

## 22M:001-Practice Final Exam

1) Find an equation for the line passing through the point  $(1, 2)$  and perpendicular to the line with equation  $2x + 3y = 1$ .

2) Solve for  $B$ :  $A = \frac{1}{2}(B + b)h$ .

3) Solve the system

$$\begin{aligned}x + y &= 3 \\ -3x + y &= 1\end{aligned}$$

4) Subtract and leave in lowest terms:  $\frac{q}{q^2-4q-5} - \frac{3}{2q^2-13q+15}$ .

5) Solve the equation  $2x^2 + 6x = 10$

6) The longer leg of a right triangle is two meters longer than twice the short leg. The hypotenuse is two meters less than three times the short leg. Find the lengths of all three sides of the triangle.

7) Factor as completely as possible:  $8x^2y - 14xy^3 + 6y^5$ .

8) Find the domain of the function  $y = \frac{x+y}{x-3}$ .

9) Simplify by writing as a rational expression and canceling common factors:  $\frac{\frac{x-1}{x+1}}{\frac{1}{x^2-1}}$ .

10) Express as a single power of  $m$  the expression  $\frac{m^{2/3}m^{5/6}}{m^{4/3}}$

11) Solve the equation (if possible)  $\sqrt{21+x} = 3 + \sqrt{x}$

12) Multiply and combine like terms:  $(x^3 + 1)(x^6 - x^3 + 1)$ .

13) Solve  $2x^2 + 6x < -4$  and graph the solution set.

14) For what values of  $k$  does the equation  $2x^2 + 3x + k = 0$  have **no** real solution?

15) A 60% solution of salt is to be mixed with and 80% solution of salt to get 40 liters of a 65% solution of salt. How many liters of each solution should be used?

16) A boat cruises in still water at 30 mph. At cruising speed it travels 45 miles with the current in the same time it takes to travel 35 miles against the current. What

is the speed of the current?

17) If  $x$  varies directly as  $y$  and  $x = 12$  when  $y = 5$ , find the value of  $x$  when  $y = 3$

18) Sketch the graph of the parabola  $y + 3x^2 + 5x = -2x^2 + 4$ .

19) Graph  $y - 1 = 2x^2 - 4x$ .

20) Find  $\frac{6}{x^2-2x+1} - \frac{1}{x^2-1}$ .