

22M:001-Practice Final Exam Version 2

- 1) Factor $6x^2 + 7x - 20$.
- 2) One Job pays \$250 per week with a 10% commission. The second pays \$300 per week with an 8% commission, for what amount of sales do these two jobs pay the same?
- 3) Divide and simplify. Assume variables are positive: $\frac{\sqrt{2yx^5y^7}}{\sqrt{3xy^5}}$
- 4) Solve the equation by completing the square: $x^2 - 6x - 16 = 0$.
- 5) Solve the equation by using the quadratic formula: $2x^2 - 6x + 3 = 0$
- 6) Add and simplify: $\frac{x-1}{x+2} + \frac{2x}{x-2}$
- 7) Simplify: $\frac{5}{\frac{3}{x} - \frac{6}{y}}$
- 8) If $f(x) = x^2 + x$, find $f(0)$, $f(1)$, and $f(3)$.
- 9) Simplify: $\left(\frac{2x^3}{3y^2}\right)^{-2}$
- 10) Find the equation of the line passing through the points $(7, -2)$ and $(-3, 4)$.
- 11) A 22-foot piece of rope is cut into two pieces, such that one piece is 7 feet longer than the other. Find the length of the shorter piece.
- 12) Divide $(x^2 - x - 12)$ by $(x - 4)$.
- 13) Solve for x : $(2x + 5)^2 = 81$
- 14) A square has area equal to 72 in^2 . Find the length of its diagonal.
- 15) Solve for x : $\frac{5}{x} + 3 = \frac{7}{2x}$
- 16) Determine if the graphs of $x + 3y = 6$ and $-6x + 2y = 8$ are parallel lines, perpendicular lines, or neither.
- 17) Find the slope, x -intercept, y -intercept and graph of the equation $7x + 3y = 21$.
- 18) Graph the inequality $5x - y > 10$.

19) Solve the linear system:

$$2x + 7y = 16$$

$$3x + 2y = 7$$

20) Use the quadratic formula to solve for x : $x^2 + 4x + 2 = 0$.

21) Solve the following for x : $\frac{2}{3}(x + 5) = \frac{1}{4}x + 5$.

22) The formula for the surface area of a cylinder is given by $A = 2\pi r^2 + 2\pi rh$. Solve this equation for h .

23) A plumber charges a flat fee of \$30 plus \$55 per hour. How many hours must a job take for the plumber to make more than \$800?

24) Simplify the following expression: $\left(\frac{-2m^2}{5n^3}\right)^3$

25) Find a polynomial expression for the perimeter of a rectangle with length $4x^2 - 3$ and width $x + 9$. Also, find a polynomial expression for the area of this rectangle.

26) Factor the following by grouping, rearrange the terms if necessary: $6x^2 + 6y^2 + 9xy + 4xy$

27) Factor completely:

a $81a^4 - b^2$

b $x^6 - y^6$ {Hint: consider this as a difference of cubes}

28) The area of a triangle is 12 square inches. The height of the triangle is 5 inches longer than the base. Find the length of the base of this triangle.

29) Express the given fraction in lowest terms. Assume that the denominator is not equal to 0. $\frac{x^3}{x^3+x^2}$

30) Divide $\frac{2xy-4x}{3xy+12x}$ by $\frac{y-2}{y+4}$.

31) Subtract and simplify: $\frac{y}{2y+2} - \frac{1}{y+1}$

32) Juan can bike to the Hy-Vee at an average speed of 15 mph. As he was returning the chain broke and he had to walk at an average speed of 5 mph. If the return trip took 80 minutes longer, how far is it from Juan's house to the Hy-Vee?

33) The charge for the plumber in problem 23 is given by $C = 55h + 30$ where h is the time worked in hours. Complete the given ordered pairs of the form (h, C) and interpret their meaning.

a $(5, \quad)$

b $(\quad, 745)$

34) Graph each equation and indicate whether the graph is a horizontal line or a vertical line:

a $x = -2$

b $y = 6$

35) It takes a boat $1\frac{1}{2}$ hours to go 12 miles downstream, and 6 hours to return. Find the speed of the current.

36) Simplify: $\sqrt[2]{25m}\sqrt[3]{125m^3}$

37) Sketch the graph: $y = x^2 - 3x - 4$. Identify the coordinates of the vertex and find the x - and y -intercepts.

38) An economist has determined that the price per unit, y , and the demand, x , are related by the demand equation $y = 60 - \frac{3}{4}x$, while the supply is given by the equation $y = \frac{3}{4}x$. Equilibrium supply and demand occurs at the intersection of these two lines. Complete the table of values, draw graphs for both lines and determine:

a At what value of x does supply equal demand?

b At what value of y does supply equal demand?

c What are the coordinates of the point of intersection of the two lines?

demand	price	supply	price
x	y	x	y
10		10	
20		20	
30		30	
40		40	
50		50	
60		60	

39) Use substitution to solve the system:

$$2x + 3y = 8$$

$$4x + 3y =$$

40) Solve this system by the addition-elimination method:

$$3x - 2y = -13$$

$$9x + 5y = 16$$

41) A 40% dye solution is to be mixed with a 70% dye solution to get 60 liters of a 50% solution. How many liters of the 40% and 70% solutions will be needed?