

Date Due: **November 22, 2011**

1. Two complementary angles are in the ratio 3:2. The number of degrees in the *smaller* angle is

- (1) 18
- (2) 54
- (3) 36
- (4) 72

2. Point  $P'$  is the image of point  $P(-3, 4)$  after a translation defined by  $T_{(7, -1)}$ . Which other transformation on  $P$  would also produce  $P'$ ?

- (1)  $r_{y=-x}$
- (2)  $R_{90^\circ}$
- (3)  $r_{y\text{-axis}}$
- (4)  $R_{90^\circ}$

3. Line  $M$  is perpendicular to plane  $B$ . If line  $M$  is in plane  $A$ , then which statement must be true?

- (1) Planes  $A$  and  $B$  are parallel.
- (2) Line  $M$  is perpendicular to plane  $A$ .
- (3) Planes  $A$  and  $B$  are skew.
- (4) Planes  $A$  and  $B$  are perpendicular.

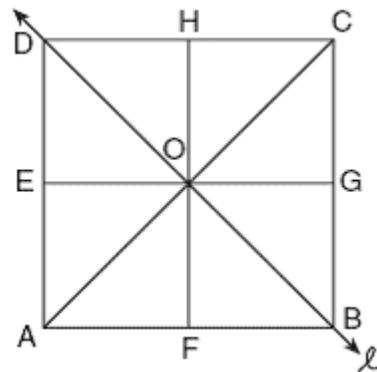
4. Which transformation is an indirect isometry?

- (1) dilation
- (2) line reflection
- (3) rotation of  $90^\circ$
- (4) translation

5. The statement " $x \geq 4$  and  $2x - 4 < 6$ " is true when  $x$  is equal to

- (1) 1
- (2) 10
- (3) 5
- (4) 4

6. In the accompanying diagram of square  $ABCD$ ,  $F$  is the midpoint of  $\overline{AB}$ ,  $G$  is the midpoint of  $\overline{BC}$ ,  $H$  is the midpoint of  $\overline{CD}$ , and  $E$  is the midpoint of  $\overline{DA}$ .



Which is the image of  $\triangle EOA$  after it is reflected in line  $l$ ?

- (1)  $\triangle OCG$
- (2)  $\triangle OGB$
- (3)  $\triangle HOC$
- (4)  $\triangle EDO$

7. Point  $A$  is not contained in plane  $B$ . How many lines can be drawn through point  $A$  that will be perpendicular to plane  $B$ ?

- (1) 1
- (2) 2
- (3) 0
- (4) infinite

### Short Answer

Please show all work on a separate piece of paper and/or graph paper.

8. If the coordinates of  $A$  are  $(2, -3)$ , what are the coordinates of  $A'$ , the image of  $A$  after  $R_{90^\circ} \circ r_{y\text{-axis}}$  ( $A$ )?

9. For any point  $(x, y)$ , which transformation is equivalent to  $R_{45^\circ} \circ R_{135^\circ}$ ?

10. Find the image of  $A(4, -3)$  under the transformation  $r_{x=2}$

11. If  $x = 3$ , write a conjunction that is false.

12. Which statement is logically equivalent to the statement "If  $x = 3$ , then  $x$  is a prime number"?

13. Given that:

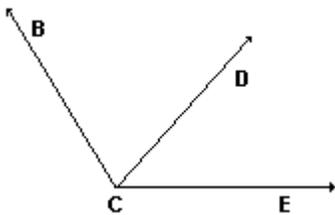
- If I buy a shirt, then I will buy a vest.
- If I do not have any money, then I will not buy a vest.
- Either I buy a shirt or I will not go to the dance.
- I am going to the dance.

Do I have any money (yes, no, cannot tell)?

14. Given the true statement "John is not handsome" and the false statement "John is handsome or smart." Determine the truth value for the statement "John is smart."

15. The coordinates of  $A$  are  $(4, 5)$  and the coordinates of  $B$  are  $(10, y)$ . If the midpoint of  $\overline{AB}$  is  $(7, -2)$ , find the value of  $y$ .

16. What is the distance between points  $A(7, 3)$  and  $B(5, -1)$  in simplest radical form?



17. In the diagram,  $m\angle ECB = 6x$ ,  $m\angle ECD = 3x - 11$ , and  $m\angle DCB = 74$ . What is the value of  $x$ ?

18. Solve the following system of equations graphically or algebraically.

$$2x^2 - 4x = y + 1$$

$$x + y = 1$$