

Name: _____

Math Teacher: _____

**DO NOT OPEN EXAMINATION PAPER UNTIL YOU ARE TOLD BY THE
SUPERVISING TEACHER TO BEGIN**

Mathematics 1201 SAMPLE Midterm Questions

JANUARY SAMPLE 2017

Value: 80 Marks

Time: 2 Hours

General Instructions

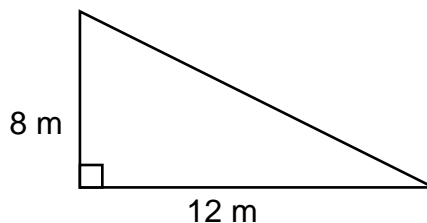


1. Calculators are permitted.
2. The examination consists of the following sections:
Part A: 30 Multiple Choice (30 Marks)
Part B: 12 Constructed Response Questions (50 Marks)
3. Students are required to do ALL items in the space provided. Be sure to **show all necessary workings for Part B** as partial marks may be awarded for partially correct solutions.
4. Be sure to write your name in the space provided above as well as on the answer sheet.

Part A: Multiple Choice. Circle the correct letter. (30 Marks)

1. Which statement is true?
A) $\sqrt{12}$ cannot be written as a simplified mixed radical.
B) All the factors of 12 are 2, 3, 4 and 6.
C) The prime factorization of 12 is $2^1 \times 3^2$.
D) The prime factors of 12 are 2 and 3.
2. Which is the LCM of 28 and 42 ?
A) $2^3 \times 3 \times 7$ B) $2^2 \times 3 \times 7$ C) $2 \times 3 \times 7$ D) 2
3. What is $15\sqrt{2}$ written as an entire radical?
A) $\sqrt{900}$ B) $\sqrt{450}$ C) $\sqrt{60}$ D) $\sqrt{30}$
4. Which number is rational?
A) $\sqrt{48}$ B) $\sqrt{8.1}$ C) $\sqrt[3]{-16}$ D) $\sqrt{\frac{4}{169}}$
5. What is $\sqrt[3]{1372}$ in simplest form?
A) $4\sqrt[3]{7}$ B) $7\sqrt[3]{4}$ C) $7\sqrt[3]{28}$ D) $14\sqrt[3]{7}$
6. Between which two consecutive integers would you locate $\sqrt[3]{-24}$?
A) 2 and 3 B) -1 and -2 C) -2 and -3 D) -3 and -4
7. What is the length of the hypotenuse, simplified as a mixed radical?

- A) $4\sqrt{13}$
- B) $16\sqrt{13}$
- C) $\sqrt{208}$
- D) $\sqrt{20}$

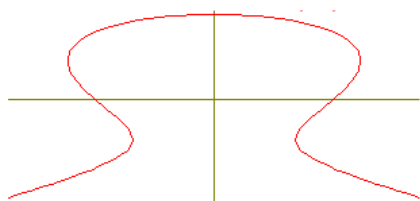


8. Which expression is written correctly to evaluate $18^{\frac{2}{5}}$?
A) $\sqrt{18^5}$ B) $\sqrt[5]{18^2}$ C) $\frac{18 \times 2}{5}$ D) $\frac{18 \times 5}{2}$

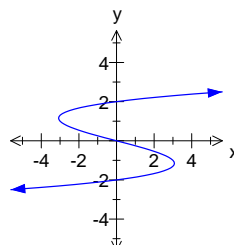
9. Evaluate $(-125)^{\frac{1}{3}}$: A) -5 B) -11.2 C) -41.7 D) -375
10. Which of these numbers is irrational? A) -68 B) $\sqrt{48}$ C) $\sqrt[3]{216}$ D) $\sqrt{\frac{49}{16}}$
11. What is the index of $\sqrt[3]{2^7}$? A) 2^7 B) 3 C) 7 D) 2
12. A square has an area of 12 square inches. What is the side length of the square as a radical in simplest form?
A) $4\sqrt{3}$ in. B) $2\sqrt{6}$ in. C) $3\sqrt{2}$ in. D) $2\sqrt{3}$ in.
13. What is $\sqrt{\left(\frac{3}{4}\right)^9}$ as a power?
A) $\left(\frac{3}{4}\right)^{\frac{-9}{2}}$ B) $\left(\frac{3}{4}\right)^{\frac{9}{2}}$ C) $\left(\frac{4}{3}\right)^{\frac{-2}{9}}$ D) $\left(\frac{3}{4}\right)^{\frac{2}{9}}$
14. Write $2a^{-3}$ without a negative exponent.
A) $\frac{1}{2a^3}$ B) $\frac{a^{-3}}{2}$ C) $\frac{2}{a^3}$ D) $\frac{2}{a^{-3}}$
15. What is equivalent to $\left(\frac{3}{5}\right)^{-2}$? A) $\frac{25}{9}$ B) $\frac{9}{25}$ C) $\frac{6}{10}$ D) $\frac{10}{6}$
16. Simplify $\frac{12p^3q^{-7}}{15pq^6}$. A) $\frac{4p^2}{5q^{13}}$ B) $\frac{p^2}{3q^{13}}$ C) $\frac{4p^2}{5q}$ D) $\frac{4p^2}{15q^{13}}$
17. For the expression $x^2 - ?x - 12$ to be factorable, give the value for ? .
A) 2 B) 3 C) 4 D) 6
18. Two students set up some algebra tiles to help model a product. Which expression represents the modeled area? (Shaded tiles are positive)
-
- A) $x^2 + 6x$
B) $2x^2 + 3x$
C) $x^2 + 3x$
D) $2x^2 + 6x$
19. Multiply: $(2x - 3)(3x + 4)$
A) $6x^2 - x - 12$ B) $6x^2 - 12$ C) $6x^2 - 17x - 12$ D) $6x^2 + 2x - 12$
20. The area of a rectangle is $x^2 - 2x - 24$. What are the dimensions?
A) $(x + 4)(x - 6)$ B) $(x - 4)(x + 6)$ C) $(x + 4)(x + 6)$ D) $(x - 4)(x - 6)$
21. Factor completely: $2x^2 + 4x - 6$
A) $(x + 3)(x - 1)$ B) $(2x - 2)(x + 3)$ C) $2(x^2 + 2x - 3)$ D) $2(x - 1)(x + 3)$
22. The following relation associates a shape with its number of sides
{ (triangle, 3), (circle, 0), (square, 4), (octagon, 8) } Which statement is true?
A) circle is an element in the range B) square is an element in the domain
C) 3 is an element in the domain D) square is an element in the range
23. Which set of ordered pairs represents a function?
A) { (1,1), (2,2), (1,3), (4,4) } B) { (1,-5), (2,-4), (3,-4), (3,-3) }
C) { (1,-1), (1,-2), (1,-3), (1,-4) } D) { (1,-1), (0,-1), (-1,-1), (-2,-1) }
24. The equation $C = \pi \times d$ relates the circumference of a circle, C, to its diameter, d. What is the independent variable?
A) Circumference B) Diameter C) Radius D) π

25. Which of the following relations is also a function?

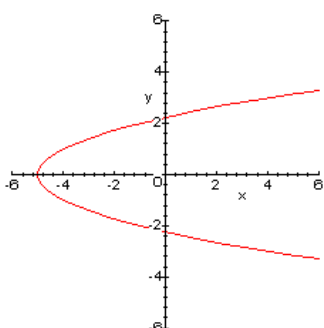
A)



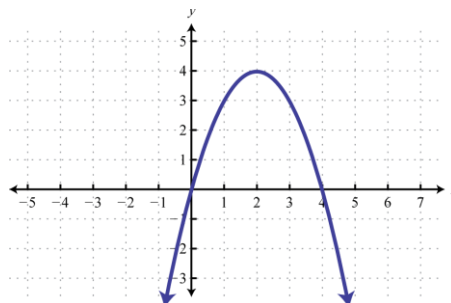
B)



C)



D)



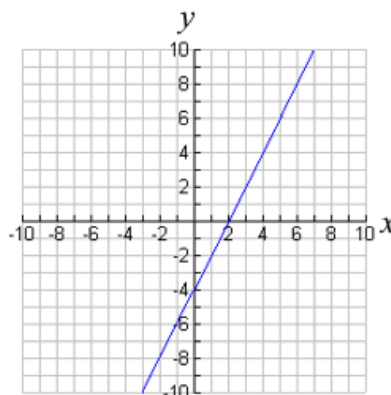
26. The graph below shows the relationship between the distance from Josh's house and the time in hours. What does the y-intercept represent in this situation?

- A) Speed Josh was driving.
- B) The number of hours driven to return home.
- C) Total distance Josh is away from home
- D) Number of miles driven until the car was out of gas.



27. What is the rate of change for the following graph?

- A) $-\frac{1}{2}$
- B) -2
- C) $\frac{1}{2}$
- D) 2

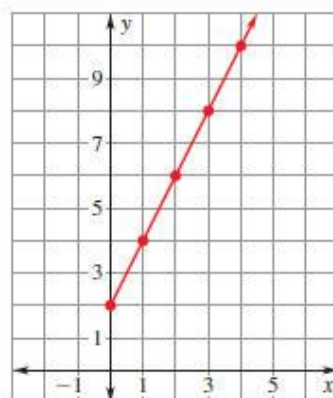


28. Which ordered pair represents $f(6) = -1$?

- A) (6,-1)
- B) (-1,6)
- C) (-6,1)
- D) (1,-6)

29. What is the range of the following function?

- A) $\{y/y \leq 0, y \in \mathbb{R}\}$
- B) $\{y/y \geq 0, y \in \mathbb{R}\}$
- C) $\{y/y \leq 2, y \in \mathbb{R}\}$
- D) $\{y/y \geq 2, y \in \mathbb{R}\}$



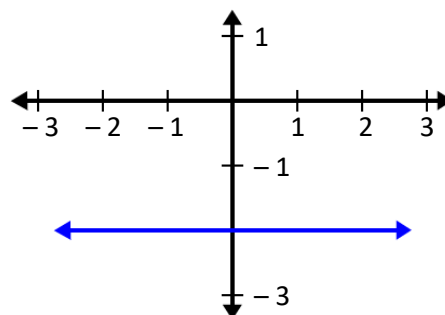
30. What is the equation of the line in the following graph?

A) $y = -2$

B) $x = -2$

C) $y = -2x$

D) $x = -2y$



Part B: Constructed Response. Place your answer in the space provided. Show all necessary workings to receive full marks! (50 Marks)

31. Using a method of your choice, determine the greatest common factor between 225 and 180. (2 Marks)

32. The volume of a cube is given as 4096 ft^3 . Determine the surface area of the cube. (2 Marks)

33. Hamburger patties come in packages of 8, while buns come in packages of 6. What is the least number of hamburgers that can be made with no patties or buns left over? (2 Marks)

34. Arrange the numbers from least to greatest. Be sure to show all of your workings! (2 Marks)

$$-8^{\frac{3}{2}}, 4\sqrt{3}, -3\sqrt{6}, 2\sqrt[3]{7}$$

35. Evaluate without a calculator; remember no marks will be given for an answer only. (5 Marks)

a) $32^{0.4}$

b) $\left(\frac{9}{16}\right)^{-\frac{3}{2}}$

c) $(-32)^{\frac{-3}{5}}$

36. Simplify. Be sure to write final answers with positive exponents. Show ALL necessary workings. (10 Marks)

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

b) $\sqrt{x} \cdot \sqrt[3]{x^2} \cdot \sqrt[4]{x}$

c) $\left(x^{\frac{1}{2}}x^{\frac{3}{2}}y^{-1}\right)^2(y^{-6})^{\frac{2}{3}}$

d) $\left(x^{\frac{1}{5}}y^{\frac{-2}{4}}\right)^{\frac{1}{2}}\left(x^{\frac{-1}{5}}y^{\frac{-1}{2}}\right)^{-1}$

37. Factor fully each of the following expressions: (5 Marks)

a) $x^2 - 5x - 14$

b) $8x^2 + 10x - 3$

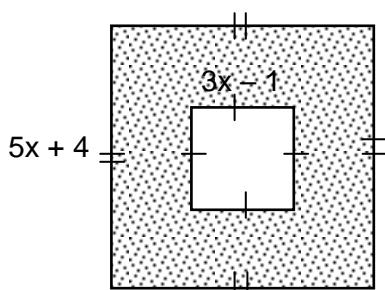
c) $18x^2 + 24x + 8$

38. Simplify. (6 Marks)

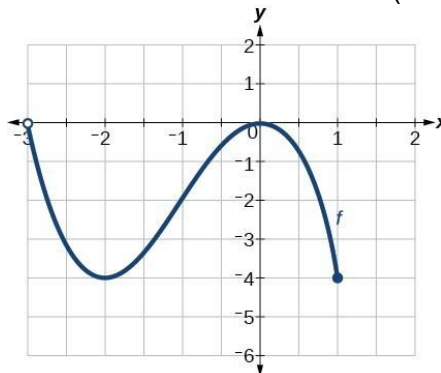
a) $(3x - 2)(4x - 3y + 5)$

b) $(3g^2 + 4g - 2)(-g^2 - g + 4)$

39. Determine the area of the shaded region. (4 Marks)



40. Write the domain and range of the following function in interval notation. (2 Marks)



41. A computer company charges a base fee of \$50 and \$1.50 for each additional gigabyte of data downloaded. The cost is represented by the equation:

$$C = 1.5g + 50$$

(5 Marks)

- Write the equation in function notation.
- Identify the independent and dependent variables.
- Determine $C(20)$. What does this value represent?
- Determine $C(g) = 135.5$. What does this value represent?
- Is this function a linear relationship? How do you know?

42. Given the function $f(x) = 3x + 6$:

(5 Marks)

- Determine the horizontal intercept.
- Determine the vertical intercept.
- Using the intercepts, graph the function.