2}$, $0.001 = 10^{-3}$, $0.0001 = 10^{-4}$
 $0.00001 = 10^{-5}$, $0.000001 = 10^{-6}$