

Practice Final for Math 110

Multiple Choice

Answer

- 1) If $\frac{7-2y}{3} < -5$, then solve for y .
 a) $y < -4$ b) $y < 11$ c) $y > 11$ d) $y > -4$ e) none _____

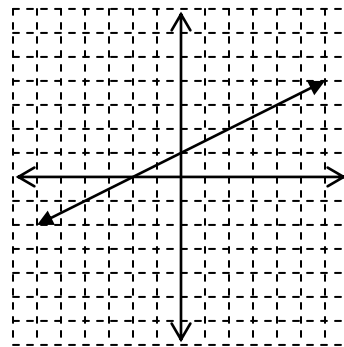
- 2) Pedro is sharing the \$60 in his wallet with his friend. His friend will get a certain amount while Pedro will keep \$5 more than twice the amount he gave his friend. If x represents the amount Pedro gave to his friend, then which equation can be used to find the amount each received?
 a) $3x + 5 = 60$ b) $2x + 5 = 60$ c) $5x = 60$ d) $3x - 5 = 60$ e) none _____

- 3) The distance between city A and city B is 2800 miles. On a certain map, this distance is represented by 140 inches. On the same map, city C and city D are 88 inches apart. What is the actual distance between city C and city D?
 a) 1760 miles b) 1860 miles c) 220 miles d) 1770 miles e) none _____

- 4) Which of these equations has $(4,2)$ as a solution?
 a) $3x - 3y = 18$ b) $y = 2x - 4$ c) $y = \frac{1}{2}x + 1$ d) $2x - 5y = -2$ e) none _____

- 5) Given the equation of the line $y = \frac{4}{3}x - 2$, find the slope and y-intercept.
 a) $m = \frac{4}{3};$
 $(0,2)$ b) $m = -2;$
 $(0, \frac{4}{3})$ c) $m = \frac{4}{3};$
 $(0,-2)$ d) $m = \frac{4}{3};$
 $(-2,0)$ e) none _____

- 6) Find the equation of the line pictured to the right.



- a) $y = \frac{1}{2}x + 1$ b) $y = -\frac{1}{2}x - 1$ c) $y = 2x + 1$ d) $y = -2x - 2$ e) none _____

- 7) Find the equation of the line through the point $(2, -3)$ and with slope $m = \frac{1}{6}$
 a) $y = \frac{1}{6}x + \frac{10}{3}$ b) $y = \frac{1}{6}x - \frac{10}{3}$ c) $y = 6x - 15$ d) $y = \frac{1}{6}x - 3$ e) none _____

- 8) When the system $\begin{cases} 2x + y = -10 \\ 3x + 2y = -14 \end{cases}$ is solved, one of the solutions is:
 a) -2 b) 6 c) -3 d) -6 e) none _____

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9) Jennifer has an assortment of 120 quarters and dimes worth a total of \$25.50. Assume that a system of equations is used to find how many coins of each type Jennifer has. One of the equations would be:

- a) $x + y = 25.50$ b) $0.25x + 0.10y = 120$ c) $0.25x + 0.10y = 120(25.50)$
 d) $0.25x + 0.10y = 25.50$ e) none

10) Simplify $\left(\frac{2y^3}{xz^{-2}}\right)^3$. Write the answer without parentheses or negative exponents.

- a) $\frac{8y^6}{x^3z}$ b) $8x^3y^9z^6$ c) $\frac{6y^9z^6}{x^3}$ d) $\frac{8y^9z^6}{x^3}$ e) none

11) Simplify $\frac{2^{-3} \cdot 2^6}{2^{-4}}$. Write the answer without parentheses or negative exponents.

- a) 4^7 b) 2^7 c) 2^5 d) 8^8 e) none

12) Subtract $3x - 4$ from $2x + 5$.

- a) $x - 9$ b) $x + 1$ c) $-x + 9$ d) $5x + 1$ e) none

13) Multiply $(x - 2)(x + 8)$.

- a) $x^2 - 10x - 16$ b) $x^2 - 6x + 16$ c) $x^2 - 6x - 2$ d) $x^2 + 6x - 16$ e) none

14) Multiply $(6x - 5)^2$.

- a) $36x^2 - 25$ b) $36x^2 - 60x + 25$
 c) $36x^2 + 60x + 25$ d) $36x^2 + 25$ e) none

15) When $8x^2 + 2x - 3$ is factored completely, one of the factors is:

- a) $(2x + 1)$ b) $(8x - 3)$ c) $(2x - 1)$ d) $(4x - 1)$ e) none

16) Factor completely $25x^2 - 4$.

- a) $(5x - 2)^2$ b) $(5x + 2)^2$ c) $(5x + 2)(5x - 2)$ d) Prime e) none

17) Write $\frac{y^2 + 5y - 14}{y^2 + 4y - 21}$ in simplest terms.

- a) $\frac{y - 2}{y - 3}$ b) $\frac{5y - 14}{4y - 21}$ c) $\frac{y^2 + 5y - 14}{y^2 + 4y - 21}$ d) $\frac{5y - 2}{4y - 3}$ e) none

18) Divide $\frac{3(p - 1)}{p} \div \frac{4(p - 1)}{5p^2}$. Write the answer in lowest terms.

- a) $\frac{12p^2 + 24p + 12}{5p^3}$ b) $\frac{4}{15p}$
 c) $\frac{15p^3 - 15p^2}{4p^2 - 4p}$ d) $\frac{15p}{4}$ e) none

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- 19) Subtract the two fractions and simplify completely: $\frac{3x-1}{x+2} - \frac{x-5}{x+2}$.
- a) $\frac{4x-6}{x+2}$ b) 2 c) $\frac{2}{x+2}$ d) $\frac{2x-6}{x+2}$ e) none _____

- 20) You are to add the two fractions $\frac{5x}{x(x-1)} + \frac{6-x}{(x-1)(x+2)}$. To do so, you would have to convert the first fraction to which of the following equivalent forms?
- a) $\frac{5x}{x(x-1)(x+2)}$ b) $\frac{5x(x+2)}{x(x-1)(x+2)}$
- c) $\frac{5x}{x^2-x}$ d) $\frac{5x(x-1)(x+2)}{x(x-1)^2(x+2)}$ e) none _____

- 21) One maid can clean the house in 3 hours. Another maid can do the job in 6 hours. How long will it take them to do the job working together?
- a) $\frac{1}{9}$ hour b) $\frac{1}{18}$ hour c) 6 hours d) 2 hours e) none _____

- 22) Simplify: $\sqrt{40x^5}$
- a) $4x^2\sqrt{10x}$ b) $10x\sqrt{4x^3}$ c) $x^2\sqrt{40x}$ d) $2x^2\sqrt{10x}$ e) none _____

- 23) Rationalize the denominator and simplify completely: $\frac{6}{\sqrt{7}}$
- a) $\frac{\sqrt{42}}{7}$ b) $\frac{6\sqrt{7}}{7}$ c) $\frac{6\sqrt{7}}{49}$ d) $6\sqrt{7}$ e) none _____

- 24) Rationalize the denominator: $\frac{2}{3-\sqrt{2}}$.
- a) $\frac{2(3-\sqrt{2})}{7}$ b) $2\sqrt{2}$ c) $6+2\sqrt{2}$ d) $\frac{6+2\sqrt{2}}{7}$ e) none _____

- 25) You are to solve the equation $\sqrt{x-1} = x-3$. What would be your next step?
- a) $x-1 = x-9$ b) $x-1 = x^2+9$
- c) $x^2+1 = x^2-6x+9$ d) $x-1 = x^2-6x+9$ e) none _____

- 26) Use the quadratic formula to solve $x^2+4x-2=0$. Be sure to simplify your answer completely.
- a) $x = \frac{-4 \pm \sqrt{8}}{2}$ b) $x = \frac{-4 \pm \sqrt{24}}{2}$ c) $x = -2 \pm \sqrt{2}$ d) $x = -2 \pm \sqrt{6}$ e) none _____

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Free Response

Solve the Linear Equations

27) $x + 2(x - 5) = 14$

28) $\frac{x}{4} + 2 = \frac{x}{2} + \frac{1}{3}$

29) $0.12x + 0.04(12 - x) = 0.09(12)$

Simplify

30) $\left(\frac{4x^{-3}y}{x^{-1}}\right)^{-2}$

Multiply

31) $(3x - 4)(2x + 1)$

32) $(4x^2 + 2x - 1)(3x + 2)$

Factor Completely

33) $x^2 - 3x + 2$

34) $2x^2 - 7xy - 15y^2$

35) $12y^2 + 11y + 2$

36) $6xy - 9y + 4x - 6$

Solve

37) $6x^2 + 11x - 7 = 0$

38) $x^2 = 5x$

39) $x^2 = 36$

40) $z(z - 5) = 14$

Word Problems

- 41) Two investments produce an annual interest income of \$4200. The amount invested in 14% is \$6000 less than the amount invested in 10%. Find the amount invested in 14%.
- 42) From a point on a straight road, Lupe and Maria start at the same time and ride bicycles in opposite directions. Lupe rides 10 miles per hour and Maria rides 12 miles per hour. In how many hours will they be 55 miles apart?
- 43) A 40% solution of acid is to be mixed with a 60% solution to get 100 liters of 55% solution. How many liters of each solution should be used?
- 44) A boat can travel 48 miles downstream in 3 hours. If it takes the boat 8 hours to make the return trip back upstream, find the speed of the river current.
- 45) A motorboat can travel on a river upstream 24 miles in the same amount of time it takes to travel 48 miles downstream. If the speed of the river's current is 6 miles/hour, find the speed of the motorboat in still water.

Simplify the Rational Expressions

46) $\frac{2x^2 - x - 1}{x^2 - 2x + 1} \cdot \frac{x^2 + 2x - 3}{2x^2 + 7x + 3}$

47) $\frac{x^2 - 25}{x^2 - 2x - 3} \div \frac{x^2 - 3x - 10}{x^2 - 8x - 20}$

48) $\frac{3}{x^2 - 4} + \frac{2}{x^2 + 4x + 4}$

49) $\frac{13}{x^2 - 5x + 6} - \frac{5}{x - 3}$

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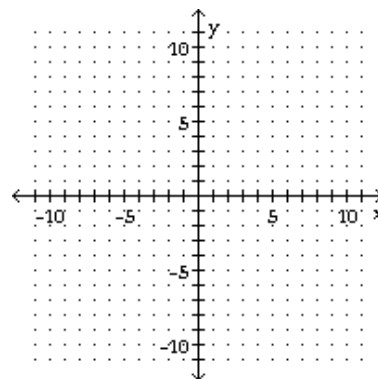
Solve

50) $\frac{10}{x^2 - 25} = \frac{3}{x+5} + \frac{1}{x-5}$

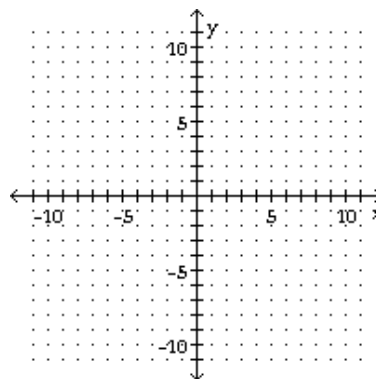
51) $\frac{4y}{y-3} = \frac{3y-1}{y+3} + 3$

52) Find the equation of the line through $(2, -3)$ and $(-1, 8)$. Write your final answer in $y = mx + b$ form.

53) Graph the line through the point $(-3, -4)$, with the slope $\frac{5}{7}$



54) Sketch the graph of $2x - 3y = 12$



Simplify the Radical Expression

55) $\sqrt{\frac{y^3}{7}}$

56) $\sqrt{50} + \sqrt{32} + \sqrt{72}$

Solve each of the following

57) $2(3 - x) \leq 4x + 8$

58) $\sqrt{2-x} - 4 = x$

Solve using the Quadratic Formula. Be sure to simplify your answer completely

59) $3x^2 + 7x - 4 = 0$

Solve each system of linear equations

60) $y = -2x - 1$
 $x + 2y = 4$

61) $2x - 7y = 3$
 $-5x + 3y = 7$

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Answers

- 1) $7 - 2y < -15$
 $\rightarrow -2y < -22 \rightarrow C$
- 2) Pedro: $2x + 5$ dollars,
 friend: x dollars $\rightarrow A$
- 3) $\frac{2800}{140} = \frac{x}{88} \rightarrow A$
- 4) D
- 5) C
- 6) Slope & y-intercept $\rightarrow A$
- 7) B
- 8) Elimination $\rightarrow D$
- 9) D
- 10) $\frac{2^3 y^9}{x^3 z^{-6}} \rightarrow D$
- 11) $\frac{2^3}{2^{-4}} \rightarrow B$
- 12) $(2x + 5) - (3x - 4) \rightarrow C$
- 13) D
- 14) $(6x - 5)(6x - 5) \rightarrow B$
- 15) C
- 16) C
- 17) Factor & Cancel $\rightarrow A$
- 18) Invert & Multiply $\rightarrow D$
- 19) $\frac{2x + 4}{x + 2} \rightarrow B$
- 20) B
- 21) $\frac{1}{3} + \frac{1}{6} = \frac{1}{x} \rightarrow D$
- 22) D
- 23) $\frac{6}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} \rightarrow B$
- 24) $\frac{2}{3 - \sqrt{2}} \cdot \frac{3 + \sqrt{2}}{3 + \sqrt{2}} \rightarrow D$
- 25) Square both Sides $\rightarrow D$
- 26) Reduce Answer $\rightarrow D$
- 27) $x = 8$
- 28) $3x + 24 = 6x + 4 \rightarrow \left\{\frac{20}{3}\right\}$
- 29) $x = 7.5$
- 30) $\frac{4^{-2} x^6 y^{-2}}{x^2} = \left\{\frac{x^4}{16y^2}\right\}$
- 31) $6x^2 - 5x - 4$
- 32) $12x^3 + 14x^2 + x - 2$
- 33) $(x - 1)(x - 2)$
- 34) $(2x + 3y)(x - 5y)$
- 35) $(3x + 2)(4x + 1)$
- 36) $(2x - 3)(3y + 2)$
- 37) $(2x - 1)(3x + 7) = 0$
 $\rightarrow x = \frac{1}{2} \& -\frac{7}{3}$
- 38) $x^2 - 5x = 0$
 $\rightarrow x(x - 5) = 0 \rightarrow \{0 \& 5\}$
- 39) $x = \pm 6$
- 40) $z^2 - 5z - 14 = 0 \rightarrow (z - 7)(z + 2) = 0 \rightarrow \{7 \& -2\}$
- 41) $0.14(x - 6000) + 0.10x = 4200 \rightarrow x = 21,000 \rightarrow \{\$15,000\}$
- 42) $10x + 12x = 55 \rightarrow 2.5$ hours
- 43) $\begin{cases} x + y = 100 \\ 0.40x + 0.60y = 0.55(100) \end{cases}$
 $\rightarrow 25$ L of 40% & 75 L of 60%
- 44) $\begin{cases} 3(b + c) = 48 \\ 8(b - c) = 48 \end{cases}$
 \rightarrow current is 5 mph
- 45) $\frac{24}{b - 6} = \frac{48}{b + 6} \rightarrow 18$ mph
- 46) Factor & Cancel $\rightarrow 1$
- 47) $\frac{(x + 5)(x - 10)}{(x - 3)(x + 1)}$

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$$48) \frac{5x+2}{(x+2)^2(x-2)}$$

$$49) \frac{23-5x}{(x-2)(x-3)}$$

$$50) 10 = 3(x-5) + 1(x+5) \rightarrow x = 5 \rightarrow \text{No solution}$$

$$51) 4y(y+3) = (3y-1)(y-3) + 3(y-3)(y+3) \rightarrow 0 = y^2 - 11y - 12 \rightarrow \{-1 \& 12\}$$

$$52) m = -\frac{11}{3} \rightarrow \left\{y = -\frac{11}{3}x + \frac{13}{3}\right\}$$

$$53) \text{ Goes thru } (-3, -4) \& (4, 1)$$

$$54) \text{ Goes thru } (0, -4) \& (6, 0)$$

$$55) \frac{y\sqrt{y}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \left\{ \frac{y\sqrt{7y}}{7} \right\}$$

$$56) 15\sqrt{2}$$

$$57) x \geq -\frac{1}{3}$$

$$58) 2 - x = x^2 + 8x + 16 \rightarrow x = -7 \& -2 \rightarrow \{-2\}$$

$$59) x = \frac{-7 \pm \sqrt{97}}{6}$$

$$60) \text{ Substitution } \rightarrow x = -2, y = 3 \quad 61) \text{ Elimination } \rightarrow x = -2, y = -1$$