Entering Algebra 2 Honors Summer Homework



Name _____

Please read all instructions before beginning this packet.

Show all work directly in this packet.
If you need additional space, use lined paper and clearly label each problem.
Submit the completed printed packet when you return to school in August.

To maintain your academic progress, the math department at CSN expects you to spend approximately one hour per week working on these problem sets. Most problems can be completed without a calculator, but use when necessary.

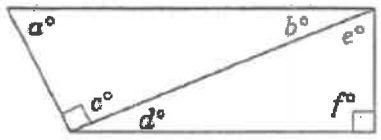
Your grade will be based on:

- Completion
- Accuracy
- A beginning-of-year assessment given during the first week of school

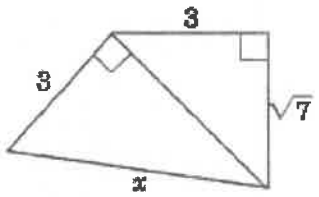
Please give your best effort. This work helps reflect your individual strengths and areas for growth, and it also allows the department to analyze overall student performance. Teachers will use this information to adjust instruction and better support your learning.

Please reach out to your teacher or the department chair with any questions or concerns.

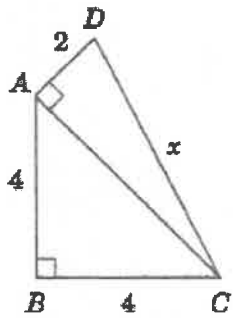
Practice E



1. In the figure above, what is the value of (c + f) – 2 (a + b + d + e)?
   (a) -180^0 (b) -90^0 (c) -0^0 (d) 90^0 (e) 180^0

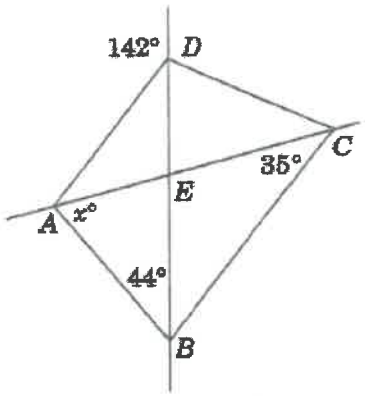


2. In the figure above, what is the value of x?
   (a) $\sqrt{7}$ (b) $\sqrt{19}$ (c) 5 (d) 7 (e) 10



3. In the figure above, what is the value of x?
   (a) 4 (b) $4\sqrt{2}$ (c) 5 (d) 6 (e) $6\sqrt{2}$

4. A square that measures 5 inches on a side is folded in half along a diagonal. Which of the following must be true?
   I. The triangle is a right triangle II. The triangle is an isosceles triangle III. The length of the hypotenuse of the triangle is 5
   (a) *I Only* (b) II Only (c) *III Only* (d) *I and II Only* (e) *I, II and III*

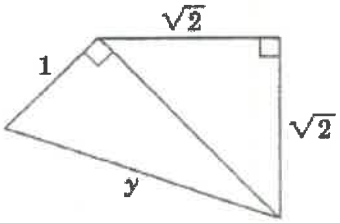


5. In the figure above $AD \parallel BC$. What is the value of x?

(a) 43 (b) 53 (c) 63 (d) 73 (e) 98

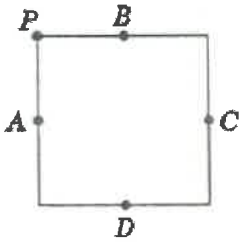
6. The number of diagonals d in a polygon with n sides is given by the formula $d = \frac{n^2-3n}{2}$. If a polygon has 90 diagonals, how may sides does it have?

(a) 12 (b) 15 (c) 18 (d) 24 (e) 30



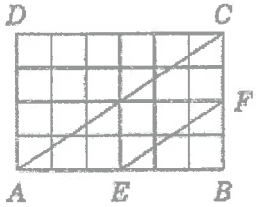
7. In the figure above, what is the value of y?

(a) 5 (b) $\sqrt{5}$ (c) 2 (d) $\sqrt{3}$ (e) 1



8. In the figure above, points A, B, C, and D are the midpoints of the sides of the square. If the length of one side is 4, what is the sum of the lengths of PA, PB, PC, and PD?

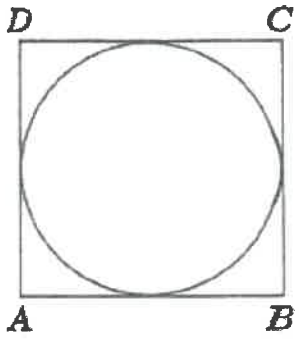
(a) $2\sqrt{2}$ (b) 4 (c) $2 + \sqrt{5}$ (d) $4 + 4\sqrt{5}$ (e) $8\sqrt{2}$



9. If the rectangle ABCD is divided into 24 equal squares, and diagonal $AC \parallel EF$, what is the ratio of AC to EF?

(a) 1:3 (b) 1:2 (c) 2:1 (d) 3:1 (e) 6:1

Questions 11 and 12 refer to the following information.



The circle inscribed in the square *ABCD* above has an area of 16π.

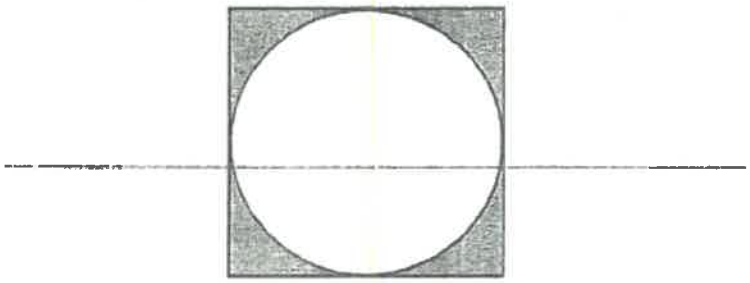
11. What is the length of diagonal AC?

(a) 4 (b) 8 (c) $8\sqrt{2}$ (d) 16 (e) $16\sqrt{2}$

12. To the nearest tenth, what is the positive difference between the diagonal of the square and the diameter of the circle?

(a) 1.4 (b) 3.3 (c) 3.4 (d) 4.7 (e) 11.3

Questions 13 and 14 refer to the following information.



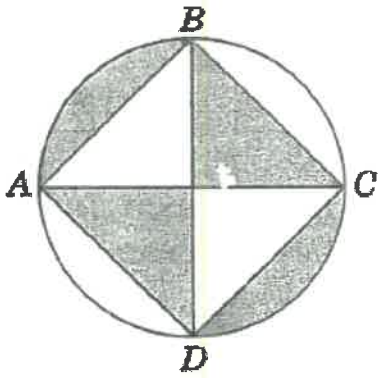
In the figure above, the circle inscribed in the square has a radius of 3.

13. What is the ratio of the perimeter of the square to the circumference of the circle?

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{8}{9}$ (d) $\frac{4}{\pi}$ (e) $\frac{6}{\pi}$

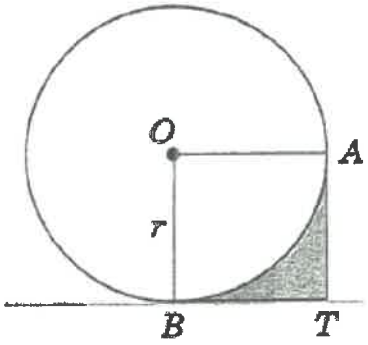
14. What is the area of the shaded region?

(a) $9\pi - 36$ (b) $24 - 9\pi$ (c) $24 - 6\pi$ (d) $36 - 9\pi$ (e) $36 - 6\pi$



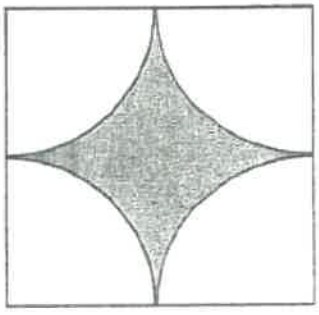
15. A square ABCD is inscribed in a circle of radius 8, as seen in the figure above. What is the area of the shaded region?

(a) 64π (b) 32π (c) 16π (d) 32 (e) $16\pi - 32$



16. In the figure above, r is the radius of the circle with center O and BOAT is a square with points B and A on the circle. In terms of r, what is the area of the shaded region?

(a) $r^2(1-\frac{\pi}{4})$ (b) $r^2(1-\pi^2)$ (c) $r(r-\frac{\pi}{2})$ (d) $r(r-\pi)$ (e) $r^2(1-\pi)$



17. In the square above, each arc is from a circle of radius 1. What is the area of the shaded region?

(a) $4-4\pi$ (b) $\pi-4$ (c) $4-\pi$ (d) π (e) $4\pi-4$

Test 1 Section 1

1. If a = 0 and $b \neq 0$, then what is the value of $\frac{a}{b} + \frac{a+1}{b} + \frac{a-1}{b}$?
   (A) 3 (B) 2 (C) 1 (D) $\frac{1}{2}$ (E) 0

2. If 33mn + 10 = 38mn, then what is the value of mn?
   (A) $-\frac{1}{2}$ (B) 0 (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) 2

3. Which of the following numbers satisfy $\frac{3}{x} - 2 = \frac{1}{x}$?
   (A) -1 (B) 0 (C) $\frac{1}{2}$ (D) 1 (E) 3

4. If a – b = 80 and $\frac{3}{5} = \frac{b}{a}$, then what is the value of a?
   (A) 240 (B) 200 (C) 120 (D) 80 (E) 5

5. If x onions cost r cents, how many onions can be bought with d dollars?
   (A) $\frac{100d}{xr}$ (B) $\frac{r}{100dx}$ (C) $\frac{100r}{dx}$ (D) $\frac{100dx}{r}$ (E) $\frac{dx}{100r}$

6. If a + b = c and a = c, then all of the following must be true except…
   (A) $b = 0$ (B) c – a = 0 (C) $a - b = c$ (D) $c - a = a - c$ (E) 3b = a + 2c

7. If $(y-4)^2 = 36$ and y < 0, what is the value of y?
   (A) 10 (B) 2 (C) -2 (D) -6 (E) –10

8. If v, w, x, y, and z are positive consecutive integers whose sum is 15, then what is the value of $\frac{z+v}{y-v}$?
   (A) 3 (B) 2 (C) $\frac{4}{3}$ (D) $\frac{6}{5}$ (E) -2

9. If a positive number n increased by r times that number equals that number, then what is the value of r?
   (A) -2 (B) -1 (C) 0 (D) 1 (E) 2

10. If $2^{3x} = 8$, then x =
    (A) $\frac{2}{3}$ (B) 1 (C) $\frac{3}{2}$ (D) 4 (E) $\frac{8}{3}$

11. If x + y = 15 and x – y = 25, then what is the value of $2x^2 - y^2$?

(A) 425 (B) 775 (C) 825 (D) 1,575 (E) 1,625

12. If x – 5 = y, then what is the value of $(y - x)^3$?

(A) -125 (B) -15 (C) 15 (D) 125 (E) 625

13. If the square of a number N ($N \neq 0$) equals g times that number, then what is that number in terms of g?

(A) $-g^2$ (B) -g (C) g (D) $2g$ (E) g^2

14. If x = y and m > y, then which of the following must be true?

I. x < m
II. x = m
III. x > m

(A) I Only (B) II Only (C) III Only (D) I and II (E) II and III

15. If $\frac{m}{n} = 5$, then $m^2 - 25n^2 =$?

(A) 25 (B) 24 (C) 0 (D) -24 (E) -25

16. If $1 \leq x < y \leq 8$ and x and y are integers, what is the least possible value of $\frac{x+y}{xy}$?

(A) $\frac{3}{2}$ (B) $\frac{9}{8}$ (C) $\frac{9}{14}$ (D) $\frac{13}{42}$ (E) $\frac{15}{56}$

17. If -3x + 13 < -14, then…

(A) $x > 9$ (B) x < 9 (C) x < $\frac{1}{3}$ (D) x < $-\frac{1}{3}$ (E) $x < -9$

18. If x > y and y > 0 and xz < 0, then which of the following must be true about all of the values of z?

(A) $z > 0$ (B) z = 0 (C) z < 0 (D) $z > x$ (E) $z > y$

19. If $\frac{x+y}{y} = 4$ *and* $\frac{x+z}{z} = 6$, what is the value of $\frac{y}{z}$?

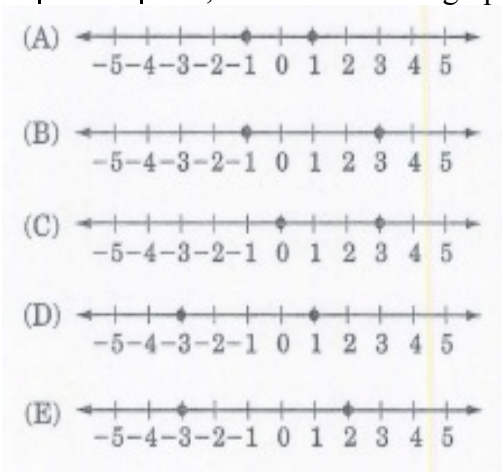
(A) $\frac{3}{5}$ (B) $\frac{2}{3}$ (C) 1 (D) $\frac{3}{2}$ (E) $\frac{5}{3}$

20. If $x^2 - 6x + 8 = 0$ *and* $y = x + 3$, then what are the possible values of y?

(A) 2 and 4 (B) 2 and 5 (C) 4 and 5 (D) 4 *and* 7 (E) 5 *and* 7

Test 1 Section 2

1. If $|3x - 3| = 6$, then the solution graphed on a number line is…



2. If it takes 10 men 4 hours to repair a barn, how long will it take 8 men to complete the task?

   (A) 2 Hours (B) 5 Hours (C) 6 $Hours$ (D) 8 $Hours$ (E) 10 Hours

3. If $\frac{4}{x} = \frac{y}{5}$, what is the value of $\frac{y}{x}$?

   (A) $\frac{1}{20}$ (B) $\frac{4}{5}$ (C) $\frac{5}{4}$ (D) 20 (E) Cannot be determined from the information given

4. If $a = -2\ and\ b = 16$, then $a^0 b^{\frac{1}{2}} + a^{-2} b^{-\frac{1}{2}}$ is equal to…

   (A) $-\frac{3}{16}$ (B) $\frac{1}{32}$ (C) $\frac{1}{16}$ (D) $\frac{65}{16}$ (E) $\frac{257}{32}$

5. If $f(x) = \frac{x^2-9}{x^2-4}$, the domain of x is all real numbers except…

   (A) $2\ and\ -2$ (B) $-3\ and\ 3$ (C) 0 (D) 2 (E) 2 and 3

6. In x years from now, Robert will be k years old. How old was Robert m years ago?

   (A) x – (k + m) (B) k – x (C) $k - x - m$ (D) x – (k – m) (E) k + m – x

7. If x = y and y + 2 = x^2, then x must equal…

   (A) $-2\ Only$ (B) $1\ Only$ (C) $2\ Only$ (D) $-1\ or\ 2\ Only$ (E) $-2\ or\ 1\ Only$

8. If $\sqrt{2x} + 7 = 13$, then the value of x equals…

   (A) $\frac{3}{2}$ (B) 3 (C) 10 (D) 18 (E) 200

Student-Produced Response Questions

9. If m = $(x + 3)^2$ AND $X = -1, then$ $m =$

10. George has 9 more dollars than Frank, who has 3 more than Richard. What is the least amount of money that must be exchanged so that they each have the same amount of money?

11. If $\frac{2m+7n}{4m^2-49n^2} = 7$, what is the value of 2m – 7n?

12. If x – 5y = 37 and x and y are positive integers, then what is the least possible value of x?

13. If n – 1 = 7 and mn – m = 28, then m =

14. If $x^2 + y^2 = 12$ and $xy = -4, then$ $(x + y)^2 =$

15. If $(2x^2 + 5x - 3)(5x - 4) = ax^3 + bx^2 + cx + d$ for all real values of x, what is the value of b?

16. If $(y - 5)^2 = 0$, then what is the value of $(y + 3)^2(y - 10)^2$?

17. If 4a + 3b = 27 and 3a + 4b =29, then $\frac{7a+7b}{2} =$

18. In August Amy spent $\frac{2}{5} ths$ of the money in her checking account. In September she spent $\frac{1}{3} rd$ of the remainder. If she had $400 left, what was in her checking

Test 1 Section 3

1. If $m > 0, then\ (-m)^5(-m)^4 =$
   (A) $-m^{54}$ (B) $-m^{20}$ (C) $-m^9$ (D) m^9 (E) m^{20}

2. If $\frac{m}{5} = m^2$, then the non-zero value of m is…
   $(A) -5$ (B) $-\frac{1}{5}$ (C) 0 (D) $\frac{1}{5}$ (E) 5

3. If number K ($K \neq 0$) equals the number squared divided by r, then what is K in terms of r?
   $(A) -r^2$ (B) $-r$ (C) r (D) $2r$ (E) r^2

4. If 4 x – 3 < -9, when which of the following could be one solution for x?
   $(A) -2$ (B) -1 (C) 3 (D) 4 (E) 5

5. If the steps below are followed in the order given, then which is the correct simplified result?
   1. Add 3x – 2 to 3 – 2x
   2. Multiply that sum by – 1
   3. Subtract x + 2 from the product
   $(A) -2x-3$ (B) $-2x-1$ (C) $2x-3$ (D) $2x+1$ (E) $2x+3$

6. If $\frac{x}{x-6} = \frac{1}{x-4}$, then x equals…
   $(A) 1\ and\ 6$ (B) $-1\ and -6$ (C) $-2\ and -3$ (D) $2\ and\ 3$ (E) $3\ and -3$

7. Sam's parents give him extra allowance based on the number of times he walks the dog. Last week Sam got \$3.00 for walking the dog twice. How much extra allowance would he get for walking the dog seven times?
   (A)\$6.50 (B) \$10.00 (C) \$10.50 (D) \$14.00 (E) \$21.00

8. If $p\left(\frac{1}{q}\right) = -1$, then which of the following is NOT necessarily true?
   $(A) p+q=0$ (B) $p-q=2p$ (C) $pq=-p^2$ (D) $p^2+q^2=2p^2$ (E) $p=-\frac{1}{q}$

9. If $a = 1+\frac{1}{b}, and\ b > 1$, then a could equal…
   $(A)\frac{1}{5}$ (B) $\frac{4}{5}$ (C) $\frac{8}{5}$ (D) $\frac{11}{5}$ (E) $\frac{14}{5}$

10. If x – y = 7 and $x^2 - y^2 = -70$, then what is the value of x?
    $(A) -10$ (B) -6 (C) -3 (D) $-\frac{3}{2}$ (E) $-\frac{2}{3}$

11. If $\frac{a}{b} = k\ and\ ab \neq 0, then\ \frac{a+b}{a}$ is equal to…
    $(A)\frac{1}{k+1}$ (B) $\frac{k}{k+1}$ (C) $\frac{k+1}{k-1}$ (D) $\frac{k+1}{k}$ (E) $k+1$

12. A trip to Europe for a class of N students has a fixed cost of x dollars. If 5 students decide not to go, then how much more will it cost EACH student to take the trip?
    $(A)\frac{x}{5}$ (B) $\frac{x}{N-5}$ (C) $\frac{x}{N}-\frac{x}{5}$ (D) $\frac{x}{N}-\frac{x}{N-5}$ (E) $\frac{x}{N-5}-\frac{x}{N}$

13. If 6x = 8 and 4y = 10, then what is the value of 3(3x) – 4(2y)?
$(A) -16$ (B) -10 (C) -8 (D) 8 (E) 16

14. What is the value of $f(x) = 3^x + 3x + 3^0$ if x = 3?
$(A) 18$ (B) 19 (C) 36 (D) 37 (E) 39

15. If 3m = 11 and x – 6m = 27, what is the value of x?
$(A) 5$ (B) 16 (C) 38 (D) 49 (E) 93

SAT-Type Problems **Practice A**

1. Simplify 5x – 3y – 7x + y.

   (A) 12x + 4y (B) 12x – 2y (C) -2x + 2y (D) -2x – 2y (E) None of these

2. What does 5(x + y) – (5x – y) equal?

   (A) 4y (B) 6y (C) 10x – 6y (D) 10x – 4y (E) 10x + 6y

3. $1 - (1 + [1 - (1 + y)]) =$

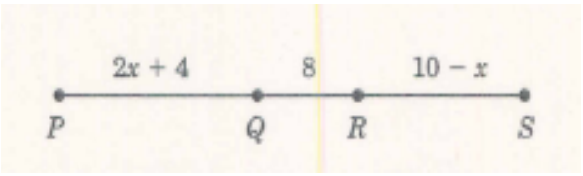
   (A) 4 – y (B) 2 – y (C) y (D) 2 + y (E) 4 + y

4. What is the result when 10x – 7 is subtracted from 9x – 15?

   (A) x + 8 (B) x + 22 (C) –x – 8 (D) –x + 8 (E) –x – 22

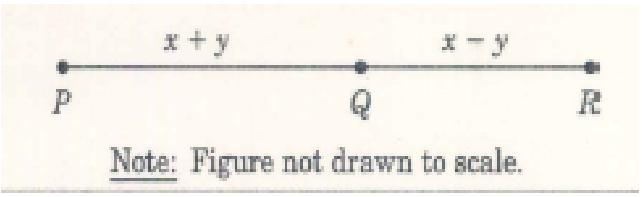
5. What is the result when 3 – 2x is subtracted from the sum of x + 3 and 5 – x?

   (A) -5 – 2x (B) -5 + 2x (C) 5 (D) 5 – 2x (E) 5 + 2x



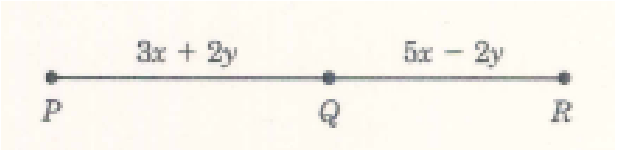
6. In the figure above, what is the length of PS in terms of x?

   (A) 14 – x (B) x + 22 (C) 3x + 22 (D) 3x + 2 (E) x + 2



7. In the figure above, segment PR is divided into 2 segments. The length of PQ is x + y and the length of QR is x – y. If PQ is twice as long as QR, and x = 15, then what is the length of PR?

   (A) 5 (B) 20 (C) 25 (D) 30 (E) 40



8. If line segment PR, in the figure above, has length 2, what is the value of y?

   (A) 8 (B) 4 (C) 2 (D) 0 (E) Cannot be determined from the information given

9. If x = y = -1, that what is the value of $3(x + y) - (3x - y)$?

(A) -8 (B) -4 (C) -3 (D) -2 (E) 2

10. If r = s and s = -5, then what is the value of $r(r + s) - s(r - s)$?

(A) 0 (B) 25 (C) 50 (D) 75 (E) 100

11. If 2c = -1, then $(4 - 4c)^2 =$

(A) 36 (B) 6 (C) 4 (D) 2 (E) 0

12. If 5b = -2, then $(3 - 5b)^2 =$

(A) -25 (B) -4 (C) -1 (D) 1 (E) 25

SAT-Type Problems **Practice B**

1. If m > 0, then $(\sqrt{m} - \sqrt{9m})^2 =$

   (A) -2m (B) m (C) 2m (D) 4m (E) 10m

2. If a = 1 and b = -20, find the value of $\frac{-a+\sqrt{a^2-4b}}{4}$.

   (A) -2 (B) 1 (C) $1\frac{1}{2}$ (D) 2 (E) $2\frac{1}{2}$

3. If $k^{12} = 36^8$, then what is the value of k^{24}?

   (A) $2x36^8$ (B) 36^3 (C) 36^6 (D) 36^{16} (E) 36^{20}

4. If $8^{\frac{x}{3}} = 4, then\ 4x^4 =$

   (A) 4 (B) 16 (C) 64 (D) 128 (E) 4,096

5. If a and b are integers and $(3^3)(2^4)(9^5) = 2^a)(3^b)$, then what is the value of a + b?

   (A) 12 (B) 17 (C) 18 (D) 22 (E) 28

6. If $a \neq 0, (9^a)^2 =$

   (A) 9^{2a} (B) 9^{a^2} (C) 18^{2a} (D) 81^{2a} (E) 81^{a^2}

7. $(m^{3x})^{x^2} =$

   (A) m^{9x^3} (B) m^{9x^2} (C) m^{4x^3} (D) m^{4x^2} (E) m^{3x^3}

8. If $4^n = 16^6$, then what is the value of n?

   (A) 6 (B) 8 (C) 10 (D) 12 (E) 14

9. If $8^{3x} = 8^{x+24}$, what is the value of x?

   (A) 1 (B) 3 (C) 12 (D) 24 (E) 36

10. If $2^{3x-1} = 8$, then what is the value of x?

    (A) $\frac{2}{3}$ (B) 1 (C) $1\frac{1}{3}$ (D) 2 (E) $2\frac{1}{3}$

11. If $3^{3x} = 27^{2x-1}$, what is the value of x?

    (A) -1 (B) $\frac{1}{3}$ (C) 1 (D) 2 (E) 3

12. If $3^{23} = 3^k x 3^{k-3}$, what is the value of x?

(A) 2 (B) 9 (C) 10 (D) 13 (E) 20

13. If ab = 3 and $ab^2 = 18$, then what is the value of a?

(A) $\frac{1}{2}$ (B) 1 (C) 2 (D) 6 (E) 54

14. If $x^2 = 25$, then $x^3 =$

(A) $-125\ Only$ (B) $125\ Only$ (C) $-125\ or\ 125$ (D) 15 (E) 15,625

15. If $5y^2 = 25$, then what is the value of $5y^4$?

(A) 125 (B) 525 (C) 625 (D) 3,125 (E) 15,625

16. If $y^{2k} = 36$ when y and k are positive integers, then what is the value of y^{3k}?

(A) $\sqrt{6}$ (B) $6\sqrt{6}$ (C) 54 (D) 108 (E) 216

17. If $3^x = 10$, then $3^{-3x} =$

(A) -1000 (B) -27 (C) $\frac{1}{1,000}$ (D) $\frac{3}{1,000}$ (E) $\frac{3}{20}$

18. If $(y^r)(4y^{2r}) = 32$, then what is the value of y^r?

(A) $\sqrt[3]{2}$ (B) 2 (C) $\sqrt{8}$ (D) 4 (E) 8

19. If $2^n = 32$, then what is the value of 5^{n-2}?

(A) 5 (B) 25 (C) 125 (D) 625 (E) 3,125

20. If $5^x = 125$, then what is the value of 4^{3x-5}?

(A) 4 (B) 8 (C) 16 (D) 64 (E) 256

21. If $10^n = 1$, then $10^{2n+2} =$

(A) 1 (B) 10 (C) 100 (D) 1,000 (E) 10,000

22. If $x^7 = a\ and\ x^5 = 3m$, which of the following represents m?

(A) $\frac{1}{x^2}$ (B) $\frac{a}{x^2}$ (C) $\frac{a}{3x^2}$ (D) $\frac{1}{3x^2}$ (E) $\frac{x^2}{3a}$

23. If $c = a^2b^3$ and $b = a^2d^4$, which of the following is the correct expression for c in terms of a and d?

(A) a^6d^{12} (B) a^7d^7 (C) a^7d^{12} (D) a^8d^7 (E) a^8d^{12}

24. If $y^n = x^{3n}$, where n, x, and y are positive integers, then what is x in terms of y?

(A) $\sqrt[3]{y}$ (B) $\sqrt{y}$ (C) $\frac{y}{3}$ (D) 3y (E) y^3

25. If $a^4 = x \; and \; b^3 = y$, then what does $(ab)^{12}$ equal in terms of x and y?

(A) x^4y^3 (B) x^3y^4 (C) x^9y^8 (D) x^8y^9 (E) $x^{12}y^{12}$

SAT-Type Problems **Practice C**

1. If 3(5)(11)y = 11(3)(-15), then y =

   (A) -660 (B) -3 (C) 3 (D)330 (E) 660

2. If -2(5)(6)r = 5(6)(7), then r =

   (A) -9 (B) -7 (C) $-\frac{7}{2}$ (D) $-\frac{2}{7}$ (E) 5

3. If 2(5)(-7)m = 5(-7)(8), then m =

   (A) -40 (B) -4 (C) 4 (D) 40 (E) 44

4. Given that $\frac{n^2}{4} = p$, what is the value of 12p?

   (A) $\frac{n^2}{12}$ (B) $\frac{n^2}{3}$ (C) $3n^2$ (D) $4n^2$ (E) 12^2

5. Given that $\frac{x^2}{6} = 4p$, what is the value of 12p?

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

6. If $\frac{x}{3} = 15$, then 3x =

   (A) 5 (B) 12 (C) 18 (D) 44 (E) 135

7. If $\frac{254}{1000y} = 40$, then y =

   (A) 0.00635 (B) 0.0635 (C) 0.635 (D) 6.35 (E) 63.5

8. If $\frac{5{,}432}{100k} = 50$, then k =

   (A) 0.10864 (B) 1.0864 (C) 10.864 (D) 108.64 (E) 1,086.4

9. If (x + 5)(8 – 5) = 60, then x =

   (A) 5 (B) 10 (C) 15 (D) 20 (E) 25

10. If (r + 6)(9 – 3) = 18, then r =

    (A) -9 (B) -3 (C) 0 (D) 3 (E) 9

11. If 6(x + 2) – 3x = 8, then x =

    (A) $-\frac{8}{3}$ (B) $-\frac{4}{3}$ (C) $-\frac{2}{3}$ (D) $\frac{4}{3}$ (E) $\frac{8}{3}$

12. If $5x - (x - 2) = 18$, then $x =$

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

13. If $4x - 4 = 14$, then $x + \frac{1}{2} =$

(A) 4 (B) 5 (C) 7 (D) 18 (E) 22

14. If $3x + 1 = 5$, then $x + \frac{2}{3} =$

(A) $\frac{4}{3}$ (B) 2 (C) $\frac{7}{3}$ (D) 3 (E) $\frac{10}{3}$

15. If $7 - 5m = -23$, then $m - \frac{1}{5} =$

(A) 3 (B) $3\frac{2}{5}$ (C) $5\frac{1}{5}$ (D) $5\frac{4}{5}$ (E) $6\frac{1}{5}$

16. If $3x + 15 = 33$, then $x + 5 =$

(A) $5\frac{1}{3}$ (B) $10\frac{1}{3}$ (C) 11 (D) 18 (E) 30

17. If $3(2x + 4y) = R$, then $3(4x + 8y) =$

(A) $2R$ (B) $3R$ (C) $4R$ (D) $6R$ (E) $9R$

SAT-Type Problems **Practice D**

1. If a + b = a – b, the b =

   (A) 0 (B) 1 (C) a (D) $-a$ (E) $-2a$

2. If $ab = \frac{a}{b}, then\ b =$

   (A) $-1\ Only$ (B) 1 Only (C) – 1 or 1 (D) 0 (E) – a or a

3. If r = pq, which of the following must be equivalent to rp?

   (A) pq (B) p^2q (C) p^2r (D) pr^2 (E) pqr

4. If k = am, which of the following must be equivalent to $m^2 =$

   (A) $\sqrt{\frac{k}{a}}$ (B) $\frac{k}{a}$ (C) kam (D) $\frac{k^2}{a}$ (E) $\frac{k^2}{a^2}$

5. If $x = \frac{y}{z}$, which of the following must be equal to yz?

   (A) xz (B) xy (C) xy^2 (D) xz^2 (E) xyz

6. If $a^3 + b^3 = a^3 + y^3$, then what does b equal?

   (A) y^3 (B) $y^3 + 2a^3$ (C) $y^3 - 2a^3$ (D) $y^3 + a^3$ (E) y

7. If $\frac{3a}{4b} = \frac{12a}{c}$, then what does c equal?

   (A) 4 (B) 16 (C) 4b (D) 16b (E) $48ab$

8. If $\frac{4abc}{5xyz} = \frac{4abcd}{m}$, then what is the value of m?

   (A) $5dxyz$ (B) d (C) 5abcd (D) 5xy (E) $5abc$

9. Which of the expressions represents x if $a = \frac{b}{x} - c, and\ if\ x \neq 0$?

   (A) $-\frac{bc}{a}$ (B) $\frac{b}{a-c}$ (C) $\frac{b}{a+c}$ (D) $\frac{a-c}{b}$ (E) $\frac{a+c}{b}$

10. If a(b + 1) = c, the b =

    (A) $\frac{c}{a} - 1$ (B) $c - 1$ (C) $\frac{1}{a} - 1$ (D) $\frac{c-1}{a}$ (E) $c - a - 1$

11. If $\frac{a+a+a}{3} = \frac{c+c+c+c}{4}, and\ c \neq 0, then\ \frac{a}{c} =$

    (A) $\frac{3}{4}$ (B) 1 (C) $\frac{4}{3}$ (D) 2 (E) 8

12. If $\frac{a+a+a}{3} = \frac{b+b}{2} = \frac{c+c+c+c}{4}, and\ c \neq 0, then\ \frac{ab}{c} =$

(A) $\frac{6}{4}$ (B) 1 (C) b (D) $\frac{4}{6}$ (E) $\frac{1}{b}$

13. The ratio of p:q is 3:5 and the ratio of q:r is 4:9. What is the ratio of p:r?

(A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{4}{15}$ (D) $\frac{1}{2}$ (E) $\frac{5}{9}$

14. The ratio of a:b is 2:5 and the ratio of d:b is 3:2. What is the ratio of a:d?

(A) $\frac{6}{25}$ (B) $\frac{4}{15}$ (C) $\frac{3}{5}$ (D) $\frac{2}{3}$ (E) $\frac{3}{2}$

15. The ratio of a:b is 2:5 the ratio of c:d is 5:2, and the ratio of d:b is 3:2. What is the ratio of a:c?

(A) $\frac{8}{75}$ (B) $\frac{6}{25}$ (C) $\frac{1}{2}$ (D) $\frac{3}{5}$ (E) Value cannot be determined from …the information given

16. If a + b = c + d = -a – d = 22, b + c equals…

(A) 22 (B) 44 (C) 66 (D) 88 (E) Value cannot be determined from …the information given

17. If $z \neq 0\ and\ 2x = 3y = 4z$, what is the value of x + y in terms of z?

(A) $\frac{2}{3}z$ (B) $\frac{4}{3}z$ (C) $2z$ (D) $\frac{10}{3}z$ (E) Value cannot be determined from …the information given

18. If $P = 2l + 2w, the\ l =$

(A) P – w (B) $\frac{P-2w}{2}$ (C) $P + w$ (D) $\frac{P+2w}{2}$ (E) $\frac{2P-w}{2}$

19. If A = p + prt, the p =

(A) $\frac{A}{rt}$ (B) $\frac{A}{1+rt}$ (C) $\frac{A}{2rt}$ (D) $\frac{rt}{A}$ (E) rtA

20.

$a = \frac{b}{2}$	$b = 4c$	$c = \frac{d}{2}$	$d = \frac{x}{2}$

Given the table above, x is equal to which of the following?

(A) a (B) b (C) c (D) d (E) None of these

SAT-Type Problems **Practice E**

1. If x = 3b and $y = \frac{2}{6b+4}$, what is y in terms of x?

(A) $\frac{2}{x+4}$ (B) $\frac{1}{x+2}$ (C) $2x$ (D) $x + 2$ (E) 2x + 4

2. If $x^2 - 7 = y \; and \; x = 4, then \; y^2 - 1 =$

(A) 8 (B) 80 (C) 81 (D) 14,228 (E) 14,329

3. If $x + y - z = 8 \; and \; x - y + z = 12, then \; x =$

(A) 2 (B) 4 (C) 10 (D) 20 (E) Cannot be determined..
…from the information given

4. If $x + 7 = 2y \; and \; y = 2x - 1$, then what is the value of y?

(A) -5 (B) 3 (C) 5 (D) 9 (E) 13

5. If $2x + y = 6 \; and \; x - 6 = y$, then what is the value of x?

(A) 0 (B) 2 (C) 3 (D) 4 (E) 6

6. If $5x - 2y = 10 \; and \; x = \frac{4y}{5}$, then y =

(A) 1 (B) 4 (C) 5 (D) 7 (E) 9

7. If $\frac{3}{5} = \frac{a}{m} \; and \; m - a = 80$, then what is the value of m?

(A) 2 (B) 20 (C) 80 (D) 120 (E) 200

8. If $3m + 2n = 16 \; and \; m - 2n = 0$, then what is the value of m?

(A) 4 (B) 6 (C) 8 (D) 10 (E) 12

9. If $x + y = 4 \; and \; x - y = k$, then what does x equal?

(A) $k + 4$ (B) $4k$ (C) $4 - k$ (D) $2 + \frac{1}{2}k$ (E) $2 - \frac{1}{2}k$

10. $r + t = s \quad and \quad r - t = -s$
Based on the equations above, which of the following must be equal to t?

(A) -s (B) -r (C) 0 (D) r (E) s

11. $x + y = z$
$y - z = x$
Based on the equations above, which of the following must be equal to z?

(A) 0 (B) x (C) y (D) -x (E) –y

12.

10	9
11	8
x	x
y	z
+12	+7
32	37

In the correctly worked addition problems above, what is the value of $\boldsymbol{z - y}$?

(A) $\mathbf{-14}$ (B) $\mathbf{-12}$ (C) $\mathbf{5}$ (D) 12 (E) 14

13. If $x + y = 12$ *and* $x - y = 8$, then what is the value of $x^2 + y^2$?

(A) 20 (B) 24 (C) 100 (D) 104 (E) 208

14. If $8x - 4y = 20$ *and* $4x - 8y = 4$, then what is the value of $x - y$?

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

15. If $5x - 4y = 22$ *and* $3x + 6y = 30$, then what is the value of $x - 5y$?

(A) -8 (B) -4 (C) -2 (D) 0 (E) 2

16. If $2x - y = 0$ *and* $x - 2y = 3$, then what is the value of $6x - 6y =$

(A) 6 (B) 12 (C) 18 (D) 21 (E) 24

17. If $9x + 2y^2 - 3z^2 = 132$ *and* $9y - 2y^2 + 3z^2 = 12$, *then* $x + y =$

(A) 3 (B) 8 (C) 16 (D) 120 (E) 144

SAT-Type Problems **Practice F**

1. What is the product of the solutions of the equation $|3x + 21| = 9$?

   (A) -49 (B) -40 (C) -9 (D) 40 (E) 49

2. -6 *and* 14 are solutions to which of the following equations?

   (A) $|x + 4| = 10$
   (B) $|x - 4| = 10$
   (C) $|x - 2| = 12$
   (D) $|x + 16| = 10$
   (E) $|x - 16| = 10$

3. What is the greater solution for the equation $|-3x - 12| = 30$?

   (A) 6 (B) 10 (C) 14 (D) 15 (E) 18

4. If $x = -2$, what is the value of $|x^0| - |x^1| + |x^2| - |x^3|$?

   (A) -6 (B) -5 (C) -3 (D) 14 (E) 15

5. $x = 3$ is the complete solution set to which of the following equations?

   (A) $x - 6 = 9$
   (B) $-2x = -6$
   (C) $|-x + 3| = 6$
   (D) $|4x - 6| = 6$
   (E) $|x| = 3$

6. If Jorge scores within 3 points of Sam, they will be placed on opposing teams. Sam scores 12 points and they play on opposing teams. How many different point totals could Jorge score?

   (A) 9 (B) 8 (C) 7 (D) 6 (E) 3

7. Prizes are awarded to all participants in a charity event who guess within 5 the number of people attending the event. If 43 people attended the event, how many guesses are a multiple of 3?

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

8. What is the sum of the solutions to the equation $|-3x + 18| = 6$?

   (A) 4 (B) 8 (C) 12 (D) 16 (E) 20

9. 4 *and* 8 are solutions to which of the following equations?

   (A) $|x + 2| = 6$
   (B) $|x - 2| = 2$
   (C) $|x + 6| = 10$
   (D) $|x + 16| = 10$
   (E) $|x - 6| = 2$

10. Which is the smaller solution for the equation $|16 - 4x| = 8$?

    (A) -6 (B) -4 (C) -2 (D) 2 (E) 4

SAT-Type Problems **Practice G**

1. If $x^2 + 81 = (6)(27)$, then x could be…

   (A) -81 (B) -9 (C) 0 (D) 3 (E) 14

2. If $x = \sqrt{5}\ and\ y = \sqrt{7}$, what is the value of (x + y)(x – y)?

   (A) -2 (B) $\sqrt{2}$ (C) 2 (D) $\sqrt{35}$ (E) 35

3. $(3 + ab)(7 - ab) =$

   (A) $21 - a^2b^2$ (B) 21 (C) $21 - 4ab$ (D) $21 + 4ab - a^2b^2$ (E) $21 - ab$

4. $(5x - 3y)^2 + (5x + 3y)^2 =$

   (A) $100x^2$ (B) $50x^2 + 18y^2$ (C) $50x^2 - 30xy + 18y^2$ (D) $50x^2 + 15xy + 18y^2$

   (E) $50x^2 + 30xy + 18y^2$

5. If $x + y = 12\ and\ x - y = \frac{1}{3}$, then $x^2 - y^2 =$

   (A) 36 (B) 16 (C) 8 (D) 4 (E) 2

6. If $x = 10.00001$, then $\frac{x^2+5x+6}{(x+2)}$ rounded to the nearest whole number is…

   (A) 3 (B) 7 (C) 13 (D) 16 (E) 26

7. If $\frac{4x+3y}{16x^2-9y^2} = 10$, what is the value of 4x – 3y?

   (A) 0.01 (B) 0.1 (C) 1 (D) 7 (E) 10

8. If $x^2 + 7x + 8 = (x + 3)(x + 4) + p$, then p =

   (A) 8 (B) 4 (C) 2 (D) -2 (E) -4

9. If $x^2 - 3x - 2 = 0$, then what is the value of $2x^2 - 6x - 11$?

   (A) -9 (B) -7 (C) 0 (D) 7 (E) 9

10. $(2x + 3y)^2 - (2x - 3y)^2 =$

    (A) $12x$ (B) $12y$ (C) $24x$ (D) $12xy$ (E) $24xy$

SAT-Type Problems **Practice H**

1. $\frac{4a-\frac{2}{3}}{2} =$

   (A) $2a - \frac{4}{3}$ (B) $2a - 1$ (C) $2a - \frac{2}{3}$ (D) $2a - \frac{1}{3}$ (E) $8a - \frac{4}{3}$

2. If $\frac{x^3 \cdot x^4 \cdot x^5}{x^6} = x^n$, then n =

   (A) 2 (B) 6 (C) 10 (D) 54 (E) 66

3. If $\frac{x}{y} = \frac{1}{5}$, then $\frac{y}{x} + 5 =$

   (A) $\frac{1}{6}$ (B) $\frac{5}{26}$ (C) $\frac{6}{5}$ (D) $\frac{26}{5}$ (E) 10

4. If $a \neq 0$, then $\frac{(\frac{1}{a})^2}{(\frac{4}{a})^2} =$

   (A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D) $\frac{a}{16}$ (E) $\frac{a}{4}$

5. If $x = \frac{a^3}{b}$ and $a \cdot b \neq 0, then$ $\frac{1}{a^3} =$

   (A) bx (B) $\frac{b}{x}$ (C) $\frac{x}{b}$ (D) $\frac{1}{b-x}$ (E) $\frac{1}{bx}$

6. If g and m are positive integers, then which of the following must be equal to $\frac{g}{m}$?

   (A) $\frac{g+5}{m+5}$ (B) $\frac{g+g}{m+m}$ (C) $\frac{g+m}{m+g}$ (D) $\frac{g-m}{gm}$ (E) $\frac{g^2}{m^2}$

7. If $\frac{x+2x+3X+4x}{x \cdot x} = 9$, then x =

   (A) $\frac{9}{10}$ (B) 1 (C) $1\frac{1}{9}$ (D) 5 (E) 10

8. If $\frac{n}{25} = \frac{25}{n}$, then which of the following could equal 50?

   (A) n^2 (B) $50n$ (C) $2n - 25$ (D) $n^2 - 25^2$ (E) $3n - 25$

9. If $\frac{2}{x} + 2 + \frac{2}{x} + 2 + \frac{2}{x} + 2 = 0$, then x =

   (A) -2 (B) -1 (C) $-\frac{1}{2}$ (D) 0 (E) 1

10. If $\frac{8}{a+1} = \frac{8}{2a-2}$, then what is the value of a?

    (A) 3 (B) 2 (C) 1 (D) 0 (E) $-\frac{1}{3}$

11. If $\frac{2}{y+2} = \frac{-3}{y-3}$, then what is the value of y?

(A) -3 (B) -2 (C) 0 (D) 2 (E) 3

12. If $a^2 = \frac{b}{c}, then\ c^2 =$

(A) $\frac{b}{a}$ (B) $\frac{b^2}{a^2}$ (C) $\frac{a^2}{b^4}$ (D) $\frac{b^2}{a^4}$ (E) $\frac{a^4}{b^2}$

13. If $m = \frac{2}{5}r\ and\ r = \frac{9}{10}t$, then what is t in terms of m?

(A) $\frac{9}{25}m$ (B) $\frac{2}{5}m$ (C) $\frac{9}{10}m$ (D) $\frac{5}{2}m$ (E) $\frac{25}{9}m$

14. If r and s are positive integers and $\frac{1}{r} + s = 1$, then what is the value of s in terms of r?

(A) $\frac{r-1}{r}$ (B) $\frac{1-r}{r}$ (C) $\frac{1-r}{1+r}$ (D) $\frac{r}{1+r}$ (E) $\frac{r}{r-1}$

15. If $\frac{m+m+m}{m \cdot m \cdot m} \cdot y = 1, where\ m \neq 0$, then what is the value of y?

(A) $\frac{1}{3m^3}$ (B) $\frac{3}{m^2}$ (C) $\frac{3}{m}$ (D) $\frac{m^2}{3}$ (E) $3m^2$

16. If $\frac{5}{6}x = \frac{7}{6}y$, then what is the ratio of x to y?

(A) $6\ to\ 5$ (B) $6\ to\ 7$ (C) $7\ to\ 6$ (D) $5\ to\ 7$ (E) $7\ to\ 5$

17. If 0<a<1<b and $x = \frac{1}{a} - \frac{1}{b}$, then which of the following statements must be true?

(A) $x = a - b$ (B) $x > 0$ (C) $x = 1$ (D) $x > 1$ (E) $0 < x < 2$

18. If $\frac{1}{g} + x = 1$, then which of the following is an expression for x in terms of g?

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

19. Solve $\frac{1}{4} + \frac{3}{m^2} = \frac{2}{m}$

(A) $-2\ and\ -6$ (B) $-3\ and\ -4$ (C) $2\ and\ 6$ (D) $3\ and\ 4$ (E) $1\ and\ 12$

20. Solve $\frac{1}{p^2} + \frac{1}{18} = \frac{1}{2p}$

(A) $-3\ and\ -6$ (B) $-3\ and\ 6$ (C) $-2\ and\ 9$ (D) $3\ and\ -5$ (E) $3\ and\ 6$

SAT-Type Problems **Practice J**

1. The sum of two consecutive even integers is 26. What is the product of the two integers?

   (A) 52 (B) 120 (C) 132 (D) 160 (E) 168

2. If the sum of three consecutive integers equals 60, what is the greatest of the integers?

   (A) 18 (B) 19 (C) 20 (D) 21 (E) 22

3. If the sum of three consecutive integers equals 24. Written from least to greatest, what is the middle integer?

   (A) 6 (B) 7 (C) 8 (D) 9 (E) 10

4. If the sum of three consecutive odd integers equals 33. What is the product of the least and the greatest integer?

   (A) 90 (B) 99 (C) 110 (D) 117 (E) 143

5. If a certain number is doubled and the result is decreased by 5, the number obtained is 23. What is the original number?

   (A) 6.5 (B) 9 (C) 14 (D) 16.5 (E) 28

6. An integer n is doubled and then decreased by 5. If the result is 6 more than the original number n, what is the value of n?

   (A) 69 (B) 11 (C) 13 (D) 15 (E) 16

7. A certain number is increased by 15 and the result is doubled. The new result is 6 more than 3 times the original number. What is the original number?

   (A) 4 (B) 9 (C) 10 (D) 12 (E) 24

8. If a positive integer is doubled and then increased by 10, the result is 5 less than the square of the integer. What is the integer?

   (A) 1 (B) 3 (C) 5 (D) 10 (E) 25

9. If half the difference between the square of a certain positive number and the number is 3 more than twice the number, what is the number?

   (A) 1 (B) 2 (C) 3 (D) 6 (E) 12

10. Penny bought a sandwich and a container of juice for $3.60. The sandwich costs three times as much as the juice. How much did the sandwich cost?

    (A) $.90 (B) $1.20 (C) $2.40 (D) $2.70 (E) $3.00

11. Samara bought 2 frankfurters and 1 order of fries for \$7.50. Lauren bought 2 frankfurters and 2 orders of fries for \$9.00. How much did 1 frankfurter cost?

(A) \$1.50 (B) \$2.25 (C) \$2.75 (D) \$3.00 (E) \$4.00

12. A board game uses a mathematical formula for determining the penalty for landing on a certain box. The result is obtained by taking the last penalty assessed for that square, doubling it, and adding \$5. At the beginning of the game, the penalty is \$15. Phyllis landed on the box first and then Dennis landed on the second box. What was Dennis' penalty?

(A) \$30 (B) \$35 (C) \$60 (D) \$65 (E) \$70

13. In a mathematical relay game, each team has three participants. Each player has the same instructions: Take the number your are given, double the difference between your number and 5, add 4, divide by 2, then pass the result to the next person on your team. The third player writes his result on the chalkboard. If the first player is given a 12, what number should the third person write?

(A) -3 (B) -2 (C) 2 (D) 3 (E) 7

14. If n assignments were divided equally between two reporters, each reporter would get 2 assignments more than if the n assignments were divided equally among 3 reporters. What is the value of n?

(A) 2 (B) 4 (C) 6 (D) 12 (E) 18

15. If b baseball cards were divided equally among 3 people, each person would receive 25 cards less than if the b baseball cards were divided equally between 2 people. What is the value of b?

(A) 200 (B) 174 (C) 150 (D) 124 (E) 102

SAT-Type Problems **Practice K**

1. If y varies directly as x, and y = 8 and x = 1, what is the value of y when x = 4?

   (A) $\frac{1}{2}$ (B) 2 (C) 4 (D) 12 (E) 32

2. If y varies directly as x^2, and y = 3 and x = 3, what is the value of y when x = 6?

   (A) 36 (B) 24 (C) 12 (D) 6 (E) 3

3. If y^2 varies directly as $2x$, and y = 4 and x = 1, what is the value of y when x = 4?

   (A) 2 (B) 4 (C) 6 (D) 8 (E) 12

4. If y^2 varies directly as x, and y = 10 and x = 5, what is the constant of variation?

   (A) 2 (B) 4 (C) 5 (D) 10 (E) 20

5. Students receive 5 bonus points for every 2 community service projects they perform. If Simran received 100 bonus points, how many projects did she perform?

   (A) 20 (B) 40 (C) 50 (D) 250 (E) 500

6. If x and y vary inversely and y = 6 when x = 2, what is the value of y when x = 3?

   (A) 4 (B) 7 (C) 9 (D) 12 (E) 16

7. If x and y vary inversely when x = 4 and y = 2x, what is the value of y when x = 16?

   (A) 1 (B) 2 (C) 8 (D) 16 (E) 32

8. If x and y vary inversely and y = 12 when x = 12, what is the value of x when y = 8?

   (A) 4 (B) 8 (C) 12 (D) 18 (E) 24

9. If it takes 4 people 3 hours each to pave a playground, how many hours will it take 12 people to complete the same task?

   (A) 1 $Hour$ (B) 2 $Hours$ (C) 6 $Hours$ (D) 9 $Hours$ (E) 10 $Hours$

10. If a teacher can score 4 SAT English essays in 1 hour and 15 minutes, how long will it take the grader to score 100 essays?

    (A) 25 $Hours$ (B) $31\frac{1}{4}$ $Hours$ (C) 75 $Hours$ (D) $90\frac{1}{2}Hours$ (E) 115 $Hours$

SAT-Type Problems **Practice L**

1. Carol, Claire, and Cleo share a paper route. Carol delivers x papers, Claire delivers x papers, and Cleo delivers y papers. If they deliver 420 papers altogether, what is y in terms of x?

   (A) $y = 210 - x$ (B) $y = 420 - x$ (C) $y = 420 - 2x$ (D) $y = 420 - \frac{2}{x}$ (E) $y = 420 - 3x$

2. Allen, Larry, and Debbie move lawns. Allen mowed x lawns, Larry mowed 2y lawns, and Debbie mowed 3y lawns. If they mowed 28 lawns altogether, what is x in terms of y?

   (A) $5y - 28$ (B) $28 - 5y$ (C) $28 - \frac{y}{5}$ (D) $\frac{28-y}{5}$ (E) $28 + 5y$

3. Michelle read B books, which is 5 more than Barbara read. Jamie read twice as many books as Barbara. In terms of B, how many books did Jamie read?

   (A) $2B - 10$ (B) $2B - 5$ (C) $B + 10$ (D) $2B + 5$ (E) $2B + 10$

4. Zachary bought x books. He paid $5.00 each for 4 of them and $7.50 each for the others. What was Zachary's coast in terms of x?

   (A) $20 + 7.5x$ (B) $20 + 7.5(x - 4)$ (C) $20 + 7.5(4 - x)$ (D) $5 + 7.5(x - 4)$ (E) $5 + 7.5$

5. If the bridge toll for one car is d dollars, in terms of d and c, what is the total cost in dollars for c cars to go over the bridge?

   (A) $d + c$ (B) $d - c$ (C) dc (D) $\frac{c}{d}$ (E) $\frac{d}{c}$

6. Maria has d dollars in her savings account. In the summer, her weekly expenses, e, are greater than her weekly salary, s. If she makes up the difference from her savings, how many weeks will her saving last?

   (A) $\frac{d}{e-s}$ (B) $\frac{d}{s-e}$ (C) $\frac{s}{e-d}$ (D) $\frac{e-s}{d}$ (E) $\frac{e-d}{s}$

7. A school district is buying boxes of disposable dishes for the cafeteria. If each box contains x dishes and the cafeteria used y dishes each day, how many boxes of dishes will be needed to supply the cafeteria for z days?

   (A) xyz (B) $\frac{x}{yz}$ (C) $\frac{yz}{x}$ (D) $\frac{z}{xy}$ (E) $\frac{xz}{y}$

8. A school breakfast program used 1 gallon of milk for every x children. Each breakfast group has y children. How many gallons of milk will be needed for z breakfast groups?

   (A) xyz (B) $\frac{xz}{y}$ (C) $\frac{yz}{x}$ (D) $\frac{z}{xy}$ (E) $\frac{y}{xz}$

9. If it takes *m* sacks of oats to feed h horses, how many sacks of oats are needed to feed n horses?

   (A) $\frac{h}{mn}$ (B) $\frac{mn}{h}$ (C) $\frac{hn}{m}$ (D) $\frac{hm}{n}$ (E) hmn

10. If Josh earns d dollars in x hours, how much money will he earn in x + 10 hours?

(A) $\frac{x}{x+10}$ (B) $\frac{10d}{x}$ (C) $d + \frac{10d}{x}$ (D) $\frac{x^2+10x}{d}$ (E) $dx + 10d$

11. An old grading system describes grades from 0 to 10. New grading guidelines require that grades be entered from 50 to 100. Which expression can be used to convert an old grade, g, to the new grade?

(A) $5g$ (B) $g + 50$ (C) $g + 90$ (D) $10g - 50$ (E) $5g + 50$

SAT-Type Problems **Practice M**

1. If $f(x) = x^2 + 3x + 2$, then what is the value of f(3)?

   (A) -2 (B) -1 (C) 17 (D) 20 (E) 38

2. If $f(x) = \frac{x^2}{4} + 4x^{-2} + x^0$, then what is the value of f(4)?

   (A) $-7\frac{1}{2}$ (B) 0 (C) 1 (D) $5\frac{1}{4}$ (E) $8\frac{1}{2}$

3. If $h(x) = \sqrt{3x+1}, then\ h(x) is$ ...
   I. Always positive II. Never negative III. Always an integer

   (B) *I Only* (B) *II Only* (C) *III Only* (D) *I and II Only* (E) *I and III Only*

4. Which value is <u>not</u> in the domain of $g(x) = \frac{x-3}{x-4}$?

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

5. Which value(s) are <u>not</u> in the domain of $f(x) = \frac{x+10}{x^2-25}$?

   (A) -10 (B) -5 (C) 5 (D) $-5\ and\ 5$ (E) $-10, -5, and\ 5$

6. Which value(s) are <u>not</u> in the domain of $m(x) = \frac{x^2-1}{x^2-5x+6}$?

   (A) $-1, 1, 2, and\ 3$ (B) $1, 2, and\ 3$ (C) $2\ and\ 3$ (D) $-2\ and\ -3$ (E) 1

7. The cost of preparing for a book sale is $30. If each book is sold for $3.00, express the profit as a function of n, where n represents the number of books sold.

   (A) $f(n) = 3n - 30$ (B) $f(n) = 3n + 30$ (C) $f(n) = n - 10$
   (D) $f(n) = n + 33$ (E)) $f(n) = n - 33$

8. The sign-up fee at a gym is $50. Members then must pay $25 each month. Express the cost of using the gym as a function of m, where m represents the number of months the member participates.

   (A) $f(m) = 25 + 50m$ (B) $f(m) = 50 + 25m$ (C) $f(m) = 75$
   (D) $f(m) = 25m - 50$ (E)) $f(m) = 50m - 25$

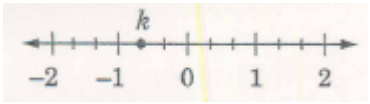
9. A CD had an original rating of 23 points out of 25 points on a survey chart. Each week, the rating fell by 2 points. Express the number of points as a function of w, the number of weeks since release.

   (A) $h(w) = 2w$ (B) $h(w) = 2w - 23$ (C) $h(w) = 25 - 2w$
   (D) $h(w) = 2 - 23w$ (E) $h(w) = 23 - 2w$

10. If $f(x) = 4x - 80$ represents the profit function for x items that require a total of \$80 investment and return a profit of \$4 each, how many items must be sold to break even?

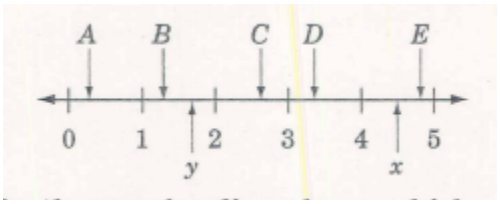
(A) 4 (B) 20 (C) 40 (D) 76 (E) 80

SAT-Type Problems **Practice N**



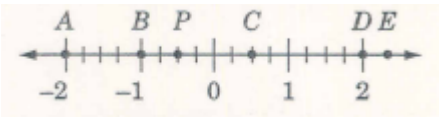
1. On the number line above what is the coordinate of point k?

(A) $-1\frac{2}{3}$ (B) $-1\frac{1}{3}$ (C) $-\frac{2}{3}$ (D) $-\frac{1}{3}$ (E) $-\frac{1}{4}$



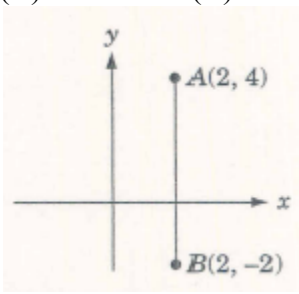
2. On the number line above, which lettered point has a coordinate closest to the difference between x and y?

(A) A (B) B (C) C (D) D (E) E



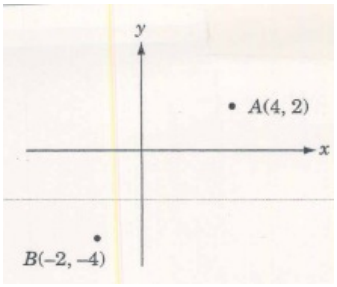
3. One the number line above, the product of the coordinates of point P and which other point will equal 1?

(A) A (B) B (C) C (D) D (E) E



4. In the figure above, what are the coordinates of the midpoint of $\overline{AB}$?

(A) $(1, 2)$ (B) $(2, -1)$ (C) $(2, 0)$ (D) $(2, 1)$ (E) $(3, 1)$



5. In the figure above, what are the coordinates of the midpoint of $\overline{AB}$?

(A) $(-1, 1)$ (B) $(0, 1)$ (C) $(0, 0)$ (D) $(1, -1)$ (E) $(1, 0)$

6. What are the coordinates of the midpoint of the line segment with endpoint (-5, -2) and (3, -2)?

(A) $(-1,-2)$ (B) $(-1,-1)$ (C) $(1,-1)$ (D) $(1,2)$ (E) $(4,-2)$

7. All of the following are coordinates of the same straight line except…

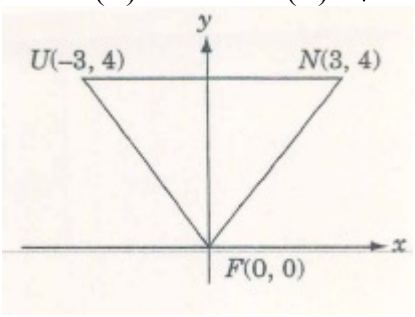
(A) $(0,2)$ (B) $(3,11)$ (C) $(5,15)$ (D) $(7,23)$ (E) $(x,3x+2)$

8. Which of the following points is the greatest distance from the y-axis?

(A) $(1,10)$ (B) $(2,7)$ (C) $(3,5)$ (D) $(4,3)$ (E) $(5,1)$

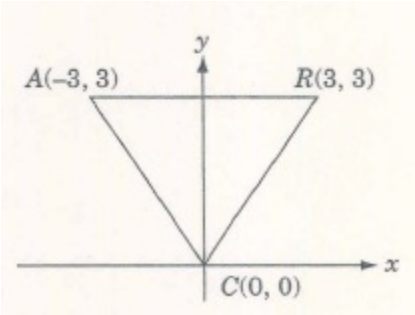
9. If the coordinates of two adjacent corners of a square are at A (4, 2) and B (7, 6), what is the length of the diagonal?

(A) 2.5 (B) 5 (C) $5\sqrt{2}$ (D) $5\sqrt{3}$ (E) 25



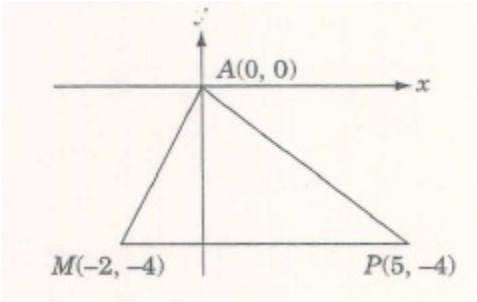
10. In the figure above, what is the perimeter of ΔFUN?

(A) 12 (B) 13 (C) 16 (D) 18 (E) 20



11. What is the perimeter of ΔCAR in the figure above?

(A) 18 (B) $12+3\sqrt{2}$ (C) $6+6\sqrt{3}$ (D) $6+6\sqrt{2}$ (E) $6+3\sqrt{2}$



12. In the figure above, what is the area of ΔMAP?

(A) 6 (B) 12 (C) 14 (D) 16 (E) 28

13. In the trapezoid ABCD, coordinates A(0, 0), B(2, 4),C (6, 4), and D(8, 0) are reflected over the line y = 4 and the image is labeled $A'B'C'D'$. In this new image, what are the coordinates of point D?

(A) $(0, 0)$ (B) $(0, 4)$ (C) $(8, 0)$ (D) $(8, 4)$ (E) $(8, 8)$

14. Square M has one vertex at (5, 5) and sides of length 5. If the sides of square M are parallel to the x-axis or the y-axis, the number of the square's vertices that lie on the axis could be:

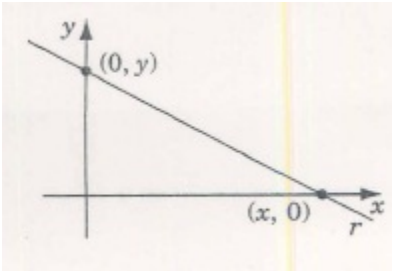
I. 0 II. 2 III. 3

(B) $I\ Only$ (B) $II\ Only$ (C) $III\ Only$ (D) $I\ or\ III\ Only$ (E) $I, II, or\ III$

15. ΔRST is drawn on the coordinate plane. The coordinates of R are (0, 6). The coordinates of S are (4, 6). If the area of ΔRST is 6, which of the following coordinate pairs should represent coordinate T?

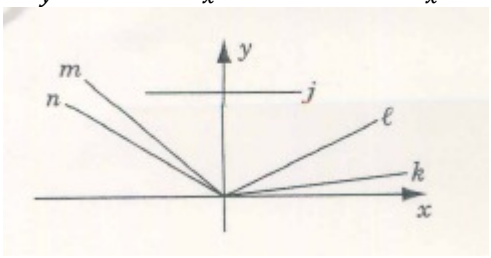
(A) $(-1, 3)$ (B) $(0, 2)$ (C) $(0, 4)$ (D) $(1, 8)$ (E) $(2, 8)$

SAT-Type Problems **Practice O**



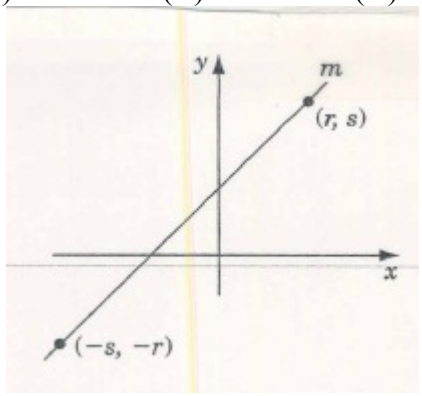
1. In the figure above, line r intersects the x- and y-axis at (x, 0) and (0, y) respectively. What is the slope of line r?

(A) $\frac{x}{y}$ (B) $-\frac{x}{y}$ (C) $\frac{y}{x}$ (D) $-\frac{y}{x}$ (E) $\frac{y}{x-y}$



2. In the figure above, line segments j, k, l, m, and n are drawn. Which line segment has the greatest slope?

(A) j (B) k (C) l (D) m (E) n



3. In the figure above what is the slope of line m?

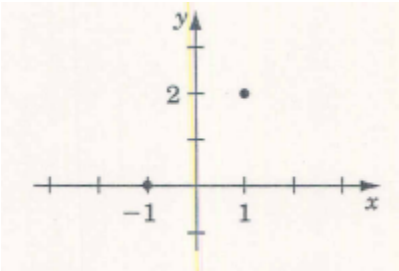
(A) $-\frac{r}{s}$ (B) $-\frac{s}{r}$ (C) $\frac{r}{s}$ (D) $\frac{s}{r}$ (E) 1

4. If the slope of a line that passes through (0, 0) is 4, which of the following points lies on the line?

(A) $(3, 1)$ (B) $(3, 2)$ (C) $(3, 4)$ (D) $(3, 8)$ (E) $(3, 12)$

5. A line l in the coordinate system passes through point (2, 1) and has a slope of $\frac{1}{2}$. Another point on this line is (x, -3). What is the value of x?

(A) 0 (B) -4 (C) -6 (D) -8 (E) -10

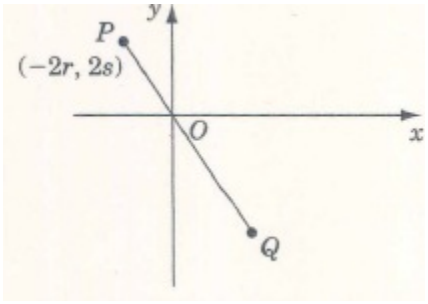


6. In the figure above, line m (not shown) passes through points with coordinates (-1, 0), (1, 2), and (0, y). Find the value of y.

(A) 0 (B) $\frac{1}{2}$ (C) 1 (D) $\frac{3}{2}$ (E) 2

7. If the slope of a line is $\frac{3}{4}$, and it passes through (5,8 and (-3,y) what is the value of y?

(A) -2 (B) -1 (C) 1 (D) 2 (E) 3



8. In the figure above, if line segment $\overline{PQ}$ is three times as long as line segment $\overline{PO}$, what are the coordinates of Q?

(A) $(-4r, 6s)$ (B) $(-6r, -6s)$ (C) $(4r, -4s)$ (D) $(4r, 4s)$ (E) $(6r, -6s)$

9. A straight line has a slope of 3 and contains the point (0, -3). Which of the following points lies on the line?

(A) $(-1, 3)$ (B) $(1, -2)$ (C) $(1, 1)$ (D) $(1, 2)$ (E) $(2, 3)$

10. The equation of line n is y = 3x + 8. If line r is parallel to line n and the equation for line r is y = mx + 16, what is the value of m?

(A) $\frac{3}{8}$ (B) 3 (C)6 (D) 8 (E) 11

11. The slope of the line l is greater than 1, and the angle formed by line l and the y-axis has a degree measure of m. What of the following is the range of the possible values for m?

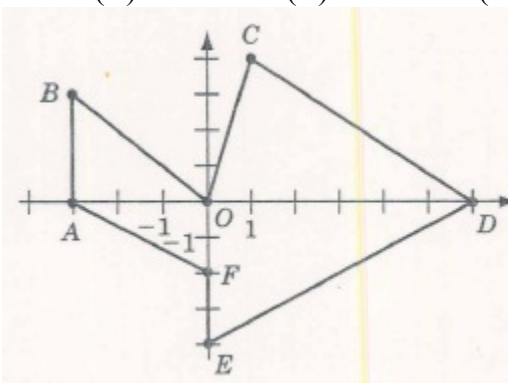
(A) $0 < m < 30$ (B) $0 < m < 45$ (C) $30 < m < 60$
(D) $0 < m < 90$ (E) $45 < m < 90$

12. If a straight line passes through the points (0, 0) and (-1, -1), which of the following points is also on this line?

(A) $(-3, 3)$ (B) $(3, -3)$ (C) $(0, -3)$ (D) $(-3, 0)$ (E) $(3, 3)$

13. In the coordinate plane, what is the slope of a line that passes through the points (0, 7) and (7, 0)?

(A) -1 (B) 0 (C) 1 (D) 7 (E) 14

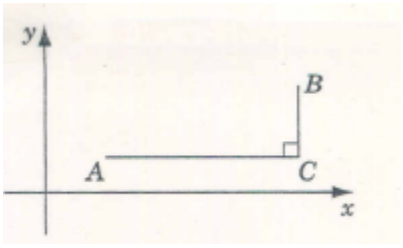


14. Which line segment in the figure above has a slope of $-\frac{2}{3}$?

(A) $\overline{BO}$ (B) $\overline{AF}$ (C) $\overline{ED}$ (D) $\overline{OC}$ (E) $\overline{CD}$

15. Points A and B are in the first quadrant of a coordinate plane with origin O. If the slope of line $\overleftrightarrow{OA}$ is 1 and the slope of line $\overleftrightarrow{OB}$ is 4, which of the following points lies in $\angle AOB$?

(A) $(1, 5)$ (B) $(2, 5)$ (C) $(2, 9)$ (D) $(3, 13)$ (E) $(4, 1)$

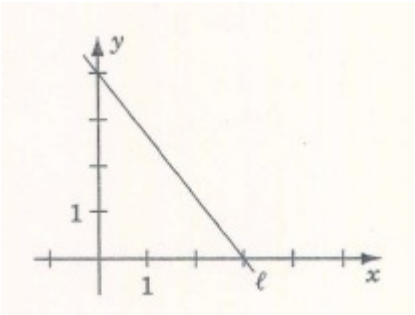


16. In the figure above, if the slope of $\overline{AB}$ (not shown) is $\frac{3}{4}$, and the length of $\overline{BC}$ is 9, what is the length of $\overline{AB}$?

(A) 12 (B) 15 (C) 16 (D) 27 (E) 36

17. In the coordinate plane, what is the slope of a line that passes through the origin and the point (-1, 3)?

(A) -3 (B) $-\frac{1}{3}$ (C) 0 (D) $\frac{1}{3}$ (E) 3

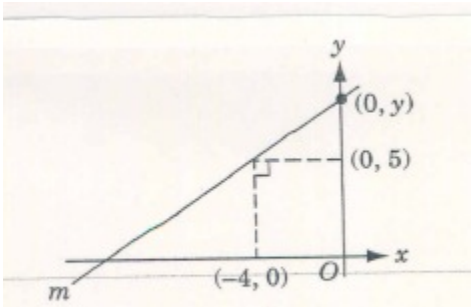


18. In the figure above, a line (not shown) passes through the points with coordinates (0, y) and (x, 0) and is parallel to the given line l. Which of the following could be the values of y and x?

(A) $y = 5, x = 4$ (B) $y = 3, x = 4$ (C) $y = 8, x = 6$ (D) $y = 3, x = 2$ (E) $y = 8, x = 9$

19. A line passes through points A, B, and C with coordinates (1, 4), (2, 7), and (x, 13) respectively. What is the value of x?

(A) 3 (B) 3.5 (C) 4 (D)4.5 (E) 5



Note: Figure not drawn to scale.

20. In the figure above, if line m has a slope of 3, what is the value of y?

(A) 10 (B) 12 (C) 15 (D16 (E) 17

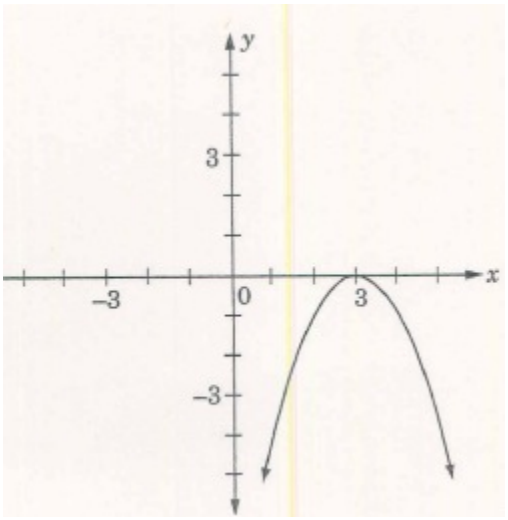
SAT-Type Problems **Practice P**

1. A parabola with the equation of the form $y = ax^2 + bx + c$ has the point (3, 1) as its vertex. If (1, 3) also lies on the parabola, which of the following is another point on this parabola?

   (A) $(-3, -1)$ (B) $(-1, -3)$ (C) $(2, 2)$ (D) $(2, 6)$ (E) $(5, 3)$

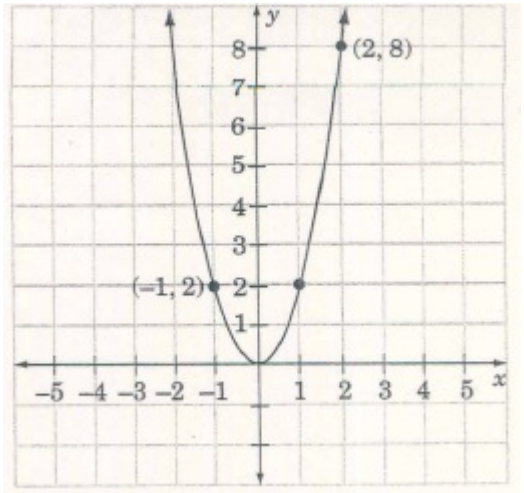
2. Which of the following sets of x-values gives all the solutions of $x^2 - 8x = 20$?

   (A) -5 *and* 4 (B) -4 *and* 5 (C) -2 *and* 10 (D) -10 *and* 2 (E) 20 *Only*



3. Which equation is best represented by the graph above?

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



4. Which of the following is the equation of the quadratic function shown in the graph above?

   (A) $y = \frac{1}{4}x^2$ (B) $y = \frac{1}{2}x^2$ (C) $y = \frac{1}{2}x^2$ (D) $y = -2x^2$ (E) $y = 2x^2$

5. Which parabola intersects the x-axis in two distinct points?

   (A) $f(x) = (x + 5)^2$ (B) $f(x) = (x - 5)^2$ (C) $f(x) = x^2 - 25$
   (D) $f(x) = x^2 + 25$ (E) $f(x) = (x - 4)^2$

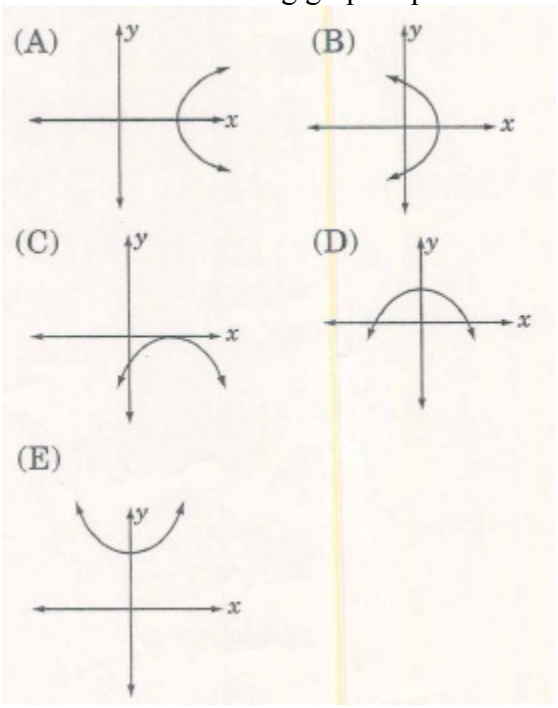
6. If the roots of a quadratic equation are 5 and -3, which of the following is the equation?

(A) $y = x^2 - 15x + 2$ (B) $y = x^2 - 15x - 2$ (C) $y = x^2 - 2x + 15$
(D) $y = x^2 + 2x - 15$ (E) $y = x^2 - 2x - 15$

7. Which of the following is the equation of a parabola that does not pass through the origin?

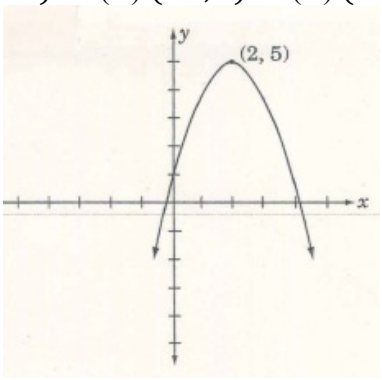
(A) $y = \frac{1}{2}x^2$ (B) $y = x^2 - 2x$ (C) $y = -x^2 - x$ (D) $y = 2x^2$ (E) $y = x^2 - 2x + 2$

8. Which of the following graph represents the equation $y = -x^2 + 4$?



9. If the parabola shown below is reflected over the x-axis, what would be the image of the vertex (or turning point) after the reflection?

(A) $(2, -5)$ (B) $(-2, 5)$ (C) $(-2, -5)$ (D) $(5, 2)$ (E) $(-5, -2)$



SAT-Type Problems Practice Q:
All of the following problems are designed as Student-Produced Response Questions:

1. If $\sqrt{x-3}=3$, then what is the value of x?

2. If $\sqrt{3x-8}=4$, then what is the value of x?

3. If $3\sqrt{2x+1}=15$, then what is the value of x?

4. If $\sqrt{5x-1}+2=10$, then what is the value of x?

5. If $\sqrt{6b+4}=20$, then what is the value of b?

6. If $\sqrt{3x+5}=2\sqrt{x+1}$, then what is the value of x?

7. If $\sqrt{20x}=2\sqrt{4x+5}$, then what is the value of x?

8. If $5\sqrt{5x-1}=7\sqrt{2x+5}$, then what is the value of x?

9. If $2\sqrt{6x}=\sqrt{4x^2}$, then what is the value of x?

10. If $\sqrt{3x+1}=x-3$, then what is the value of x?