

Math 21 Practice paper

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Express the number in terms of i .

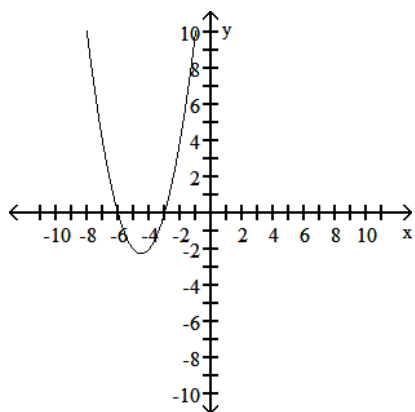
- 1) $\sqrt{-28}$ 1) _____
 A) $14i$ B) $2\sqrt{7}i$ C) $7\sqrt{2}i$ D) $-2\sqrt{7}i$

Solve.

- 2) $x^2 + 6x + 9 = 14$ 2) _____
 A) $3 + \sqrt{14}, 3 - \sqrt{14}$ B) 11
 C) $-3 + \sqrt{14}, -3 - \sqrt{14}$ D) $\sqrt{14}, -\sqrt{14}$

Use the given graph to find the x-intercepts and zeros of the function.

- 3) 3) _____



- A) $(-6, 0), (3, 0); -6, 3$ B) $(-3, 0), (-6, 0); -3, -6$
 C) $(-3, 0), (6, 0); -3, 6$ D) $(3, 0), (6, 0); 3, 6$

Use the quadratic formula to find the exact solutions.

- 4) $4t^2 - 7t = 1$ 4) _____
 A) $\frac{-7 \pm \sqrt{65}}{8}$ B) $-\frac{7}{8} \pm \frac{\sqrt{65}}{8}i$ C) $\frac{7}{8} \pm \frac{\sqrt{65}}{8}i$ D) $\frac{7 \pm \sqrt{65}}{8}$

Consider only the discriminant, $b^2 - 4ac$, to determine whether one real-number solution, two different real-number solutions, or two different imaginary-number solutions exist.

- 5) $x^2 - 12x + 36 = 0$ 5) _____
 A) Two different real-number solutions
 B) Two different imaginary-number solutions
 C) One real solution

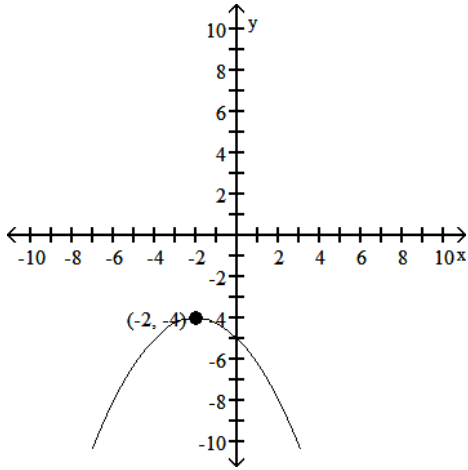
State whether the function is linear or quadratic.

- 6) $f(x) = 9x^2 - 18x$ 6) _____
 A) Linear B) Quadratic

Use the graph to find the vertex, the axis of symmetry, and the maximum or minimum value of the function.

7)

7) _____



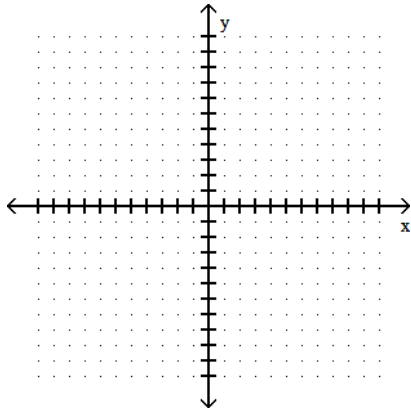
- A) (2, 4); $x = -2$; maximum: -4
- C) (-4, -2); $x = -4$; maximum: -2

- B) (-2, -4); $x = -2$; maximum: -4
- D) (-4, 2); $x = -4$; maximum: -2

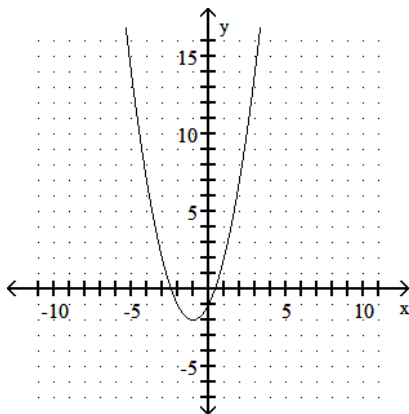
Graph.

8) $f(x) = x^2 + 2x + 1$

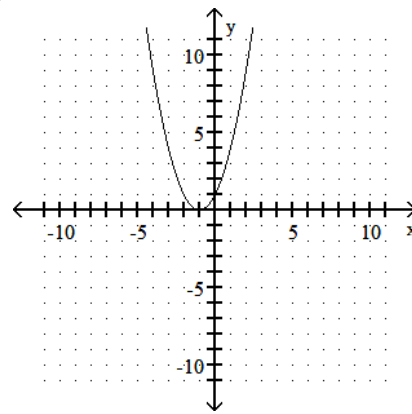
8) _____



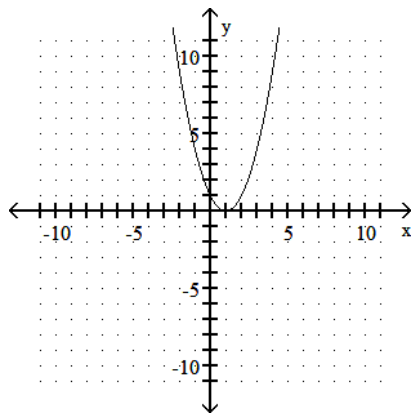
A)



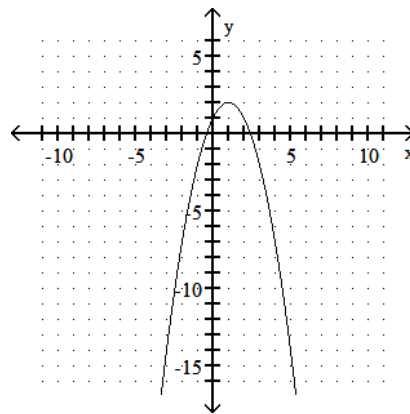
B)



C)



D)



Find the range of the given function.

9) $f(x) = x^2 - 14x + 53$

A) $[7, \infty)$

B) $(-\infty, 0]$

C) $[-7, \infty)$

D) $[4, \infty)$

9) _____

Find the inverse of the relation.

10) $\{(6, -4), (11, -3), (9, -2), (7, -1)\}$

A) $\{(-4, 6), (-3, 11), (-2, 9), (-1, 7)\}$

C) $\{(6, -4), (-3, 11), (9, -2), (-1, 7)\}$

B) $\{(-3, -4), (-4, 9), (6, 11), (-2, -2)\}$

D) $\{(-3, -4), (-1, 9), (6, 9), (-2, -2)\}$

10) _____

Find an equation of the inverse relation.

11) $y = -5x - 7$

A) $x = -5y + 7$

B) $y = -5x + 7$

C) $x = -5y - 7$

D) $y = -5 - 7x$

11) _____

Find the domain and range of the inverse of the given function.

12) $f(x) = x^3 - 1$

A) Domain: $[-1, \infty)$; range: all real numbers

B) Domain: $[0, \infty)$; range: $[0, \infty)$

C) Domain: all real numbers; range: $[-1, \infty)$

D) Domain and range: all real numbers

12) _____

Find the value of the expression.

13) $\log_2 32$

A) 32

B) 10

C) 5

D) 2

13) _____

Convert to a logarithmic equation.

14) $4^3 = 64$

A) $4 = \log_2 64$

B) $64 = \log_4 3$

C) $3 = \log_4 64$

D) $3 = \log_{16} 4$

14) _____

Convert to an exponential equation.

15) $\log_5 1 = 0$

A) $0^5 = 1$

B) $10 = 5$

C) $5^1 = 0$

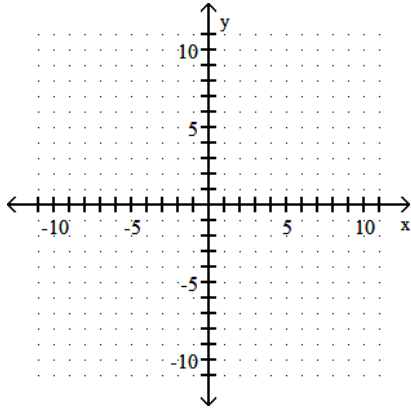
D) $5^0 = 1$

15) _____

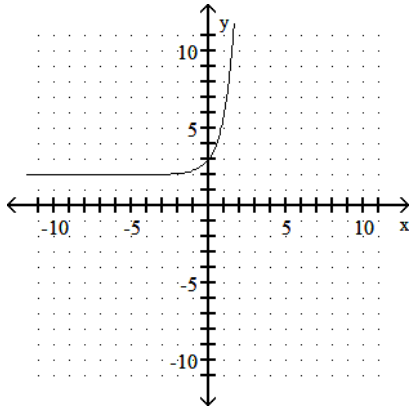
Graph the function. Describe its position relative to the graph of the indicated basic function.

16) $f(x) = \log_4(x - 2)$; relative to $f(x) = \log_4 x$

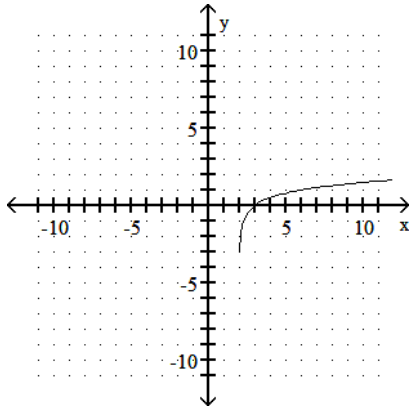
16) _____



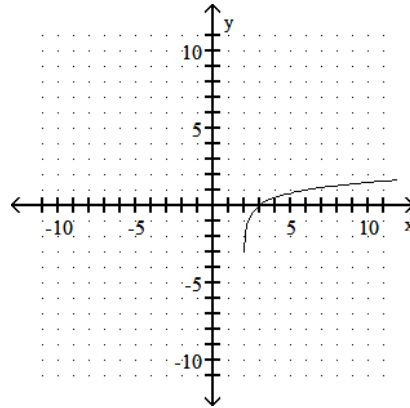
A) Moved left 2 units



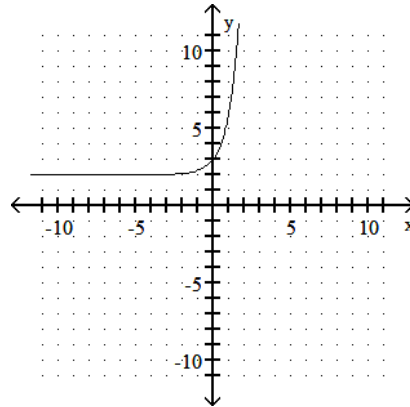
C) Moved left 2 units



B) Moved right 2 units



D) Moved right 2 units



Express as a single logarithm and, if possible, simplify.

17) $\frac{1}{2} \log_a x + 3 \log_a y - 4 \log_a x$

17) _____

A) $\log_a x^4 y^3$

B) $\log_a \sqrt{x} y^3$

C) $\log_a x^6 y^3$

D) $\log_a \left(\frac{y^3}{x^{7/2}} \right)$

Express as a difference of logarithms.

18) $\log_b \frac{5}{w}$

A) $\log_b 5 - \log_b w$

C) $\log_b 5 \div \log_b w$

B) $\log b - \log w$

D) $\log_b w - \log_b 5$

18) _____

Express in terms of sums and differences of logarithms.

19) $\ln \sqrt{x^3 y}$

A) $3 \ln x + \ln y$

B) $\ln \left(\frac{3}{2}x + \frac{1}{2}y \right)$

C) $\frac{3}{2} \ln x + \frac{1}{2} \ln y$

D) $3\sqrt{\ln x} + \sqrt{\ln y}$

19) _____

Solve the exponential equation.

20) $4^{7x} = 4$

A) 4

B) $\frac{1}{7}$

C) 1

D) 7

20) _____

Solve the logarithmic equation.

21) $\log x = 2$

A) 0.2

B) 100

C) 20

D) 2

21) _____

22) $\log(4 + x) - \log(x - 3) = \log 4$

A) $\frac{3}{2}$

B) $\frac{16}{3}$

C) $-\frac{16}{3}$

D) \emptyset

22) _____

Find the requested function value of θ .

23) If $\csc \theta = \frac{11}{10}$, find $\cot \theta$.

A) $\frac{\sqrt{21}}{10}$

B) $\frac{10}{21}$

C) $\frac{\sqrt{21}}{11}$

D) $\frac{11}{21}$

23) _____

Find the measures of two angles, one positive and one negative, that are coterminal with the given angle.

24) 110°

A) $470^\circ; -70^\circ$

B) $380^\circ; -160^\circ$

C) $290^\circ; -70^\circ$

D) $470^\circ; -250^\circ$

24) _____

Find the reference angle for the given angle.

25) 240°

A) 30°

B) 45°

C) -60°

D) 60°

25) _____

Convert to degree measure. Round to two decimal places, if necessary.

26) $-\frac{\pi}{6}$

A) $-30\pi^\circ$

B) -30°

C) $-\left(\frac{\pi}{6}\right)^\circ$

D) -0.52°

26) _____

List the quadrants in which the function has the given sign.

27) cotangent is positive

A) I, IV

B) I, II

C) I, III

D) II, IV

27) _____

Find the amplitude, period or phase shift.

28) Find the amplitude of $y = -4 \sin(2x + \pi)$.

- A) 2 B) 4 C) -8 D) π

28) _____

Multiply and simplify.

29) $(1 - \cos x)(1 + \cos x)$

- A) $\sin x + 2 \csc x$ B) $1 + 2 \sin^2 x$ C) $\cos^2 x - 1$ D) $\sin^2 x$

29) _____

Find the requested function value.

30) $f(x) = \frac{x-2}{6}$, $g(x) = 8x + 3$

Find $(g \circ f)(14)$.

- A) $\frac{113}{6}$ B) 19 C) 230 D) 22

30) _____

For the pair of functions, find the indicated sum, difference, product, or quotient.

31) $h(x) = x + 1$, $g(x) = \sqrt{x+2}$

Find $(h + g)(23)$.

- A) 33 B) 28 C) 49 D) 29

31) _____

Determine the domain and range of the relation.

32) $\{(6, 2), (-4, -7), (10, -5), (10, -9)\}$

- A) Domain: $\{2, -5, -7, -9\}$; Range: $\{6, 10, -4\}$
B) Domain: $\{6, 10, -4, -10\}$; Range: $\{2, -5, -7, -9\}$
C) Domain: $\{6, 10, -4\}$; Range: $\{2, -5, -7, -9\}$
D) Domain: $\{6, 10, -4, 10\}$; Range: $\{2, -5, -7, -9\}$

32) _____

Tell whether or not the relation is a function.

33) $\{(-7, 3), (-4, 9), (-1, 7), (3, -6)\}$

- A) Yes B) No

33) _____

Find the value of the permutation.

34) $P(7, 6)$

- A) 2 B) 2520 C) 7 D) 5040

34) _____

Solve the problem.

35) How many 2-digit numbers can be formed using the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, and 0? No digit can be used more than once.

- A) 3,628,800 B) 1,814,400 C) 90 D) 45

35) _____

36) From 9 names on a ballot, a committee of 3 will be elected to attend a political national convention. How many different committees are possible?

- A) 252 B) 504 C) 60,480 D) 84

36) _____

37) A bag contains 19 balls numbered 1 through 19. What is the probability of selecting a ball that has an even number when one ball is drawn from the bag?

- A) $\frac{2}{19}$ B) $\frac{9}{19}$ C) $\frac{19}{9}$ D) 9

37) _____

38) Find the probability of getting 2 tails when 3 fair coins are tossed.

38) _____

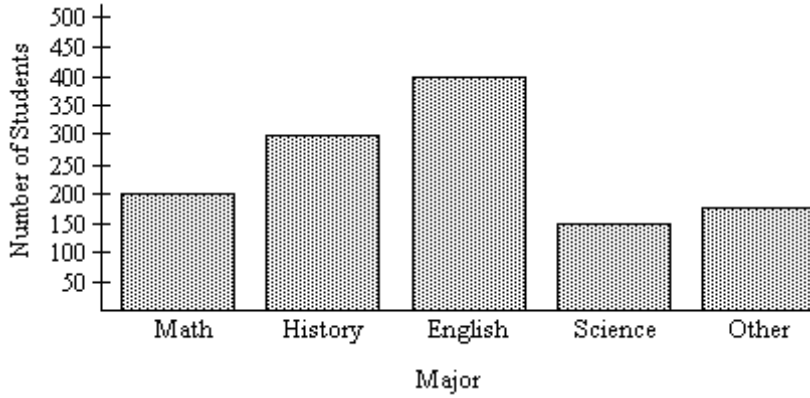
A) $\frac{2}{3}$

B) $\frac{3}{8}$

C) $\frac{1}{2}$

D) $\frac{1}{4}$

The bar graph below shows the number of students by major in the College of Arts and Sciences. Answer the question.



39) How many students are in the College of Arts and Sciences?

39) _____

A) 1250

B) 1050

C) 1225

D) 1325

Find the median. Round to the nearest tenth when necessary.

40) The numbers of vehicles passing through a toll booth in one hour for five consecutive hours are as follows: 6, 15, 23, 32, 42

40) _____

A) Median = 23 vehicles

B) Median = 15 vehicles

C) Median = 32 vehicles

D) Median = 24.2 vehicles

Answer Key

Testname: PRACTICE PAPER MATH 21

- 1) B
- 2) C
- 3) B
- 4) D
- 5) C
- 6) B
- 7) B
- 8) B
- 9) D
- 10) A
- 11) C
- 12) D
- 13) C
- 14) C
- 15) D
- 16) B
- 17) D
- 18) A
- 19) C
- 20) B
- 21) B
- 22) B
- 23) A
- 24) D
- 25) D
- 26) B
- 27) C
- 28) B
- 29) D
- 30) B
- 31) D
- 32) C
- 33) A
- 34) D
- 35) C
- 36) D
- 37) B
- 38) B
- 39) C
- 40) A