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Online Homework

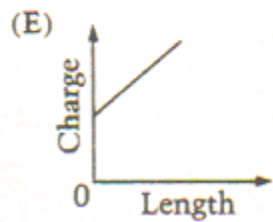
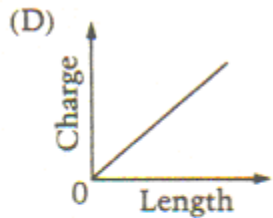
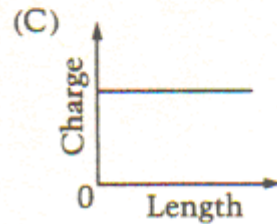
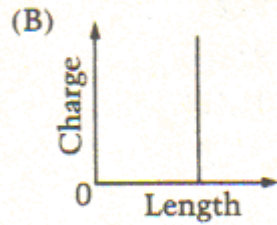
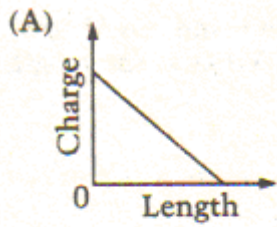
Focused Exercises for Math SAT

Skill Set 6: Lines and Slopes

Many of the problems in this exercise set came from The College Board, writers of the SAT exam.

1. Two companies charge different rates for painting lines on a road.
- Company X charges \$0.50 per foot of line painted and no base price.
 - Company Y charges a base price of \$100.00 plus \$0.30 per foot of line painted.

Which of the following graphs could show the relation between the length of line painted and the charge if Company Y does the job?



2.

x	$f(x)$
0	a
1	24
2	b

The table above shows some values for the function f . If f is a linear function, what is the value of $a + b$?

- (A) 24
 - (B) 36
 - (C) 48
 - (D) 72
 - (E) It cannot be determined from the information given.
3. In the xy - plane, the equation of line ℓ is $y = 2x + 5$. If line m is the reflection of line ℓ in the x - axis, what is the equation of line m ?
- (A) $y = -2x - 5$
 - (B) $y = -2x + 5$
 - (C) $y = 2x - 5$
 - (D) $y = -\frac{1}{2}x - 5$
 - (E) $y = -\frac{1}{2}x + 5$

4. Which of the following tables shows a relationship in which w is directly proportional to x ?

(A)

w	x
1	3
2	4
3	5

(B)

w	x
3	9
4	16
5	25

(C)

w	x
5	10
6	18
7	28

(D)

w	x
7	21
8	24
9	27

(E)

w	x
5	10
10	15
15	20

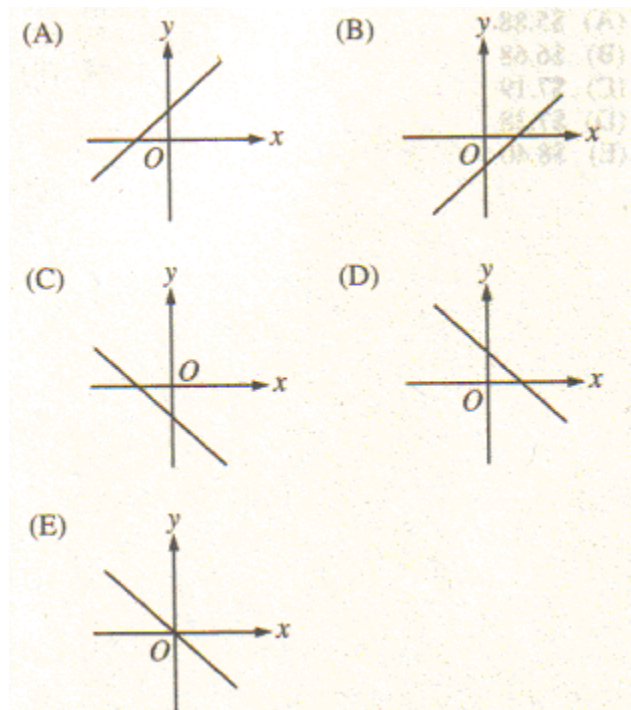
5. In the xy - plane, the line with equation $y = 5x - 10$ crosses the x - axis at the point with coordinates (a, b) . What is the value of a ?

- (A) -10
(B) -2
(C) 0
(D) 2
(E) 5

6. Line ℓ has a positive slope and passes through the point $(0, 0)$. If line k is perpendicular to line ℓ , which of the following must be true?

- (A) Line k passes through the point $(0, 0)$.
- (B) Line k has a positive slope.
- (C) Line k has a negative slope.
- (D) Line k has a positive x -intercept.
- (E) Line k has a negative y -intercept.

7. Which of the following is the graph of a linear function with a negative slope and a positive y -intercept?



8. The force required to stretch a spring beyond its natural length is proportional to how far the spring is being stretched. If a force of 15 pounds stretches a spring 8 centimeters beyond its natural length, what force, in pounds, is needed to stretch this spring 20 centimeters beyond its natural length?

- (A) 23
- (B) 27
- (C) 30.5
- (D) 35
- (E) 37.5

9. In the xy -plane, line ℓ passes through the origin and is perpendicular to the line $4x + y = k$, where k is a constant. If the two lines intersect at the point $(t, t + 1)$, what is the value of t ?

(A) $-\frac{4}{3}$

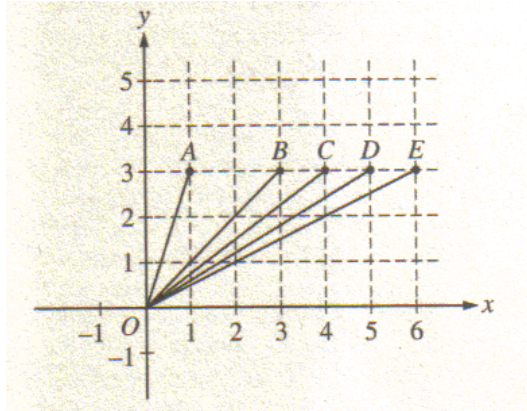
(B) $-\frac{5}{4}$

(C) $\frac{3}{4}$

(D) $\frac{5}{4}$

(E) $\frac{4}{3}$

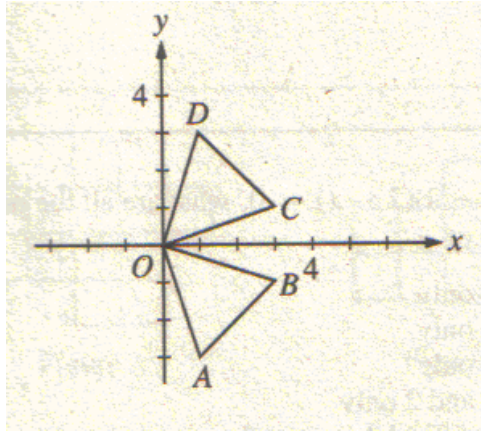
10.



In the figure above, what is the median of the slopes of \overline{OA} , \overline{OB} , \overline{OC} , \overline{OD} , and \overline{OE} ?

- (A) $\frac{4}{3}$
 - (B) 1
 - (C) $\frac{3}{4}$
 - (D) $\frac{3}{5}$
 - (E) $\frac{1}{2}$
11. In the xy -coordinate plane, line ℓ is perpendicular to the y -axis and passes through the point $(5, -3)$. Which of the following is an equation of line ℓ ?
- (A) $x = 0$
 - (B) $x = 5$
 - (C) $y = -3$
 - (D) $y + 3 = x + 5$
 - (E) $y - 3 = x + 5$

12.



In the xy -coordinate system above, which of the following line segments has a slope of -1 ?

- (A) \overline{OA}
- (B) \overline{OB}
- (C) \overline{OC}
- (D) \overline{OD}
- (E) \overline{DC}

13. In the xy -coordinate plane, line m is the reflection of line ℓ about the x -axis. If the slope of line m is $-\frac{4}{5}$, what is the slope of line ℓ ?

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

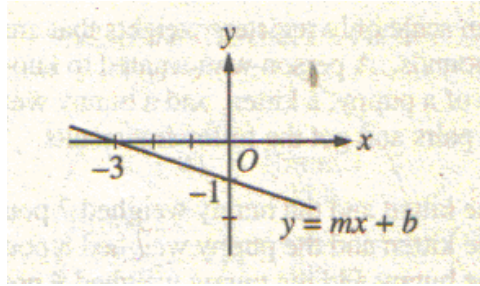
14.

t	-1	0	1	2
$g(t)$	4	2	0	-2

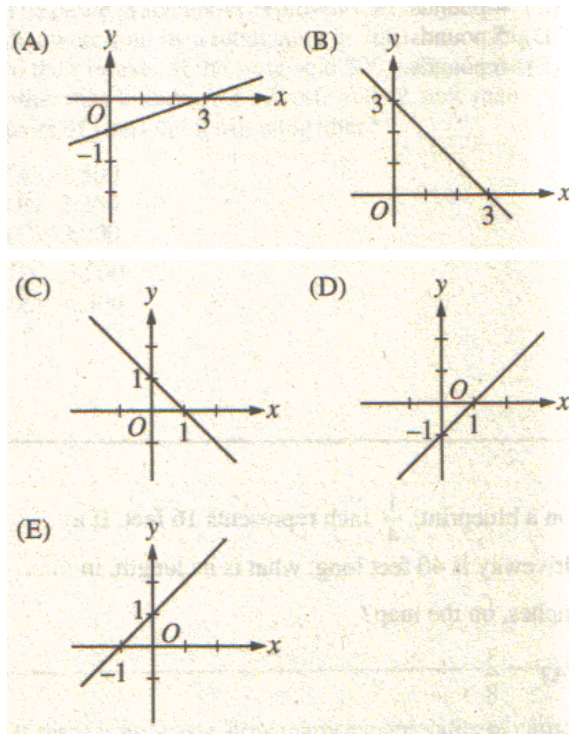
The table above gives values of the linear function g for selected values of t . Which of the following defines g ?

- (A) $g(t) = \frac{1}{2}t + 1$
- (B) $g(t) = -\frac{1}{2}t + 1$
- (C) $g(t) = -t + 1$
- (D) $g(t) = -t + 2$
- (E) $g(t) = -2t + 2$

15.



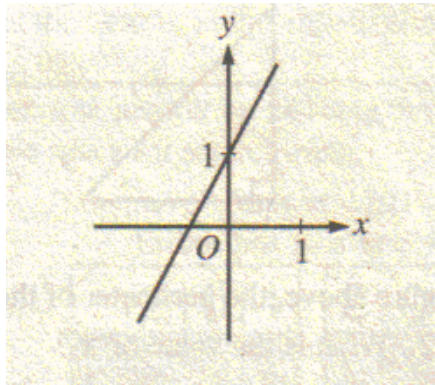
The figure above shows the graph of the line $y = mx + b$, where m and b are constants. Which of the following best represents the graph of the line $y = -3mx + b$?



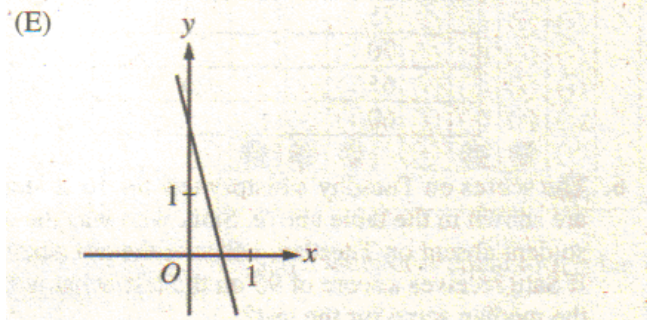
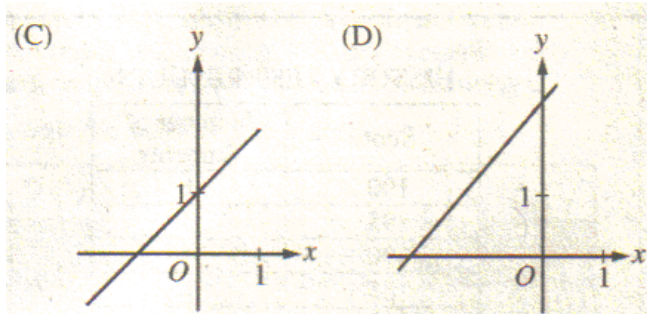
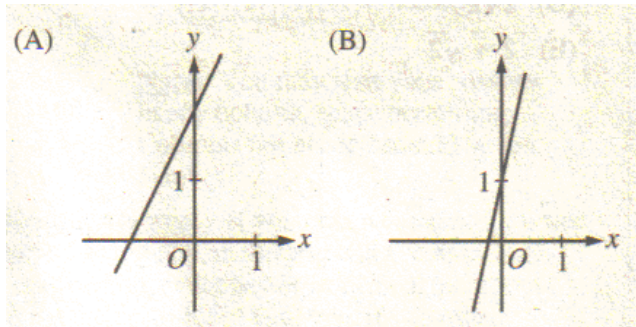
16. For a certain hot-water heater, the increase in heating expenses is directly proportional to the increase in water-temperature setting. If heating expenses increase by \$24 when the water-temperature setting is increased by 20 degrees Fahrenheit, by how much will heating expenses increase when the water-temperature setting is increased by 15 degrees Fahrenheit?

- (A) \$16
- (B) \$18
- (C) \$19
- (D) \$20
- (E) \$21

17.

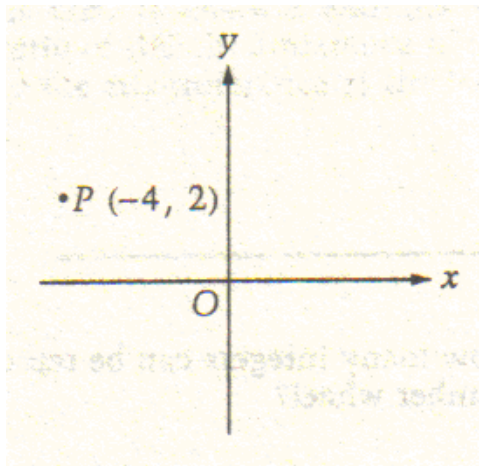


The figure above shows the graph of the line $y = ax + b$, where a and b are constants. Which of the following best represents the graph of the line $y = 2ax + b$?



18. Rectangle $ABCD$ lies in the xy -coordinate plane so that its sides are not parallel to the axes. What is the product of the slopes of all four sides of rectangle $ABCD$?
- (A) -2
(B) -1
(C) 0
(D) 1
(E) 2
19. Point P lies on the line with equation $y - 4 = 3(x - 2)$. If the x -coordinate of P is 4 , what is the y -coordinate of P ?
20. What is one possible value for the slope of a line passing through point $(-1, 1)$ and passing between points $(1, 3)$ and $(2, 3)$ but not containing either of them?
21. If the slope of the line that passes through the points $(a, 0)$ and $(1, -2)$ is $\frac{1}{2}$, what is the value of a ?

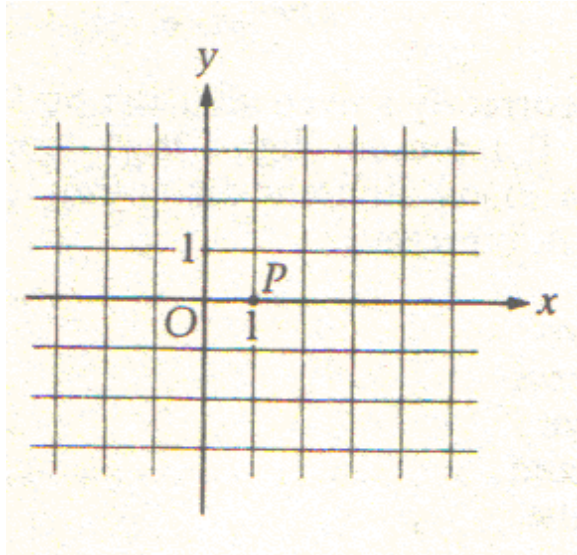
22.



In the figure above, a line is to be drawn through the point P so that it never crosses the x -axis. Through which of the following points must the line pass?

- (A) $(4, 2)$
(B) $(4, -2)$
(C) $(2, 4)$
(D) $(2, -4)$
(E) $(-4, -2)$

23.



Line ℓ (not shown) contains point P and has slope 5. Which of the following points is on line ℓ ?

- (A) (0, 5)
- (B) (1, 5)
- (C) (2, 5)
- (D) (5, 1)
- (E) (5, 5)

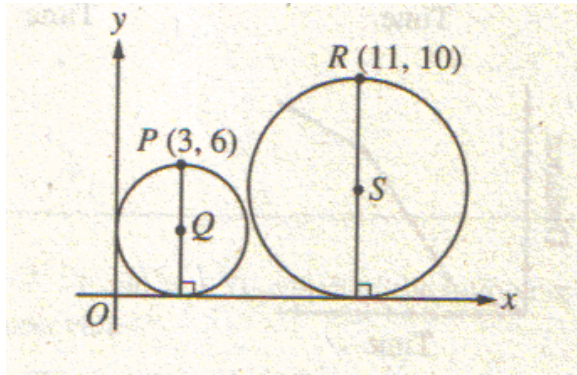
24.

x	y
2	7
4	a
a	b

In the table above, if $y = 2x + 3$, what is the value of b ?

- (A) 4
- (B) 11
- (C) 15
- (D) 25
- (E) 28

25.



In the xy -coordinate plane above, points Q and S are the centers of the circles, which are tangent to the x -axis. What is the slope of line QS (not shown)?

(A) $\frac{1}{8}$

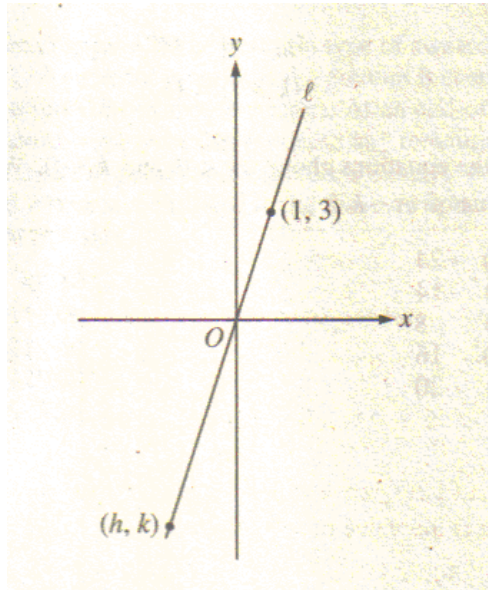
(B) $\frac{1}{4}$

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

(D) $\frac{7}{8}$

(E) 1

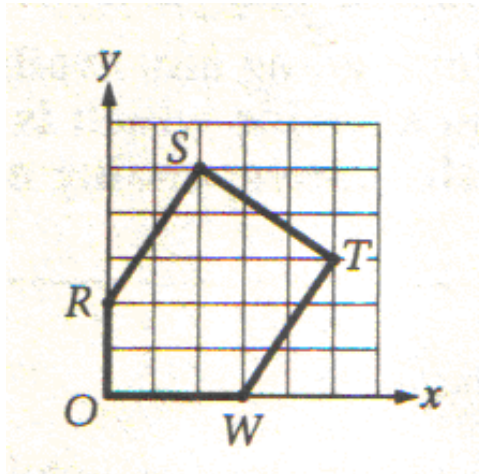
26.



In the figure above, line ℓ passes through the origin. What is the value of $\frac{k}{h}$?

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

27.

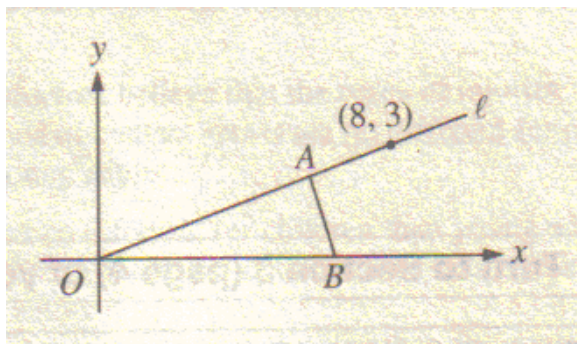


In the figure above, which two sides of polygon $ORSTW$ have the same slope?

- (A) OR and OW
- (B) OW and ST
- (C) RS and ST
- (D) RS and WT
- (E) ST and WT

28. In the xy -coordinate plane, the graph of $x = y^2 - 4$ intersects line ℓ at $(0, p)$ and $(5, t)$. What is the greatest possible value of the slope of ℓ ?

29.



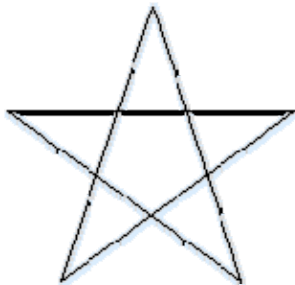
Line m (not shown) passes through O and intersects \overline{AB} between A and B . What is one possible value of the slope of line m ?

30. Four distinct lines lie in a plane, and exactly two of them are parallel. Which of the following could be the number of points where at least two of the lines intersect?

- I. Three
- II. Four
- III. Five

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

31.



The least number of marbles one would need in order to place 4 marbles on each line of the figure above is

- (A) 5
- (B) 10
- (C) 14
- (D) 15
- (E) 20