

SECTION 3
Time—25 Minutes
16 Questions

Directions: In this section solve each problem, using any available space on the page for scratchwork. Then indicate the best of the answer choices given.

Numbers: All numbers used are real numbers.

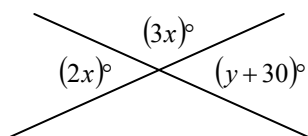
Figures: Figures that accompany problems in this section are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that its figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.

1. If p is an even integer and q is an odd integer, which of the following must be an odd integer?
(A) $\frac{p}{q}$
(B) pq
(C) $2p + q$
(D) $2(p + q)$
(E) $\frac{3p}{q}$
2. A certain college has a student-to-teacher ratio of 11 to 1. The average (arithmetic mean) annual salary for teachers is \$26,000. If the college pays a total of \$3,380,000 in annual salaries to its teachers, how many students does the college have?
(A) 130
(B) 169
(C) 1,300
(D) 1,430
(E) 1,560
3. Last year if 97 percent of the revenues of a company came from domestic sources and the remaining revenues, totaling \$450,000, came from foreign sources, what was the total of the company's revenues?
(A) \$1,350,000
(B) \$1,500,000
(C) \$4,500,000
(D) \$15,000,000
(E) \$150,000,000
4. Drum X is $\frac{1}{2}$ full of oil and drum Y , which has twice the capacity of drum X , is $\frac{2}{3}$ full of oil. If all of the oil in drum X is poured into drum Y , then drum Y will be filled to what fraction of its capacity?
(A) $\frac{3}{4}$
(B) $\frac{5}{6}$
(C) $\frac{11}{12}$
(D) $\frac{7}{6}$
(E) $\frac{11}{6}$
5. In a certain population, there are 3 times as many people aged twenty-one or under as there are people over twenty-one. The ratio of those twenty-one or under to the total population is
(A) 1 to 2
(B) 1 to 3
(C) 1 to 4
(D) 2 to 3
(E) 3 to 4
6. $\frac{2 + 2\sqrt{6}}{2} =$
(A) $\sqrt{6}$
(B) $2\sqrt{6}$
(C) $1 + \sqrt{6}$
(D) $1 + 2\sqrt{6}$
(E) $2 + \sqrt{6}$

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7. A certain telescope increases the visual range at a particular location from 90 kilometers to 150 kilometers. By what percent is the visual range increased by using the telescope?

(A) 30%
 (B) $33\frac{1}{2}\%$
 (C) 40%
 (D) 60%
 (E) $66\frac{2}{3}\%$



Note: Figure not drawn to scale.

8. In the figure above, the value of y is

(A) 6
 (B) 12
 (C) 24
 (D) 36
 (E) 42

9. A part-time employee whose hourly wage was increased by 25 percent decided to reduce the number of hours worked per week so that the employee's total weekly income would remain unchanged. By what percent should the number of hours worked be reduced?

(A) 12.5%
 (B) 20%
 (C) 25%
 (D) 50%
 (E) 75%

10. If $x > 0$, $\frac{x}{50} + \frac{x}{25}$ is what percent of x ?

(A) 6%
 (B) 25%
 (C) $37\frac{1}{2}\%$
 (D) 60%
 (E) 75%

11. If the operation \blacksquare is defined for all a and b by the equation $a \blacksquare b = \frac{a^2b}{3}$, then $2 \blacksquare (3 \blacksquare - 1) =$

(A) 4
 (B) 2
 (C) $-\frac{4}{3}$
 (D) -2
 (E) -4

12. A factory that employs 1,000 assembly-line workers pays each of these workers \$5 per hour for the first 40 hours worked during a week and $1\frac{1}{2}$ times that rate for hours worked in excess of 40. What was the total payroll for the assembly-line workers for a week in which 30 percent of them worked 20 hours, 50 percent worked 40 hours, and the rest worked 50 hours?

(A) \$180,000
 (B) \$185,000
 (C) \$190,000
 (D) \$200,000
 (E) \$205,000

13. If $x \neq 2$, then $\frac{3x^2(x-2)-x+2}{x-2} =$

(A) $3x^2 - x + 2$
 (B) $3x^2 + 1$
 (C) $3x^2$
 (D) $3x^2 - 1$
 (E) $3x^2 - 2$

14. In a certain school, 40 more than $\frac{1}{3}$ of all the students are taking a science course and $\frac{1}{4}$ of those taking a science course are taking physics. If $\frac{1}{8}$ of all the students in the school are taking physics, how many students are in the school?

(A) 240
 (B) 300
 (C) 480
 (D) 720
 (E) 960

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15. If $d > 0$ and $0 < 1 - \frac{c}{d} < 1$, which of the following must be true?

- I. $c > 0$
- II. $\frac{c}{d} < 1$
- III. $c^2 + d^2 > 1$

- (A) I only
- (B) II only
- (C) I and II only
- (D) II and III only
- (E) I, II, and III

16. The inside dimensions of a rectangular wooden box are 6 inches by 8 inches by 10 inches. A cylindrical canister is to be placed inside the box so that it stands upright when the closed box rests on one of its six faces. Of all such canisters that could be used, what is the radius, in inches, of the one that has the maximum volume?

- (A) 3
- (B) 4
- (C) 5
- (D) 6
- (E) 8

S T O P

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY.

DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

SECTION 5
Time—25 Minutes
16 Questions

Directions: In this section solve each problem, using any available space on the page for scratchwork. Then indicate the best of the answer choices given.

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1.
$$\frac{\frac{1}{2}}{\frac{1}{4} + \frac{1}{6}} =$$

- (A) $\frac{6}{5}$
- (B) $\frac{5}{6}$
- (C) $\frac{5}{24}$
- (D) $\frac{1}{5}$
- (E) $\frac{1}{12}$

2. Kelly and Chris packed several boxes with books. If Chris packed 60 percent of the total number of boxes, what was the ratio of the number of boxes Kelly packed to the number of boxes Chris packed?

- (A) 1 to 6
- (B) 1 to 4
- (C) 2 to 5
- (D) 3 to 5
- (E) 2 to 3

3. A train travels from New York City to Chicago, a distance of approximately 840 miles, at an average rate of 60 miles per hour and arrives in Chicago at 6:00 in the evening, Chicago time. At what time in the morning, New York City time, did the train depart for Chicago? (**Note:** Chicago time is one hour earlier than New York City time.)

- (A) 4:00
- (B) 5:00
- (C) 6:00
- (D) 7:00
- (E) 8:00

4. Of the following, which is the closest approximation of $\frac{50.2 \times 0.49}{199.8}$?

- (A) $\frac{1}{10}$
- (B) $\frac{1}{8}$
- (C) $\frac{1}{4}$
- (D) $\frac{5}{4}$
- (E) $\frac{25}{2}$

5. Last year Manfred received 26 paychecks. Each of his first 6 paychecks was \$750; each of his remaining paychecks was \$30 more than each of his first 6 paychecks. To the nearest dollar, what was the average (arithmetic mean) amount of his paychecks for the year?

- (A) \$752
- (B) \$755
- (C) \$765
- (D) \$773
- (E) \$775

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6. A certain pair of used shoes can be repaired for \$12.50 and will last for 1 year. A pair of the same kind of shoes can be purchased new for \$28.00 and will last for 2 years. The average cost per year of the new shoes is what percent greater than the cost of repairing the used shoes?
- (A) 3%
(B) 5%
(C) 12%
(D) 15%
(E) 24%
7. In a certain brick wall, each row of bricks above the bottom row contains one less brick than the row just below it. If there are 5 rows in all and a total of 75 bricks in the wall, how many bricks does the bottom row contain?
- (A) 14
(B) 15
(C) 16
(D) 17
(E) 18
8. If 25 percent of p is equal to 10 percent of q , and $p \neq 0$, then p is what percent of q ?
- (A) 2.5%
(B) 15%
(C) 20%
(D) 35%
(E) 40%
9. If the length of an edge of cube X is twice the length of an edge of cube Y , what is the ratio of the volume of cube Y to the volume of cube X ?
- (A) $\frac{1}{2}$
(B) $\frac{1}{4}$
(C) $\frac{1}{6}$
(D) $\frac{1}{8}$
(E) $\frac{1}{27}$
10. $(\sqrt{2} + 1)(\sqrt{2} - 1)(\sqrt{3} + 1)(\sqrt{3} - 1) =$
- (A) 2
(B) 3
(C) $2\sqrt{6}$
(D) 5
(E) 6
11. In a certain calculus class, the ratio of the number of mathematics majors to the number of students who are not mathematics majors is 2 to 5. If 2 more mathematics majors were to enter the class, the ratio would be 1 to 2. How many students are in the class?
- (A) 10
(B) 12
(C) 21
(D) 28
(E) 35
12. Machines A and B always operate independently and at their respective constant rates. When working alone, machine A can fill a production lot in 5 hours, and machine B can fill the same lot in x hours. When the two machines operate simultaneously to fill the production lot, it takes them 2 hours to complete the job. What is the value of x ?
- (A) $3\frac{1}{3}$
(B) 3
(C) $2\frac{1}{2}$
(D) $2\frac{1}{3}$
(E) $1\frac{1}{2}$
13. In the xy -coordinate system, if (a, b) and $(a + 3, b + k)$ are two points on the line defined by the equation $x = 3y - 7$, then $k =$
- (A) 9
(B) 3
(C) $\frac{7}{3}$
(D) 1
(E) $\frac{1}{3}$

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ANSWER KEY – Test Code 28

Section 2	Section 3	Section 4	Section 5	Section 6	Section 7
1. B	1. C	1. B	1. A	1. E	1. D
2. E	2. D	2. C	2. E	2. C	2. E
3. C	3. D	3. E	3. B	3. Not Scored	3. C
4. C	4. C	4. C	4. B	4. E	4. E
5. B	5. E	5. E	5. D	5. D	5. D
6. A	6. C	6. C	6. C	6. E	6. E
7. D	7. E	7. C	7. D	7. D	7. E
8. D	8. E	8. A	8. E	8. A	8. A
9. B	9. B	9. B	9. D	9. D	9. D
10. A	10. A	10. A	10. A	10. E	10. C
11. B	11. E	11. C	11. D	11. A	11. A
12. D	12. B	12. B	12. A	12. B	12. D
13. E	13. D	13. D	13. D	13. D	13. D
14. C	14. A	14. A	14. E	14. A	14. B
15. E	15. C	15. C	15. A	15. E	15. E
16. D	16. B	16. D	16. C	16. C	16. A
		17. D		17. C	17. D
		18. A		18. A	18. A
		19. E		19. E	19. C
		20. B		20. C	20. B
		21. C		21. A	
		22. E		22. B	
		23. A			