Math 46 - Packet A - Free Response

Question 1. Find the slope of the line.

$$11x + y = 9$$

Question 2. Find the slope of the line.

$$-x + 5y = 30$$

Question 3. Find the slopes of the lines that are parallel to, and perpendicular to, the line passing through the points: $(8, -6)$ and $(4, 7)$.

Question 4. Use the slope-intercept form to graph the equation.

$$y = 2x + 4$$

Question 5. Write an equation of the line with the given slope, m, and y-intercept $(0, b)$.

$$m = 7/3, b = -3$$

Question 6. Find an equation of the line through $(-6, -9)$ and $(-4, 0)$. Write the equation in the form $Ax + By = C$.

Question 7. Find an equation for the line through $(-10, -57)$ and $(3, 8)$. Write the equation in slope-intercept form if possible.

Question 8. A faucet is used to add water to a large bottle that already contained some water. After it has been filling for 3 seconds, the gauge on the bottle indicates that it contains 10 ounces of water. After it has been filling for 11 seconds, the gauge indicates the bottle contains 26 ounces of water. Let y be the amount of water in the bottle x seconds after the faucet was turned on. Write a linear equation that models the amount of water in the bottle in terms of x.

Question 9. Simplify the expression.
$$\left(\frac{4x^3}{y^2}\right)^4$$

Question 10. Simplify the expression.
$$(-3z^2)(5z^3)$$

Question 11. Simplify the expression. Write the result using positive exponents only.
$$\left(\frac{xy^4}{x^3y}\right)^{-2}$$

Question 12. Simplify the expression. Write the result using positive exponents only.
$$\frac{13r^{-1}(r^{-4})^2}{14(r^{-1})^3}$$

Question 13. Perform the indicated operation.
$$(7n^6 - 19n^3 - 19) - (3n^6 + 11n^3 - 3)$$

Question 14. Simplify by combining like terms.
$$7r + 12r^6 - 3r^6 + 12r$$

For questions 15-19, factor the polynomial completely. If the polynomial cannot be factored, write "prime."

Question 15.
$$y^2 - 4y - 21$$

Question 16.
$$x^2 + 4xy - 21y^2$$

Question 17.
$$4t^2 + t - 5$$

Question 18.
$$xy^2 + 6y^2 - 4x - 24$$

Question 19.
$$-yz^5 - y^5z$$

Question 20. Solve for t.
$$9t^3 - 64t = 0$$

Question 21. Solve for x.
$$17x^2 = 8x$$

Question 22. The sum of two numbers is 16 and the sum of their squares is 146. Find the numbers.

Question 23. Multiply and simplify if possible.
$$\frac{2x + 6y}{x^2 + 6xy + 9y^2} \cdot \frac{x + 3y}{3}$$

Question 24. Divide and simplify if possible.
$$\frac{(x + 3)^2}{x - 3} \div \frac{x^2 - 9}{3x - 9}$$

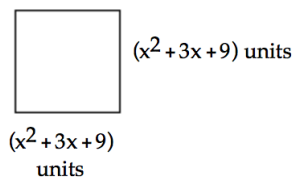**Question 25.** Simplify the expression.
$$\frac{(x^2)^4}{(3x)^3}$$

Question 26. Subtract and simplify if possible.
$$\frac{8a + 6b}{2} - \frac{8a - 6b}{2}$$

Question 27. Subtract and simplify if possible.
$$\frac{x}{x^2 + 7x - 44} - \frac{4}{x^2 + 7x - 44}$$

Question 28. Find the perimeter of the square.

$(x^2 + 3x + 9)$ units

$(x^2 + 3x + 9)$ units

Question 29. Factor the sum or difference of two cubes.
$$t^3 + 64$$

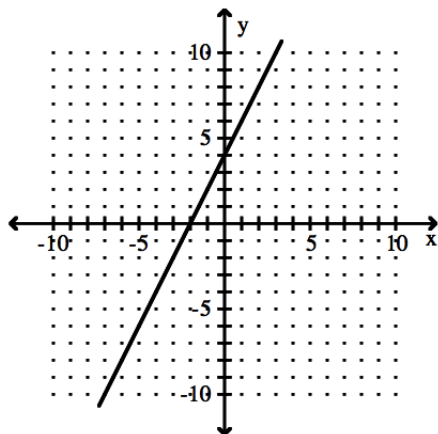**Question 30.** Find an equation of the line perpendicular to $y = 6$, through $(8, 11)$.

1. $m = -11$

2. $m = \dfrac{1}{5}$

3. $-\dfrac{13}{4} ; \dfrac{4}{13}$

4.

5. $y = \dfrac{7}{3}x - 3$

6. $9x - 2y = -36$

7. $y = 5x - 7$

8. $y = 2x + 4$

9. $\dfrac{256x^{12}}{y^{8}}$

10. $-15z^5$

11. $\dfrac{x^4}{y^6}$

12. $\dfrac{13}{14r^6}$

13. $4n^6 - 30n^3 - 16$

14. $9r^6 + 19r$

15. $(y-7)(y+3)$

16. $(x+7y)(x-3y)$

17. $(4t+5)(t-1)$

18. $(x+6)(y+2)(y-2)$

19. $-yz(y^4+z^4)$

20. $-\dfrac{8}{3}, \dfrac{8}{3}, 0$

21. $0, \dfrac{8}{17}$

22. 11 and 5

23. $\dfrac{2}{3}$

24. $\dfrac{3(x+3)}{x-3}$

25. $\dfrac{x^5}{27}$

26. $6b$

27. $\dfrac{1}{x+11}$

28. $4x^2+12x+36$ units

29. $(t+4)(t^2-4t+16)$

30. $x=8$

Math 46 Final Exam Review - Packet B

Question 1. The house numbers of two adjacent homes are two consecutive even numbers. If their sum is 326, find the house numbers.

Question 2. Solve the formula for R.
$$A = P + PRT$$

Question 3. Solve for h.
$$S = 2\pi rh + 2\pi r^2$$

Question 4. Multiply.
$$7y^2(5y^2 - 5y + 8)$$

Question 5. A store is advertising a 20% off sale on everything in the store. Find the discount of a painting that regularly sells for $280.

Question 6. A store is advertising a 15% off sale on everything in the store. Find the sale price of a painting that regularly sells for $260.

Question 7. Because of budget cutbacks, MaryAnn was required to take an 18% pay cut. If she earned $28,000 before the pay cut, find her salary after the pay cut.

Question 8. A chemist needs 100 milliliters of a 76% solution but has only 55% and 85% solutions available. Find how many milliliters of each that should be mixed to get the desired solution.

Question 9. The radiator in a certain make of car needs to contain 50 liters of 40% antifreeze. The radiator now contains 50 liters of 20% antifreeze. How many liters of this solution must be drained and replaced with 100% antifreeze to get the desired strength?

Question 10. Sue took her collection of nickels and dimes to deposit in the bank. She has five fewer nickels than dimes. Her total deposit was $55.40. How many dimes did she deposit?

Question 11. Jeff starts driving at 65 miles per hour from the same point that Lauren starts driving at 40 miles per hour. They drive in opposite directions, and Lauren has a half-hour head start. How long will they be able to talk on their cell phones that have a 480-mile range?

Question 12. Devon purchased tickets to an air show for 7 adults and 2 children. The total cost was $92. The cost of a child's ticket was $8 less than the cost of an adult's ticket. Find the price of an adult's ticket and a child's ticket.

Question 13. Multiply.
$$(y + 6)(y + 7)$$

Solve the inequality. Graph the solution set and write it in interval notation.

Question 14.
$$-2(4x - 7) < -10x + 10$$

Question 15.
$$15x - 35 > 5(2x - 11)$$

Question 16. Find the domain and the range of the relation.
$$\{(7, 3), (7, -7), (7, -5)\}$$

Question 17. Find the domain of the function.
$$g(x) = \frac{2}{x - 15}$$

Question 18. Find $f(11)$ when $f(x) = 6x - 11$.

Question 19. Solve the system of equations by the substitution method.

$$\begin{cases} -5x + y = -26 \\ -6x - 3y = -6 \end{cases}$$

Solve the system of equations by the addition method.

Question 20.
$$\begin{cases} x + 3y = 11 \\ -6x + 2y = -6 \end{cases}$$

Question 21.
$$\begin{cases} -2x + 2y = -5 \\ 4x - 4y = 10 \end{cases}$$

Multiply.

Question 22.
$$(z - 5)(z^2 + 5z - 3)$$

Question 23.
$$(6y + x)(6y - x)$$

Find the product and simplify.

Question 24.

$$\frac{5x^3y^3}{-45xy^{12}} \cdot y^9$$

Question 25.

$$\frac{8p-8}{p} \cdot \frac{8p^2}{9p-9}$$

Question 26.

$$\frac{x^2+10x+21}{x^2+15x+56} \cdot \frac{x^2+16x+64}{x^2+11x+24}$$

Find the quotient and simplify.

Question 27.

$$\frac{3x^2}{5} \div \frac{x^3}{15}$$

Question 28.

$$\frac{m^2-n^2}{m+n} \div \frac{m}{m^2-mn}$$

Question 29.

$$\frac{(x-6)(x+7)}{3x} \div \frac{5x-30}{15x^8}$$

Question 30.

$$\frac{p^2-9p+pq-9q}{6p^2-6q^2} \div \frac{p-9}{4p-4q}$$

4

Math 46 - Packet B - Answer Key

1. $162, 164$

2. $R = \dfrac{A - P}{PT}$

3. $h = \dfrac{S - 2\pi r^2}{2\pi r}$

4. $35y^4 - 35y^3 + 56y^2$

5. $56.00

6. $221.00

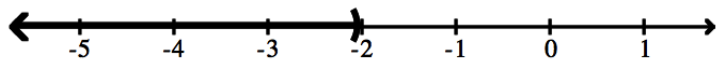7. $22,960.00

8. **30 ml of 55%; 70 ml of 85%**

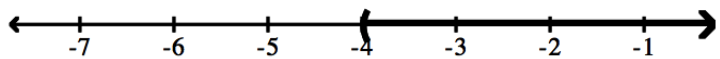9. **12.5 L**

10. **371 dimes**

11. $4\dfrac{8}{21}$ **hours**

12. **adult's ticket: $12; child's ticket: $4**

13. $y^2 + 13y + 42$

14.
(−∞, −2)

15.
(−4, ∞)

16. **domain: {7}; range: {-7,-5,3}**

17. $(-\infty, 15) \cup (15, \infty)$

18. 55

19. $(4, -6)$

20. $(2, 3)$

21. **infinite number of solutions**

22. $z^3 - 28z + 15$

23. $36y^2 - x^2$

24. $\dfrac{x^2}{-9}$

25. $\dfrac{64p}{9}$

26. 1

27. $\dfrac{9}{x}$

28. $(m - n)^2$

29. $x^7(x + 7)$

30. $\dfrac{2}{3}$

Math 46 Final Exam Review - Packet C

Simplify the expression.

Question 1.
$$(-9)^0 + (-14)^0$$

Question 2.
$$\frac{\frac{x}{6}}{\frac{7}{x+4}}$$

Question 3.
$$\frac{\frac{x}{4}}{\frac{7}{x+7}}$$

Question 4. If $Q(x) = 4x^2 + 3x + 2$, find $Q(-1)$.

Question 5. Perform the division.
$$\frac{-18x^6 - 15x^4 - 12x^2}{-3x^4}$$

Question 6. Subtract. Simplify if possible.
$$\frac{x}{x^2 - 16} - \frac{6}{x^2 + 5x + 4}$$

Question 7. Write the number in standard notation.

$$1.59 \times 10^{-4}$$

Question 8. Solve the inequality. Graph the solution set.

$$|x + 16| < 17$$

Question 9. Find an equation of the line through $(2, 3)$; perpendicular to $2x - 5y = 2$. Write the equation in standard form.

Solve the equation.

Question 10.

$$\frac{2(8 - x)}{3} = -x$$

Question 11.

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

Question 12.

$$-3(2p + 5) - 10 = -2(p + 6) + 3$$

Question 13. Linda and Dave leave simultaneously from the same starting point biking in opposite directions. Linda bikes at 7 miles per hour and Dave bikes at 8 miles per hour. How long will it be until they are 20 miles apart from each other?

Question 14. Subtract and simplify.

$$\frac{6}{9} - \frac{4}{7}$$

Question 15. Find the slope of the line that passes through the points $(9, 1)$ and $(2, -7)$.

Question 16. Solve the compound inequality. Graph the solution set.
$$6x - 4 < 2x \quad or \quad -4x \leq -12$$

Question 17. Multiply.
$$(x - 6)(x^2 - 8)$$

Question 18. Solve the system of equations by graphing.
$$\begin{cases} y = -x - 3 \\ y = 2x + 3 \end{cases}$$

Question 19. Perform the indicated operation.
$$(8n^7 - 6n^5 - 19) - (2n^7 + 13n^5 - 5)$$

Question 20. Factor out the GCF (greatest common factor) from the polynomial.
$$80m^7 + 64m^5 + 24m^3$$

Question 21. Simplify.
$$\frac{1}{4}(12x - 8)$$

Question 22. Use the slope-intercept form to graph the equation.
$$y = -\frac{1}{3}x + 3$$

Factor the polynomial completely. If the polynomial cannot be factored, write "prime."

Question 23.
$$x^2 - 2x - 15$$

Question 24.
$$x^2 - 5x - 6$$

Question 25. Solve the inequality. Graph the solution set and write it in interval notation.
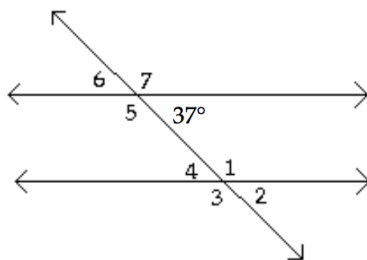$$10 \leq 2(x - 1) \leq 14$$

Question 26. Find the product and simplify.
$$\frac{7x^4 y^4}{-56xy^8} \cdot y^4$$

Question 27. Solve the absolute value equation.
$$|5x + 8| + 12 = 8$$

Question 28. The figure shows two parallel lines intersected by a transversal. One of the angle measures is given. Find the measure of $\angle$ 2.

Question 29. Solve the system of equations by graphing.

$$\begin{cases} x & \geq & 2y \\ x + 2y & \leq & 5 \end{cases}$$

Question 30. Graph the function.

$$g(x) = |x - 5|$$

Math 46 - Packet C - Answer Key

1. 2
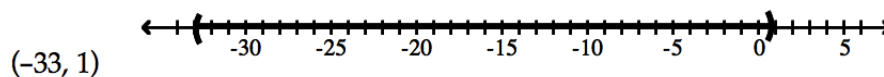
2. $\dfrac{x(x+4)}{42}$

3. $\dfrac{x(x+7)}{28}$

4. 3

5. $6x^2 + 5 + \dfrac{4}{x^2}$

6. $\dfrac{x^2 - 5x + 24}{(x-4)(x+4)(x+1)}$

7. 0.000159

8.

(−33, 1)

9. $5x + 2y = 16$

10. -16

11. 3

12. $p = -4$

13. $1\dfrac{1}{3}$ **hours**

14. $\dfrac{2}{21}$

15. $\dfrac{8}{7}$

16.

$(-\infty, 1) \cup [3, \infty)$
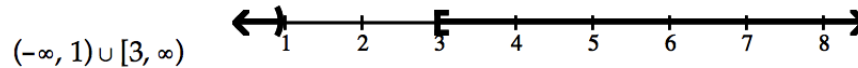
17. $x^3 - 6x^2 - 8x + 48$

18. $(-2, -1)$

19. $6n^7 - 19n^5 - 14$

20. $8m^3(10m^4 + 8m^2 + 3)$

21. $3x - 2$

22.

23. $(x-5)(x+3)$

24. $(x+1)(x-6)$

25.

$[6, 8]$
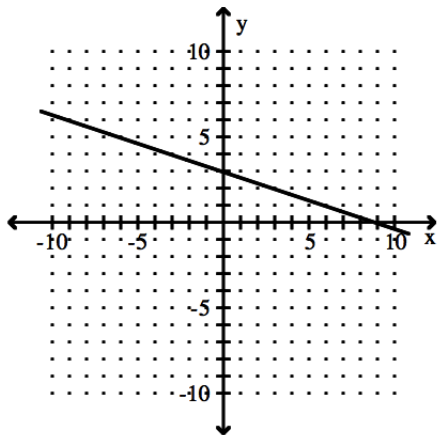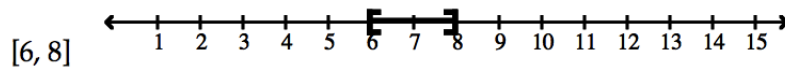
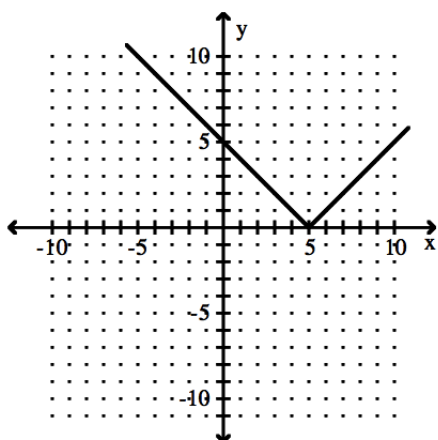**26.** $\dfrac{x^3}{-8}$

27. $\varnothing$

28. $37°$

29.
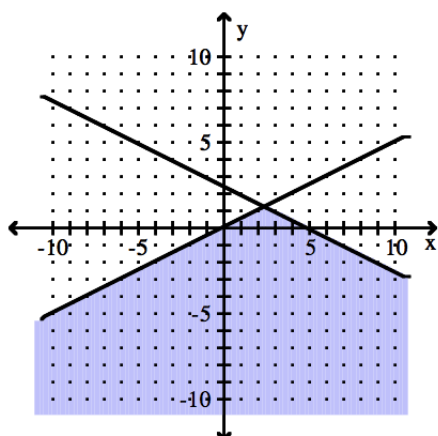
30.

Math 46 – Final Exam Review Packet D (Free Response Portion)

1. Solve.

   a. $\dfrac{2(a+3)}{3} = 9a+3$

   b. $-3(-4x+5) = \dfrac{x+3}{2}$

2. Graph. Make sure to label your graph!

   a. $y = -\dfrac{2}{7}x + 11$

   b. $2x - 3y = 15$

3. Solve the system of linear equations:

   a. $\begin{cases} 3x + 4y = -7 \\ x - 2y = -9 \end{cases}$

   b. $\begin{cases} 6x + 3y = 1 \\ y = -2x - 5 \end{cases}$

4. Factor completely.

   a. $147x^3y - 108xy^3$

   b. $135xy^2z + 90x^3yz^2$

   c. $5x^3y - 45x^5y$

5. Evaluate.

   a. $\left\{ 4 - \dfrac{8}{2} + 2\left[6 - 3(4 \cdot 3 \div 6) - 10 \right] \right\} + 7$

   b. $\left\{ \dfrac{3}{4} \div \dfrac{1}{2} + 3\left[3(4 - 6) - 5\left(\dfrac{2}{5} - 2 \right) \right] \right\} + \dfrac{4}{5}$

6. Factor completely.

   a. $3x^2 + 20x + 12$

   b. $24x^2y - 76xy + 40y$

   c. $36p^2 - 9p^3 - p^4$

   d. $26z^2 + 98z - 24$

7. Add or subtraction the following expressions and simplify your results completely.

   a. $\dfrac{3x^2 + 2x}{x-1} - \dfrac{10x - 5}{x-1}$

   b. $\dfrac{4x^2 + 12x}{2x - 3} - \dfrac{9}{3 - 2x}$

8. Multiply or divide the following expressions and simplify your results completely.

   a. $\dfrac{9x}{5x + 10} \div \dfrac{6x + 12}{5}$

   b. $\dfrac{2x(x + y)}{4x + 5} \div \dfrac{3x^2 + 6xy + 3y^2}{16x^2 - 25}$

   c. $\dfrac{x - 6 + \dfrac{6}{x-1}}{x + 3 - \dfrac{12}{x-1}}$

   d. $\dfrac{a^6b^4 + a^4b^6}{a^5b^4 - a^4b^4} \cdot \dfrac{a^2 - b^2}{a^4 - b^4}$

9. Multiply and simply completely.

   a. $(2x - 7)(5x + 3)$

   b. $(3x - 5y)(4x - 6y)$

   c. $(5c + 1) \cdot 3c^2 \cdot (c - 2)$

10. Solve.

   a. $5|-5x + 2| = 30$

   b. $6 - \dfrac{|3x - 2|}{2} = 3$

   c. $5|-5x + 2| < 30$

   d. $5|-5x + 2| \ge 30$