Name: _____

Math 109P

PART 1: True or False (2 points each)

State whether the given statements are True or False. Mark your answers on the given scantron. Mark a for True and b for False.

1) The base of -7^2 is -7. True or False: _____

2) $\sqrt[8]{x^8} = |x|$. True or False: _____

3) $(x-4)^3 = x^3 - 64$. True or False: _____

4) $x^2 + 121 = (x+11)(x-11)$. True or False: _____

5) $6x - \frac{1}{15} = 18$ is a nonlinear equation. True or False: _____

6) $distance = rate \cdot time$. True or False: _____

7) $x^2 + 3x - 6 = 0$ has no real solutions. True or False: _____

8) Parallel lines have slopes that are opposite reciprocals of one another. True or False: _____

9) $(-1, -2)$ lies in quadrant three. True or False: _____

10) $(9, -3)$ is a solution to $y = \sqrt{x} - 6$. True or False: _____

PART 2: Multiple Choice (2 points each)

Select the correct answer from the choices provided. Mark your answers on the scantron provided.

11) Simplify $(-9x^6y)(-3x^2y^3)$. _____

a) $27x^{12}y^3$ b) $-12x^8y^3$ c) $-27x^8y^3$ d) $27x^8y^4$

12) Simplify $\frac{(2x^{3/5})^5}{x^{-5/2}}$. _____

a) $2x^{1/2}$ b) $2x^{11/2}$ c) $32x^{11/2}$ d) $32x^{1/2}$

13) Multiply and simplify $4\sqrt{6x} \cdot 5\sqrt{30x}$. _____

a) $120\sqrt{5}$ b) $20x\sqrt{30}$ c) $20x\sqrt{5}$ d) $120x\sqrt{5}$

14) Find the distance between $(7,3)$ and $(-2,15)$. _____

a) 3 b) 15 c) 21 d) 225

15) Simplify $\sqrt{\frac{12x^3}{25y^4}}$. _____

a) $\frac{2\sqrt{3x^3}}{5y^2}$ b) $\frac{2x^2\sqrt{3xy^3}}{5y^2}$ c) $\frac{2x\sqrt{3x}}{5y^2}$ d) $\frac{2x^3\sqrt{3}}{5y^2}$

16) Add $7\left(\sqrt[3]{x^3y^7}\right) + 5xy\left(\sqrt[3]{8y^4}\right)$.

_____

a) $12x^2y^3\left(\sqrt[3]{y}\right)$ b) $12xy^3\left(\sqrt[3]{8y}\right)$ c) $17x^2y^2\left(\sqrt[3]{2y}\right)$ d) $17xy^2\left(\sqrt[3]{y}\right)$

17) Factor $15z^2 + 4z - 4$. _____

a) $(3z+2)(5z-2)$ b) $(15z+2)(z-2)$ c) $(3z-2)(5z+2)$ d) prime

18) Simplify $\frac{3y^2+7y+2}{y^2-4}$. _____

a) $\frac{3y+1}{y-2}$ b) $\frac{3y-1}{y+2}$ c) $\frac{1-3y}{y-2}$ d) $\frac{1-3y}{y+2}$

19) Decide what number must be added to $x^2 + 6x$ to make a perfect square trinomial. _____

a) 3 b) 9 c) 5 d) 18

20) Solve $(x + 4)(x + 3) \leq 0$. _____

a) $(-4, -3)$ b) $[-4, -3]$ c) $(-\infty, -4) \cup (-3, \infty)$ d) $(-\infty\infty, -4] \cup [-3, \infty)$

21) Find the midpoint of the line segment joining $(3, -5)$ and $(8,8)$. _____

a) $(-5, -13)$ b) $\left(\frac{11}{2}, \frac{3}{2}\right)$ c) $(11,3)$ d) $\left(-\frac{5}{2}, -\frac{13}{2}\right)$

22) Find the center of $x^2 + y^2 - 6x - 8y - 11 = 0$. _____

a) $(-3,4)$ b) $(3,4)$ c) $(-3, -4)$ d) $(3, -4)$

23) Multiply $\left(\sqrt{7x} - 4\right)\left(\sqrt{2x} - 2\right)$. Assume variables represent non-negative values. _____

a) $x\sqrt{14} + \sqrt{2x} + 8$ b) $x\sqrt{14} + 8$
c) $x\sqrt{2} + 8$ d) $x\sqrt{14} - 2\sqrt{7x} - 4\sqrt{2x} + 8$

24) Find the equation of a vertical line through $(8,5)$. _____

a) $y = 5$ b) $x = 5$ c) $y = 8$ d) $x = 8$

25) Decide whether the lines $3x - 2y = -14$ and $6x + 9y = -8$ are parallel, perpendicular, or neither. _____

a) parallel b) perpendicular c) neither

26) Perform the operation for $(x^2+1)-(4x^2-7)+(x^2+x+9)$. _____

a) $-4x^2+x+17$ b) $-2x^2-6x+10$ c) $-2x^2+x+17$ d) $-3x^2+x+17$

27) Rationalize $\frac{\sqrt[3]{5x}}{\sqrt[3]{3y}}$. Assume variables represent non-negative values. _____

a) $\frac{45x}{3y}$ b) $\frac{\sqrt[3]{45xy^2}}{3y}$ c) $\frac{\sqrt[3]{135xy^2}}{3y}$ d) $\frac{\sqrt[3]{45xy}}{3y}$

PART 3: Fill in the blank. (2 points for each blank)

Answer each question in the blank provided below.

For questions 28-32, consider the set of real numbers $\left\{-17, -\sqrt{5}, -\frac{25}{19}, 0, 0.331, 1, \frac{\pi}{2}\right\}$, list the numbers that are:

28) natural numbers Answer: _____

29) whole numbers Answer: _____

30) integers Answer: _____

31) rational numbers Answer: _____

32) irrational numbers Answer: _____

33) Evaluate. $-\left|\frac{-2\cdot 6}{4}\right| =$ Answer: _____

34) Use the commutative property to rewrite $6(x+4)$. Answer: _____

35) Use the associative property to rewrite $4+(a+11)$. Answer: _____

36) Use the distributive property to rewrite $20(x+y)$. Answer: _____

37) Write the standard form of the equations of a circle with center $(-2,3)$ and radius 4.

Answer: _____

38) Rationalize $\frac{12}{\sqrt{17}+4}$. Answer: _____

39) Simplify $4(6x-1)-3(x-3)$. Answer: _____

40) Evaluate b^2-4ac for $a=-4, b=5$, and $c=-6$. Answer: _____

PART 4: Open-ended (5 points each)

Show all of your work for full credit below each question. Circle your final answer.

41) Simplify the exponential expression. Assume all variables represent positive real numbers. Answer with positive exponents.

$$\left(\frac{8x^{-5}y^{-3}z^{3}}{2xy^{-3}z^{-3}}\right)^{-1}$$

42) Perform the operation.

$(3y+11)(7y^2-2y-10)$

43) Perform the operation.

$(x-2)(x-11)$

44) Perform the operation.

$(x + 12)^2$

45) Find the quotient and remainder when $x^2 + 8x + 6$ is divided by $x + 5$.

46) Perform the operation and simplify. Leave the answer in factored form.

$$\frac{x^2-6x-16}{3x^2-192} \div \frac{x^2+10x+16}{x^2+16x+64}$$

47) Perform the operation and simplify. Leave the answer in factored form.

$$\frac{6x}{x^2+4x-12} - \frac{x}{x^2-36}$$

48) Perform the operation and simplify. Leave the answer in factored form.

$$\frac{x-\dfrac{x}{x-8}}{x-9}$$

49) Solve the equation.

$$-5x+3+7(x+1)=-3x+7$$

50) Solve the equation.

$$\frac{1}{2}x-3=7-\frac{3}{4}x$$

51) Solve the equation.

$$\frac{1}{x-4}+\frac{2}{x-2}=\frac{2}{x^2-6x+8}$$

52) Denise has $28,000$ to invest in two investments that pay simple interest. One investment pays 4% simple interest and the other pays 5% simple interest. How much would she have to invest in each investment if the total interest earned in a year is $1,320?

53) Solve the equation.

$x^2 - x = 6$

54) Solve the equation.

$3x^2 + 8x - 3 = 0$

55) Solve the equation.

$3x^2 = 72$

56) Solve the equation.

$x^2 - 8x - 2 = 0$

57) Solve the equation.

$x - 1 = \sqrt{2x + 1}$

58) Solve the linear inequality. Express the answer in interval notation. Graph the solution set.

$3(x - 1) - 5x \geq x + 6$

59) Solve the linear inequality. Express the answer in interval notation. Graph the solution set.

$3 < 4x + 7 \leq 15$

60) Solve the inequality. Express the answer in interval notation.

$|5x - 1| + 7 \leq 9$

61) Solve the inequality. Express the answer in interval notation.

$|3x + 4| > 5$

62) Find the equation of a line passing through $(-5,7)$ and $(3, -5)$. Express your answer in point-slope form, slope-intercept form, and standard form.

63) Find the equation of a line passing through $(1, -4)$ that is perpendicular to the line whose equation is $3x - 5y = 1$. Express your answer in point-slope form.

64) Solve the system of linear equations.

$3x - 2y = 20$

$2x + 6y = -38$