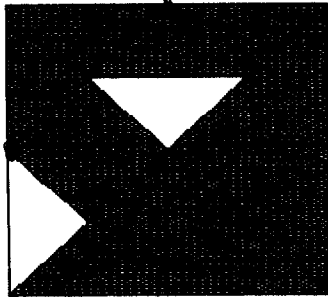


Each of the multiple choice questions is worth 5 points; for the remaining questions, the point values are written to the right of the question. There is no partial credit for multiple choice questions, but to receive credit for questions 21–28, you must show all your work. No calculators are permitted.

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

Find the area of the shaded region in the figure. Round results to the nearest unit.

1)

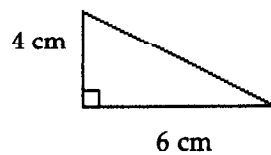


The sides of the outer square have length 28 m.

- A) 686 m^2
- B) Not enough data
- C) 588 m^2
- D) 735 m^2
- E) None of the above

Find the missing length or lengths in the right triangle. If necessary, round to the nearest tenth.

2)



- A) 20 cm
- B) $2\sqrt{5}$ cm
- C) $2\sqrt{13}$ cm
- D) 52 cm
- E) None of the above

Use rational exponents to write as a single radical expression.

3) $\frac{\sqrt[3]{y}}{\sqrt[4]{y}}$

A) y

B) $\sqrt[4]{y^3}$

C) $\sqrt[12]{y}$

D) $\frac{1}{\sqrt{y}}$

E) None of the above

4) Simplify the expression. Write your answer as a simple fraction with only positive exponents. $\frac{3x^{-3}(yz)^{-2}}{(-3)^2x^2y^{-1}z}$

A) $\frac{1}{3x^5yz^{-3}}$

B) $\frac{x^{-5}y^{-1}z^{-3}}{3}$

C) $\frac{-6}{xyz}$

D) None of the above

E) $\frac{1}{27x^5yz^3}$

Factor by grouping.

5) $30x^2 - 25xy + 24xy - 20y^2$

A) $(30x + 4y)(x - 5y)$

B) $(5x + 4)(6x - 5)$

C) $(5x - 4y)(6x - 5y)$

D) $(5x + 4y)(6x + y)$

E) None of the above

Solve the problem.

6) An airplane flies 430 miles with the wind and 330 against the wind in the same length of time. If the speed of the wind is 30, what is the speed of the airplane in still air?

A) 233 mph

B) 228 mph

C) 218 mph

D) 99 mph

E) None of the above

Use the quadratic formula to solve the equation.

7) $4m^2 + 8m + 1 = 0$

- A) $\frac{-2 \pm \sqrt{5}}{2}$
- B) $\frac{-2 \pm \sqrt{3}}{8}$
- C) $\frac{-8 \pm \sqrt{3}}{2}$
- D) $\frac{-2 \pm \sqrt{3}}{2}$

E) None of the above

Find the number needed to complete the square of the expression.

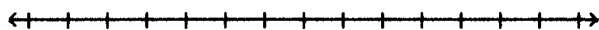
8) $x^2 + \frac{3}{5}x$

- A) $\frac{3}{25}$
- B) $\frac{9}{25}$
- C) $\frac{3}{10}$
- D) $\frac{9}{50}$

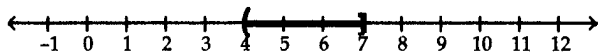
E) None of the above

Solve the inequality. Graph the solution set.

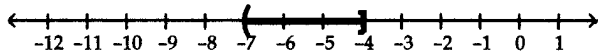
9) $-31 \leq -5c + 4 < -16$



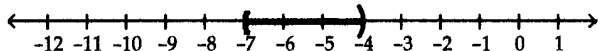
A) $(4, 7]$



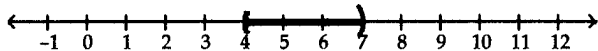
B) $(-7, -4]$



C) $[-7, -4)$



D) $[4, 7)$



E) None of the above

Solve the inequality.

10) $|3y - 8| - 9 > -12$

A) $(\frac{5}{3}, \infty)$

B) $(\frac{5}{3}, \frac{11}{3})$

C) $(-\infty, \frac{5}{3}) \cup (\frac{5}{3}, \infty)$

D) No solution

E) None of the above

Solve the problem.

11) Jim has gotten scores of 60 and 90 on his first two tests. What score must he get on his third test to keep an average of 80 or better?

A) at least 90

B) at least 75

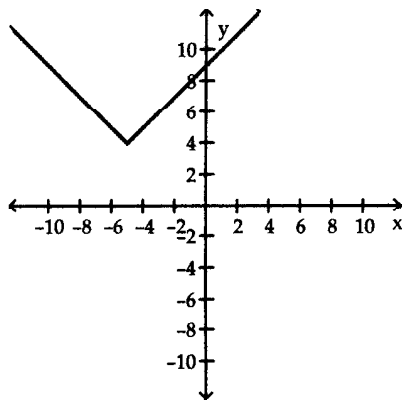
C) at least 88

D) at least 76

E) None of the above

List the intercepts of the graph. Tell whether the graph is symmetric with respect to the x-axis, y-axis, origin, or none of these.

12)



A) (0, 9); symmetric to y-axis

B) (9,0); symmetric to origin

C) (0, 9); symmetric to x-axis

D) (9,0); no symmetry

E) None of the above

Determine whether the function is symmetric with respect to the y-axis, symmetric with respect to the x-axis, symmetric with respect to the origin, or none of these.

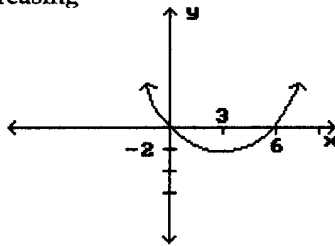
- 13) $y = -7x^3 + 3x$
- A) y-axis only
 - B) x-axis only
 - C) origin only
 - D) x-axis, y-axis, origin
 - E) None of the above

Solve the problem.

- 14) In simplified form, the period of vibration P for a pendulum varies directly as the square root of its length L . If P is 4.5 sec when L is 81 in, what is the period when the length is 25 in?
- A) 2.5 sec
 - B) 50 sec
 - C) 12.5 sec
 - D) 10 sec
 - E) None of the above

Identify the intervals where the function is changing as requested.

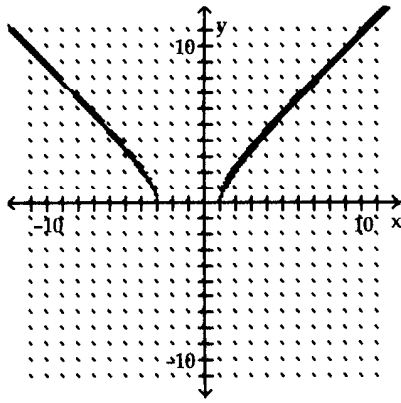
- 15) Increasing



- A) (3, 6)
- B) (6, ∞)
- C) (-2, 0)
- D) (3, ∞)
- E) None of the above

Give the domain and range of the function. Assume the ends of the function continue on.

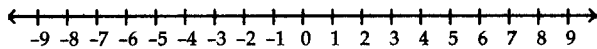
16)



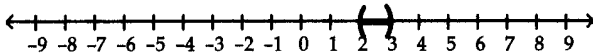
- A) Domain $(-\infty, \infty)$; Range $(0, \infty)$
- B) Domain $(0, \infty)$; Range $(-\infty, -3) \cup (1, \infty)$
- C) Domain $(-\infty, -3) \cup (1, \infty)$; Range $[0, \infty)$
- D) Domain $(0, \infty)$; Range $(-\infty, -3) \cup (1, \infty)$
- E) None of the above

Solve the inequality, then graph its solution. Use interval notation.

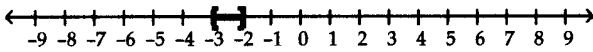
17) $x^2 + 5x \leq -6$



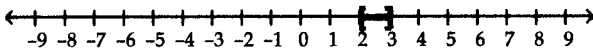
A) $(2, 3)$



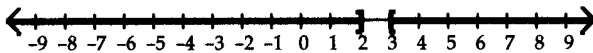
B) $[-3, -2]$



C) $[2, 3]$



D) $(-\infty, 2] \cup [3, \infty)$



E) None of the above

Solve the problem.

18) A wire of length $7x$ is bent into the shape of a square. Express the area of the square as a function of x .

A) $A(x) = \frac{1}{16}x^2$

B) $A(x) = \frac{7}{4}x^2$

C) $A(x) = \frac{49}{8}x^2$

D) $A(x) = \frac{49}{16}x^2$

E) None of the above

List all numbers that must be rejected as possible solutions.

$$19) \frac{5}{19x-1} - \frac{1}{x} = \frac{1}{2x-5}$$

A) $0, \frac{1}{19}, \frac{5}{2}$

B) $\frac{1}{19}, \frac{5}{2}$

C) $0, \frac{1}{19}, \frac{5}{2}, 5$

D) $\frac{1}{19}, \frac{5}{2}, -5$

E) None of the above

Give the equation of the specified asymptote(s).

20) Vertical asymptote(s): $f(x) = \frac{x-4}{x-9}$

A) $x = 3$

B) $x = -3$

C) $x=9$

D) $x = 4$

E) None of the above