Name: Kelly **Date:**

Math 433—Pulford **Sample Test 1**

TEST # 1 – (SAMPLE)

Answer all questions, showing all the appropriate work. Express all fractional answers in simplest form

1) Simplify each of the following. Assume that all exponents represent positive integers.

a) $\dfrac{5^{10x+7}}{5^{2x-3}}$ $5^{10x+7-(2x-3)}$ $5^{10x+7-2x+3}$ 5^{8x+10}	b) $6x^{m+4}(2x^{m-4}-x^{5-m}+3x)$ $12x^{2m}-6x^{9}+18x^{m+5}$	c) $(7n-1)^2-(n-4)(n+3)$ $(49n^2-14n+1)-(n^2-n-12)$ $49n^2-14n+1-n^2+n+12$ $48n^2-13n+13$

2) Factor Completely.

a) $\dfrac{1}{16}-81y^{8n}$ $\left(\frac{1}{4}-9y^{4n}\right)\left(\frac{1}{4}+9y^{4n}\right)$ $\left(\frac{1}{2}-3y^{2n}\right)\left(\frac{1}{2}+3y^{2n}\right)\left(\frac{1}{4}+9y^{4n}\right)$	b) $7x^2-12xy-4y^2$ $7x^2-14xy+2xy-4y^2$ $7x(x-2y)+2y(x-2y)$ $(x-2y)(7x+2y)$
c) $128n^2m^4+2n^2m$ $2n^2m(64m^3+1)$ $2n^2m(4m+1)(16m^2+4m+1)$	d) $24p^3+15p^2-56p-35$ $3p^2(8p+5)-7(8p+5)$ $(8p+5)(3p^2-7)$

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$2 \quad -14$

3) Solve for x: $2^x \cdot 4^{2x} = (2^{x-2})^3 \cdot 16^6$

$2^x(2^2)^{2x}=(2^{x-2})^3\cdot(2^4)^6$

$2^x\cdot 2^{4x} = 2^{3x-6}\cdot 2^{24}$

$2^{5x} = 2^{3x+18}$

$5x = 3x+18$

$2x=18$

$\boxed{x=9}$

4) Solve. State the solution set in interval notation and graph the inequality on the number line provided.

a) $4\left[\frac{a}{2}+\frac{7}{4}>5\right]$ or $\left[\frac{3}{8}+\frac{a}{3}\le\frac{5}{12}\right]24$

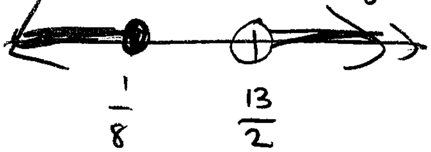
$2a+7>20$

$2a>13$ or $9+8a\le 10$

$a>\frac{13}{2}$

$8a\le 1$

$a\le\frac{1}{8}$



$(-\infty,\frac{1}{8}]\cup(\frac{13}{2},\infty)$

b) $6x-5<\frac{5x+3}{2}<7x+9$

$12x-10<5x+3<14x+18$

$12x-10<5x+3$ and $5x+3<14x+18$

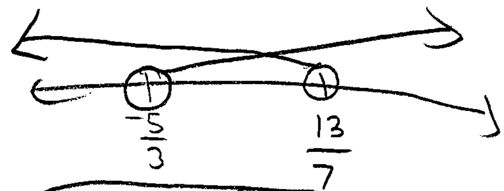
$7x<13$

$-9x<15$

$x<\frac{13}{7}$ and

$x>\frac{-15}{9}$

$x>-\frac{5}{3}$



$\boxed{(-\frac{5}{3},\frac{13}{7})}$

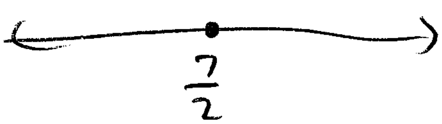
c) $0\ge|2r-7|$

$|2r-7|\le 0$

$2r-7\le 0$ AND $2r-7\ge 0$

$r\le\frac{7}{2}$

$r\ge\frac{7}{2}$



$\boxed{r=\frac{7}{2}}$

d) $7-3|4d-7|\ge 4$

$-3|4d-7|\ge -3$

$|4d-7|\le 1$

$4d-7\le 1$ AND $4d-7\ge -1$

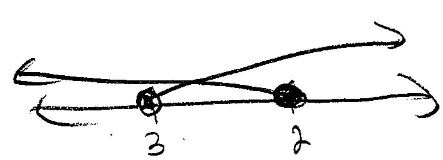
$4d\le 8$

$4d\ge 6$

$d\le 2$

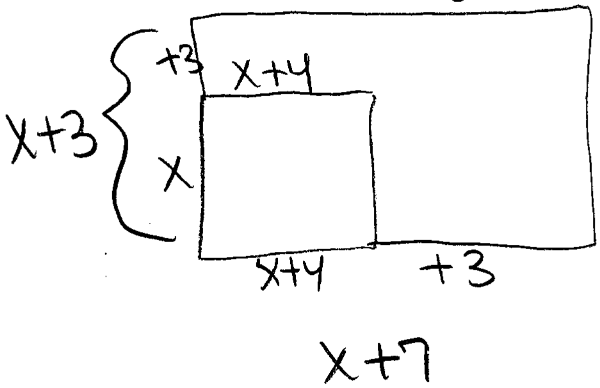
$d\ge\frac{6}{4}$

$d\ge\frac{3}{2}$



$[\frac{3}{2},2]$

5) A rectangle is 4 cm longer than it is wide. If the length and width are each increased by 3 cm, the new area is at least 63 cm^2 greater than the original area. Find the minimum dimensions of the original rectangle.



$$(x+3)(x+7) \geq x(x+4)+63$$

$$\cancel{x^2}+10x+21 \geq \cancel{x^2}+4x+63$$

$$6x \geq 42$$

$$x \geq 7$$

Minimum dimensions are 11cm x 7cm

6) A person is considered unhealthy if their body temperature differs from the normal body temperature by 1.4° or more. If we let *t* represent a person's body temperature and the normal body temperature is 98.6° *F*, express this as an ***absolute value inequality***.

$$|t-98.6| \geq 1.4$$

Multiple Choice. Select the best answer

7) Solve for x: $|2x-6|-x=3$

a) x = 1, x = 9
b) x = -9, x = -1
c) x = 1
d) x = 9

$|2x-6| = x+3$

$2x-6 = x+3$ OR $2x-6 = -x-3$

$x = 9$ OR $3x = 3$

$x = 1$

Ck: Both solutions check

8) Find $(2n^3)^2$ if $(n+2)(n+3)=(4-n)(12-n)$

a) 144
b) 128
c) 256
d) 784

$\cancel{n^2} + 5x + 6 = 48 - 16n + \cancel{n^2}$

$21x = 42$

$x = 2$

$(2(2^3))^2 = (2 \cdot 8)^2 = (16)^2 = 256$

9) Which equations has no solution?

a) $-|x-5|=-2$
b) $|x-5|>-2$
c) $|x-5|\ge -2$
d) $|x-5|\le -2$

Absolute value cannot be negative

10) Given $A = P + \Pr t$, solve for P

a) $P = A - rt$
b) $P = \frac{A-rt}{2}$
c) $P = \frac{A}{1+rt}$
d) $P = \frac{A}{2rt}$

$A = P + Prt$

$A = P(1+rt)$

$\frac{A}{1+rt} = P$

11) Which product of factors is equivalent to $(x+1)^2 - y^2$

a) $(x+1+y)^2$
b) $(x+1-y)^2$
c) $(x-1+y)(x-1-y)$
d) $(x+1+y)(x+1-y)$

$x^2 + 2x + 1 - y^2$

$[(x+1)-y][(x+1)+y]$