Math 098
Final Exam Review
Fall 2006

1) Simplify: $2\{-1+3[-4(-10+12)]\}$

a) -46 b) -50 c) 32 d) 50

2) Simplify: $5(x-3y)-(4x-2y)$

a) $9x-13y$ b) $x-13y$ c) $13y-x$ d) $x-17y$

3) Solve: $|x-4|=6$

a) $\{2\}$ b) $\{10,-2\}$ c) $\{2,-10\}$ d) $\{-10\}$

4) Solve the following inequality: $|2x-4|>6$

a) $(-\infty,1)$ b) $(-5,\infty)$ c) $(5,\infty)$ d) $(-\infty,-1)\cup(5,\infty)$

5) Solve for x: $\frac{5}{2}(4x+2)\le -35$

a) $(-\infty,-4]$ b) $(-4,\infty)$ c) $[-\infty,-4)$ d) $[-4,\infty)$

6) Solve the following inequality: $\frac{x+4}{x-6}\ge 0$

a) $(-\infty,-4)\cup(6,\infty)$ b) $[-4,-6)$ c) $(-4,-6)$ d) $(-\infty,-4]\cup(6,\infty)$

7) Solve for x: $(x-3)^2+5(x-3)+4=0$

a) $\{1,-2\}$ b) $\{3\}$ c) $\{-1,2\}$ d) $\{4,-1\}$

8) Simplify: $\left(\frac{6a^3b^{-2}c^4}{2a^4b^2c^2}\right)^{-2}$

a) $\frac{a^2b^8}{9c^4}$ b) $\frac{a^2b^8}{3c^4}$ c) $\frac{3c^4}{a^2b^8}$ d) $\frac{9c^4}{a^2b^8}$

9) Simplify: $\left(-3x^{-2}y^3\right)^2$

a) $\frac{x^4}{9y^6}$ b) $\frac{9y^6}{x^4}$ c) $\frac{y^6}{9x^4}$ d) $\frac{9x^4}{y^6}$

10) Write the system of equations needed to solve the problem. Do not solve.

I need to mix antifreeze A which is 12% alcohol with antifreeze B which is 18% alcohol. I want the final mixture to be 20 liters of 17% alcohol. How many liters of each type do I need?

a) $\begin{aligned} A+B&=3.4\\ .12A+.18B&=20\end{aligned}$ b) $\begin{aligned} A+B&=20\\ A+B&=17\end{aligned}$ c) $\begin{aligned} A+B&=20\\ .12A+.18B&=3.4\end{aligned}$ d) $\begin{aligned} A+B&=34\\ A+B&=20\end{aligned}$

11) Multiply: $(2x+3)(x^2-3x-2)$

a) $2x^3-9x^2-6x$ b) $2x^3-3x^2-13x-6$ c) $5x^2-15x-10$ d) $2x^3-9x^2+5x-6$

12) Divide: $\left(2x^3 - 9x^2 + 7x + 6\right) \div (x - 2)$

a) $2x^2 - 13x - 33 \quad r - 60$ b) $2x^2 - 5x - 3$

c) $2x^2 - 5x - 3 \quad r12$ d) $x^2 - 7x + 9$

13) Find all the numbers which make the following rational expression undefined.

$$\frac{1}{x^2 + 12x + 32}$$

a) 0 b) -8 and -4 c) 8 and 4 d) -16 and -2

14) Perform the indicated operations and simplify: $\dfrac{x}{x^3 - 64} - \dfrac{2}{x - 4} + \dfrac{1}{x^2 + 4x + 16}$

a) $\dfrac{-2x^2 - 6x - 36}{(x - 4)\left(x^2 + 4x + 16\right)}$ b) $\dfrac{2x + 11}{x - 4}$

c) $\dfrac{2x^2 - 9x - 36}{x^3 - 64}$ d) $\dfrac{x - 1}{x^3 - 64}$

15) Divide and simplify completely: $\dfrac{2x^2 - 7x + 6}{4x^2 - 9} \div \dfrac{x^2 - x - 2}{4x^2 + 12x + 9}$

a) $\dfrac{2x - 3}{x + 1}$ b) 7 c) -7 d) $\dfrac{2x + 3}{x + 1}$

16) Which one of the factors of $6x^2 - 19x + 10$ is listed below?

a) $2x + 5$ b) $6x - 1$ c) $2x - 5$ d) $3x - 5$

17) Larry takes $1\frac{1}{2}$ times as long to go 72 miles upstream as he takes to go 72 miles downstream. If the speed of his boat in still water is 30 mph, what is the speed of the current?

a) 12 mph b) 8 mph c) 60 mph d) 6 mph

18) Simplify: $\dfrac{\dfrac{3}{x - 3}}{\dfrac{5}{x^2 - 9} - \dfrac{2}{x + 3}}$

a) -1 b) $\dfrac{3x + 9}{-2x - 1}$ c) $\dfrac{3x + 9}{-2x - 2}$ d) $\dfrac{3x + 9}{-2x + 11}$

19) Simplify: $\left(-x^6\right)^{-2/3}$

a) $-x^4$ b) $\dfrac{1}{x^4}$ c) x^9 d) $\dfrac{1}{-x^9}$

20) Add the following: $3x\sqrt[3]{128y^3} + 5y\sqrt[3]{2x^3}$

a) $17xy\sqrt[3]{2}$ b) $17(x + y)\sqrt[3]{2}$ c) $17x^2y^2\sqrt[3]{2}$ d) $17xy\sqrt[3]{4}$

21) Rationalize the denominator: $\dfrac{\sqrt{3} + 5}{\sqrt{3} - 4}$

a) $\dfrac{23 + 9\sqrt{3}}{-13}$ b) $\dfrac{-17 + \sqrt{3}}{-13}$ c) $\dfrac{3 + 5\sqrt{3}}{-1}$ d) $\dfrac{-5}{4}$

22) Multiply: $(3-5i)(7+2i)$

a) $29-31i$ b) $31-29i$ c) $31-41i$ d) $11-29i$

23) Solve for x: $\sqrt{x+2}-2=x$

a) $\{-2,-1\}$ b) $\{2,1\}$ c) $\{-2,1\}$ d) $\{2,-1\}$

24) Write the equation to answer the following. Do not solve.

The length of a rectangle exceeds the width by 3; the area is 108. Find the width.
Let W = Width and L = Length

a) $L+W=108$ b) $W^2-3W+108=0$ c) $W^2+W=108$ d) $W^2+3W-108=0$

25) Bill the bricklayer can build a wall in 5 hours. His assistant takes 7 hours to build the same wall. How long will it take them to build the wall if they work together?

a) $3\frac{7}{12}$ hrs b) $2\frac{11}{12}$ hrs c) 6 hrs d) 5 hrs

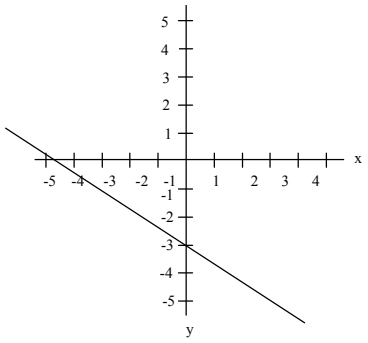
26) Write the equation that would solve the following problem. Do not solve.

The first angle is twice the measure of the third angle. The second angle is 3 times the measure of third angle.

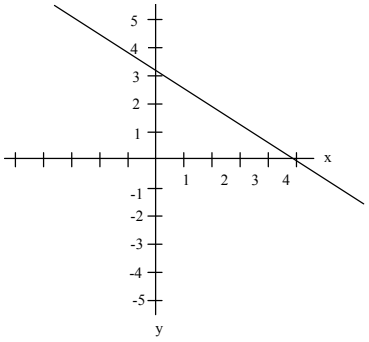
a) $5x=360$ b) $6x=360$ c) $6x=180$ d) $5x=180$

27) Graph the following: $3x-5y=15$

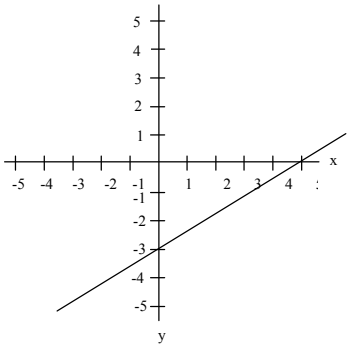
a)



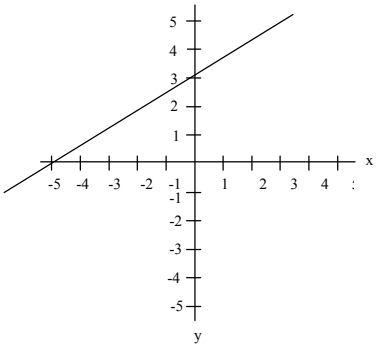
b)



c)

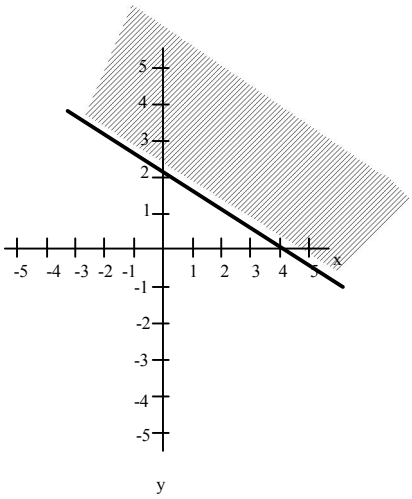


d)

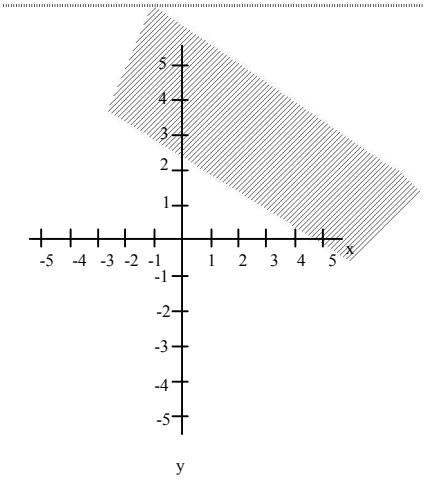


28) Graph the following: $y \geq -\frac{1}{2}x + 2$

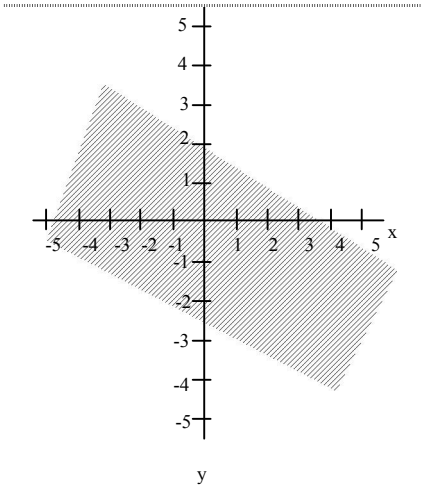
a)



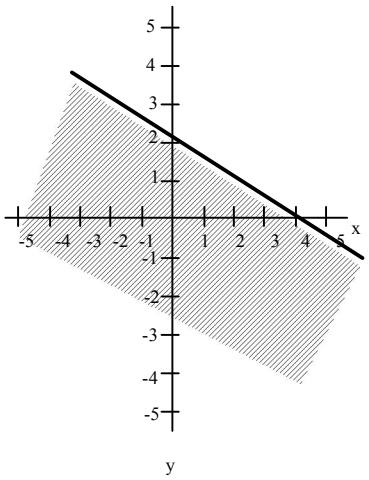
b)



c)



d)



29) Write the equation of the line through the following point $(-3,-6)$ and perpendicular to the line $y = \frac{-1}{3}x + 2$.

a) $y = 3x + 3$ b) $y = \frac{-1}{3}x - 7$ c) $y = 3x + 15$ d) $y = \frac{-1}{3}x - 5$

30) Solve the system for *y*:

$$\begin{aligned} 5x - 7y + 8z &= 69 \\ 2x - y + 9z &= 36 \\ -3x + 3y - 2z &= -27 \end{aligned}$$

a) $y = 3$ b) $y = 2$ c) $y = -5$ d) $y = 5$

31) What is the vertex of the following parabola: $y = x^2 + 6x + 2$

a) $(-3,-7)$ b) $(-3,29)$ c) $(3,-7)$ d) $(3,29)$

32) Solve: $x^2 - 4 \le 0$

a) $(-\infty, -2]$ b) $[-2, 2]$ c) $[-2, \infty)$ d) $(-\infty, -2]$ or $[2, \infty)$

33) What is the equation of the circle with center at $(-3, 5)$ and radius of 2.

a) $(x+3)^2 + (y-5)^2 = 2$ b) $(x-3)^2 + (y-5)^2 = 2$

c) $(x+3)^2 + (y-5)^2 = 4$ d) $(x-3)^2 + (y-5)^2 = 4$

34) Which of the following sets of ordered pairs is **not** a function?

a) $\{(3,1),(4,2),(5,2),(6,2)\}$ b) $\{(-1,0),(0,0),(1,0),(2,0)\}$

c) $\{(1,0),(2,1),(3,2),(4,3)\}$ d) $\{(2,3),(4,1),(6,-1),(2,-3)\}$

35) Find the distance between the points $(4, -1)$ and $(12, 3)$. Simplify completely.

a) $4\sqrt{5}$ b) 12 c) $2\sqrt{17}$ d) $4\sqrt{3}$

36) Given $f(x) = x^2 + 6x + 9$ and $g(x) = x + 1$, find $(g \circ f)(x)$.

a) $x^3 + 7x^2 + 15x + 9$ b) $x^2 + 6x + 10$ c) $x^2 + 8x + 16$ d) $x^2 + 6x$

37) Simplify and express in standard form: $\dfrac{3i}{3+2i}$

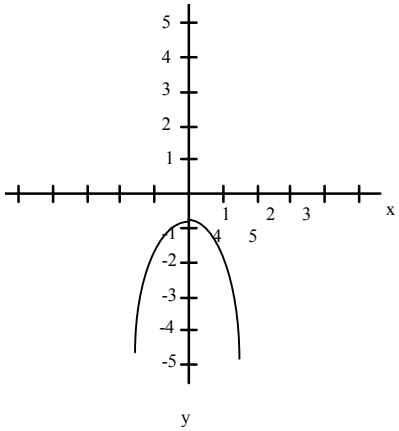
a) $\dfrac{-2}{5} + \dfrac{9}{5}i$ b) $\dfrac{6}{13} - \dfrac{9}{13}i$ c) $\dfrac{6}{13} + \dfrac{9}{13}i$ d) $\dfrac{6}{5} + \dfrac{9}{5}i$

38) Solve for x: $2x^2 + 7x + 8 = 0$

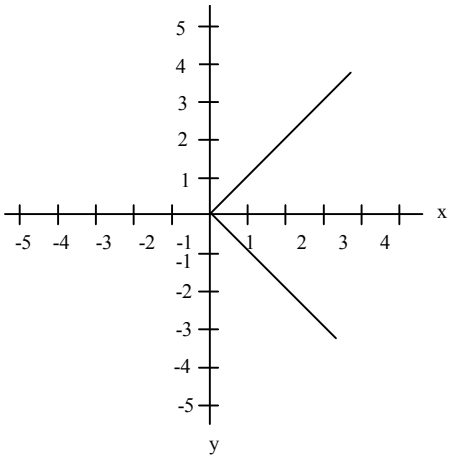
a) $\dfrac{7 \pm i\sqrt{15}}{4}$ b) $\dfrac{-7 \pm i\sqrt{113}}{4}$ c) $\dfrac{-7 \pm i\sqrt{15}}{4}$ d) $\dfrac{-7 \pm i\sqrt{15}}{-4}$

39) Which of the following graph does not represent y as function of x?

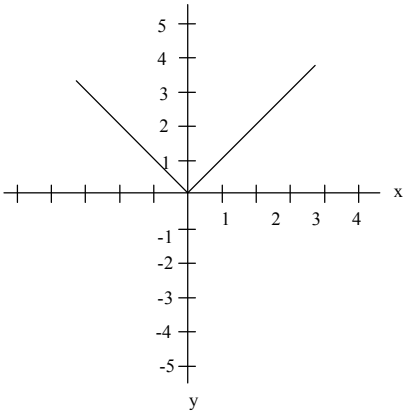
a)



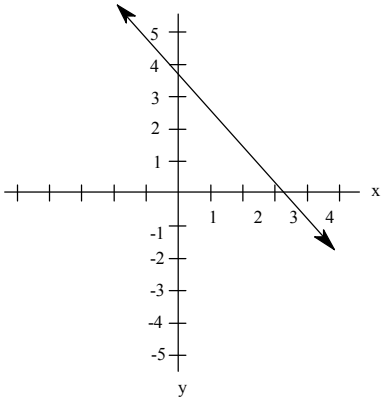
b)



c)



d)



40) If y varies directly to x, and y is $\frac{16}{3}$ when x is $\frac{16}{15}$, find the value of y when x is 2.

a) 10 b) $\frac{15}{16}$ c) $\frac{3}{16}$ d) 15

Math 098
Final Exam Review Answers
Fall 2006

1) (b) -50

2) (b) $x - 13y$

3) (b) $\{10, -2\}$

4) (d) $(-\infty, -1) \cup (5, \infty)$

5) (a) $(-\infty, -4]$

6) (d) $(-\infty, -4] \cup (6, \infty)$

7) (c) $\{-1, 2\}$

8) (a) $\frac{a^2 b^8}{9c^4}$

9) (b) $\frac{9y^6}{x^4}$

10) (c) $\begin{array}{l} A + \quad B = 20 \\ .12A + .18B = 3.4 \end{array}$

11) (b) $2x^3 - 3x^2 - 13x - 6$

12) (b) $2x^2 - 5x - 3$

13) (b) -8 and -4

14) (a) $\frac{-2x^2 - 6x - 36}{(x-4)(x^2 + 4x + 16)}$

15) (d) $\frac{2x+3}{x+1}$

16) (c) $2x - 5$

17) (d) 6 mph

18) (d) $\frac{3x+9}{-2x+11}$

19) (b) $\frac{1}{x^4}$

20) (a) $17xy\sqrt[3]{2}$

21) (a) $\frac{23 + 9\sqrt{3}}{-13}$

22) (b) $31 - 29i$

23) (a) $\{-2, -1\}$

24) (d) $W^2 + 3W - 108 = 0$

25) (b) $2\frac{11}{12}$ hrs

26) (c) $6x = 180$

27) (c) graph c

28) (a) graph a

29) (a) $y = 3x + 3$

30) (c) $y = -5$

31) (a) $(-3, -7)$

32) (b) $[-2, 2]$

33) (c) $(x+3)^2 + (y-5)^2 = 2$

34) (d) $\{(2,3), (4,1), (6,-1), (2,-3)\}$

35) (a) $4\sqrt{5}$

36) (b) $x^2 + 6x + 10$

37) (c) $\frac{6}{13} + \frac{9}{13}i$

38) (c) $\frac{-7 \pm i\sqrt{15}}{4}$

39) (b) graph b

40) (a) 10