Los Angeles Southwest College

Mathematics Department

Math 115 – Common Final Exam

Practice TEST (rubrics)

This Final Exam consists of 36 problems with a total of 150 points. Show any necessary work neatly and clearly in the space provided. Please circle or box your final answer.

Part A: No partial credit will be given to the problems 1 through 10

1 Simplify: $-26-(-37)-13$ $\boxed{-2}$ **(2 pts)**

2 Decide whether the statement is true or false: $-|29|<-|-18|$ $\boxed{True}$ **(2 pts)**

3 For the following word phrase write an **expression** using x as the variable and **simplify**. **(2 pts)**

"*Thirty two subtracted from the difference between twice a number and twelve*" $\boxed{2x-44}$

4 Evaluate: $4x^2y-5xy^2$, *if* $x=3$ *and* $y=-2$ $\boxed{-132}$ **(2 pts)**

5 Combine like terms: $5m^2+8m-3m^2-12m+15$ $\boxed{2m^2-4m+15}$ **(2 pts)**

6 Graph $-2\le x<3$ on a number line. **(2 pts)**

7 Find the **slope** of the line through $(-2,6)$ *and* $(-4,-2)$ and write answer in the simplest form **(2 pts)**

$\boxed{4}$

8 Multiply: $2y^2(4y^3-3y^2+7)$ $\boxed{8y^5-6y^4+14y^2}$ **(2 pts)**

9 Factor: $9y^2-64$ $\boxed{(3y-8)(3y+8)}$ **(2 pts)**

10 Find the LCM of $18x^4y^3$ *and* $24x^5y^2$ $\boxed{72x^5y^3 \text{ or } 2^3\cdot 3^2x^5y^3}$ **(2 pts)**

Part B: Partial credit may be given to the problems 11 through 36. Answers without supporting work will be given no credit. Please circle or box your final answer.

11 Simplify: $\dfrac{(-4)\bullet 3^2 - 2\bullet 7}{(-3)\bullet 6+13}$ **(3 pts)**

$a)$ $3^2 = 9$ $1\,pt$

$b)$ $-4\bullet 9 = -36$
$2\bullet 7 = 14$
$(-3)\bullet 6 = -18$ $1\,pt$

$c)$ $\dfrac{-36-14}{-18+13} = \dfrac{-50}{-5} = \boxed{10}$ $1\,pt$

12 Solve the equation: $3(x-4)-5(x+2)=-14$ **(4 pts)**

$3x-12-5x-10=-14$ $1\,pt$

$-2x-22=-14$ $1\,pt$

$-2x=8$ $1\,pt$

$\dfrac{-2x}{-2} = \dfrac{8}{-2}$ $\boxed{x=-4}$ $1\,pt$

13 **Solve** the following word problem by drawing a picture, defining the variable(s), setting up the equation(s), and then solve. Don't forget to include units. **(6 pts)**
The length of a rectangle is three more than twice the width.
If the perimeter is 78 inches, find the width and the length.

$2l+2w=P$
$l=2w+3$
$2(2w+3)+2w=78$ $3\,pts$

$6w+6=78$
$6w=72$
$\boxed{w=12\ \ inches}$ $2\,pt$

$\boxed{l=2(12)+3=27\ \ inches}$ $1\,pt$

14 Subtract: $(6x^3+4x^2-11x+8)-(5x^3-2x^2-8x+17)$ **(3 pts)**

$6x^3+4x^2-11x+8-5x^3+2x^2+8x-17$ $1pt$

$6x^3-5x^3+4x^2+2x^2-11x+8x+8-17$ $1pt$

$\boxed{x^3+6x^2-3x-9}$ $1pt$

15 Solve the formula $A=p+prt$ *for* t. **(3 pts)**

$A-p=prt$ $1pt$

$\dfrac{A-p}{pr}=\dfrac{prt}{pr}$ $1pt$

$\boxed{\dfrac{A-p}{pr}=t \quad or \quad \dfrac{A}{pr}-\dfrac{1}{r}=t}$ $1pt$

16 Write the equation of the line passing through the point $(-3,4)$ and having slope -5. Give the final answer in the slope - intercept form. **(4 pts)**

$\left.\begin{array}{l} y-y_1=m(x-x_1) \\ y-4=(-5)[x-(-3)] \end{array}\right\}$ *or* $\left.\begin{array}{l} y=mx+b \\ 4=(-5)(-3)+b \end{array}\right\}$ $2pts$

$\left.\begin{array}{l} y-4=(-5)(x+3) \\ y-4=-5x-15 \end{array}\right\}$ *or* $\left.\begin{array}{l} 4=15+b \\ b=-11 \end{array}\right\}$ $1pt$

$\boxed{y=-5x-11}$ $1pt$

17 Write the equation of the line passing through the pair of points $(2,-7)$ *and* $(-4,5)$. Give the final answer in the slope - intercept form. **(5 pts)**

$m=\dfrac{y_2-y_1}{x_2-x_1} \quad m=\dfrac{5-(-7)}{-4-2} \quad m=\dfrac{12}{-6} \quad m=-2$ $1pt$

$\left.\begin{array}{l} y-y_1=m(x-x_1) \\ y-(-7)=(-2)(x-2) \end{array}\right\}$ *or* $\left.\begin{array}{l} y=mx+b \\ -7=(-2)2+b \end{array}\right\}$ $2pts$

$\left.\begin{array}{l} y+7=(-2)(x-2) \\ y+7=-2x+4 \end{array}\right\}$ *or* $\left.\begin{array}{l} -7=-4+b \\ b=-3 \end{array}\right\}$ $1pt$

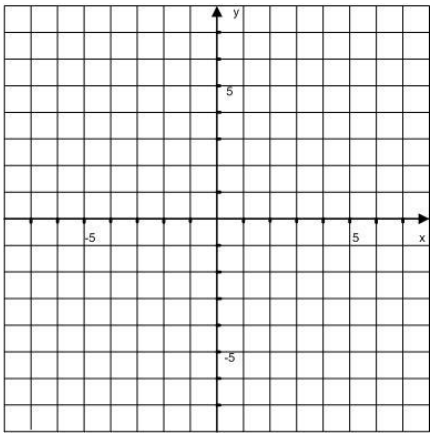
$\boxed{y=-2x-3}$ $1pt$

18 Graph the linear inequality $3x-2y<6$ **(8 pts)**

$x=0$ $\boxed{y=-3}$ $2\,pt$ $y=0$ $\boxed{x=2}$ $2\,pt$

graph the line $2\,pt$ *choose the broken line* $1\,pt$

The test point $(0,0)$, $0<6$ *is a true, shade a right region* $1\,pt$



19 (a)Solve the linear inequality, (b) graph the solution, and (c) write the solution set as interval notation: $7(x-1)-2(x+4)\le 0$ **(5 pts)**

$7x-7-2x-8\le 0$ $1\,pt$

$5x-15\le 0$ $1\,pt$

$5x\le 15$ $\boxed{x\le 3}$ $1\,pt$

$1\,pt$

$\boxed{(-\infty,3]}$ $1\,pt$

20 Solve the system of equations: $\begin{cases}2x-5y=16\\3x-4y=17\end{cases}$ **(4 pts)**

$\begin{cases}(2x-5y=16)\bullet(-3)\\(3x-4y=17)\bullet 2\end{cases}$ $1\,pt$

$\begin{cases}-6x+15y=-48\\6x-8y=34\end{cases}$ $1\,pt$

$7y=-14$ $\frac{7}{7}y=\frac{-14}{7}$ $\boxed{y=-2}$ $1\,pt$

$\left.\begin{array}{l}2x-5(-2)=16\\2x+10=16\\2x=6\quad\boxed{x=3}\end{array}\right\}$ $1\,pt$

21 Simplify and write the answer using only positive exponents: $\dfrac{-27x^{-5}y^{7}}{63x^{4}y^{-6}}$ **(4 pts)**

for canceling 27 *with* 63 *by* 9 — 1 pt

for dividing x^{-5} *by* x^{4} — 1 pt

for dividing y^{7} *by* y^{-6} — 1 pt

for moving x^{-9} *to denominator as* x^{9} — 1 pt

$\boxed{\dfrac{-3y^{13}}{7x^{9}}}$

22 Multiply: $(2y-3)(2y^{3}-4y^{2}+2y-3)$ **(5 pts)**

$4y^{4}-8y^{3}+4y^{2}-6y-6y^{3}+12y^{2}-6y+9$ — 2 pts

$4y^{4}-8y^{3}-6y^{3}+4y^{2}+12y^{2}-6y-6y+9$ — 2 pts

$\boxed{4y^{4}-14y^{3}+16y^{2}-12y+9}$ — 1 pt

23 Perform the indicated operation: $(2x-3y)^{2}$ **(3 pts)**

$(2x-3y)(2x-3y)$ — 1 pt

$4x^{2}-6xy-6xy+9y^{2}$ — 1 pt

$\boxed{4x^{2}-12xy+9y^{2}}$ — 1 pt

24 Use the long division to perform the division: $\dfrac{6x^{2}-13x-3}{x-3}$ **(6 pts)**

2 pts 2 pts

$\boxed{6x}$ $\boxed{+5}$

$x-3\overline{)\,6x^{2}-13x-3}$

$-6x^{2}+18x$

$5x-3$

$-5x+15$

$\boxed{12}$

2 pts

25 The product of the second and third of three consecutive integers is 2 more than 10 times the first integer. Find the integers. **(7 pts)**

$(x+1)(x+2)=10x+2$ $3\,pts$

$x^2+3x+2=10x+2$ $1\,pt$

$x^2-7x=0$ $1\,pt$

$x(x-7)=0 \quad x=0 \quad x=7$ $1\,pt$

$\{0,1,2\} \quad or \quad \{7,8,9)$ $1\,pt$

26 Solve by factoring: $3y^2=10y+8$ **(5 pts)**

$3y^2-10y-8=0$
$3y^2-12y+2y-8=0$ $2\,pts$

$3y(y-4)+2(y-4)=0$ $1\,pt$

$(y-4)(3y+2)=0$ $1\,pt$

$y-4=0 \quad \boxed{y=4}$

$3y+2=0 \quad \boxed{y=-\frac{2}{3}}$ $1\,pt$

27 Simplify into lowest terms: $\frac{x^2-2x-24}{x^2+x-12}$ **(4 pts)**

$x^2-2x-24=(x-6)(x+4)$ $1.5\,pts$

$x^2+x-12=(x-3)(x+4)$ $1.5\,pts$

$\frac{(x-6)(x+4)}{(x-3)(x+4)}=\boxed{\frac{(x-6)}{(x-3)}}$ $1\,pt$

28 Multiply and simplify: $\frac{x^2-5x+6}{x^2+3x-28} \bullet \frac{x^2+x-20}{x^2+2x-15}$ **(7 pts)**

$x^2-5x+6=(x-2)(x-3)$ $1.5\,pts$

$x^2+x-20=(x+5)(x-4)$ $1.5\,pts$

$x^2+3x-28=(x+7)(x-4)$ $1.5\,pts$

$x^2+2x-15=(x+5)(x-3)$ $1.5\,pts$

$\frac{(x-2)(x-3)}{(x+7)(x-4)} \bullet \frac{(x+5)(x-4)}{(x+5)(x-3)} = \boxed{\frac{(x-2)}{(x+7)}}$ $1\,pt$

29 Subtract. Write answer in lowest terms: $\frac{3}{x-2} - \frac{9}{x^2-x-2}$ **(6 pts)**

$\frac{(x+1)3}{(x-2)(x+1)} - \frac{9}{(x-2)(x+1)}$ $LCD=(x+1)(x-2)$ $1\,pt$

$\frac{3x+3}{(x-2)(x+1)} - \frac{9}{(x-2)(x+1)}$

$\frac{3x+3-9}{(x-2)(x+1)}$ $\frac{3x-6}{(x-2)(x+1)}$ $1\,pt$

$\frac{3(x-2)}{(x-2)(x+1)}$ $\boxed{\frac{3}{(x+1)}}$ $1\,pt$

30 Solve and check for any extraneous solution: $\frac{x}{x+5} + \frac{2}{x-4} = \frac{18}{x^2+x-20}$ **(8 pts)**

$\frac{x}{x+5} + \frac{2}{x-4} = \frac{18}{(x+5)(x-4)}$ $LCD=(x+5)(x-4)$ $3\,pts$

$\left[\frac{x}{x+5} + \frac{2}{x-4} = \frac{18}{(x+5)(x-4)}\right](x+5)(x-4)$ $1\,pt$

$x(x-4)+2(x+5)=18$ $1\,pt$

$x^2-4x+2x+10=18$
$x^2-2x-8=0$ $1\,pt$

$(x-4)(x+2)=0$ $1\,pt$

$x=4$ N/S $\boxed{x=-2}$ $1\,pt$

31 Nancy Johnson invested $18,000. Part of it was invested at 3% annual simple interest, and the rest was invested at 4%. Her interest income for the first year was $630. How much did she invest at each rate? **(7 pts)**

$\begin{cases} x+y=18000 \\ 0.03x+0.04y=630 \end{cases}$ $3\,pts$

$\begin{cases} x+y=18000 \\ 3x+4y=63000 \end{cases}$ $\begin{cases} (x+y=18000)(-3) \\ 3x+4y=63000 \end{cases}$ $\begin{cases} -3x-3y=-54000 \\ 3x+4y=63000 \end{cases}$ $2\,pts$

$\boxed{y=9000}$ $1\,pt$

$x+9000=18000 \quad \boxed{x=9000}$ $1\,pt$

32 Multiply and simplify: $\sqrt{3x^3y} \bullet \sqrt{27xy^3}$ **(4 pts)**

$\sqrt{3x^3y \bullet 27xy^3}$ $1\,pt$

$\sqrt{81x^4y^4}$ $1\,pt$

$\sqrt{9^2(x^2)^2(y^2)^2} = \boxed{9x^2y^2}$ $2\,pts$

33 Solve: $x^2-21=-3$ **(4 pts)**

$x^2=18 \quad or \quad x^2-18=0$ $1\,pt$

$\sqrt{x^2}=\pm\sqrt{18} \quad or \quad (x-\sqrt{18})(x+\sqrt{18})=0$ $1\,pt$

$\boxed{x=\pm 3\sqrt{2}}$ $2\,pts$

34 Solve and check each potential solution: $\sqrt{x+7}=4$ **(4 pts)**

$\left(\sqrt{x+7}\right)^2=(4)^2$ $2\,pts$

$x+7=16 \quad \boxed{x=9}$ $1\,pt$

$\sqrt{9+7}=4 \quad \sqrt{9}=4$ $1\,pt$

35 Use the quadratic formula to solve: $x^2 - 4x + 2 = 0$ **(5 pts)**

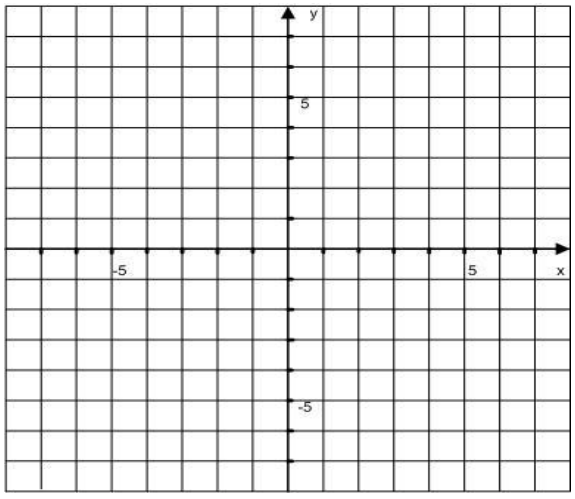
$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $a = 1$ $b = -4$ $c = 2$ $2\,pts$

$x = \dfrac{-(-4) \pm \sqrt{(-4)^2 - 4 \bullet 1 \bullet 2}}{2 \bullet 1}$ $x = \dfrac{4 \pm \sqrt{8}}{2}$ $2\,pts$

$x = \dfrac{2(2 \pm \sqrt{2})}{2}$ $x = \boxed{2 \pm \sqrt{2}}$ $1\,pt$

36 **(a) Find** the x-intercept = $(3,0)$,(b) and the y–intercept = $(0,-4)$ of the equation **(6 pts)**
$4x - 3y = 12$. (c) Graph the equation using the intercepts.

$x = 0$ $\boxed{y = -4}$ $2\,pts$ $y = 0$ $\boxed{x = 3}$ $2\,pts$



$2\,pts$