

8

If  $\frac{a}{b} = 2$ , what is the value of  $\frac{4b}{a}$ ?

- A) 0
  - B) 1
  - C) 2
  - D) 4
- $\frac{a}{b} = \frac{2}{1}$       $4(\frac{1}{2}) = 2$

9

$$\begin{aligned} 3x + 4y &= -23 \\ 2y - x &= -19 \end{aligned}$$

What is the solution  $(x, y)$  to the system of equations above?

- A)  $(-5, -2)$
  - B)  $(3, -8)$
  - C)  $(4, -6)$
  - D)  $(9, -6)$
- $3x + 4y = -23$   
 $-2x + 4y = -38$   
 $5x = 15$   
 $x = 3$   
 $(3, -8)$
- $3(x) + 4y = -23$   
 $3(3) + 4y = -23$   
 $9 + 4y = -23$   
 $4y = -32$   
 $y = -8$

10

$$g(x) = ax^2 + 24$$

For the function  $g$  defined above,  $a$  is a constant and  $g(4) = 8$ . What is the value of  $g(-4)$ ?

- A) 8
  - B) 0
  - C) -1
  - D) -8
- $8 = a(16) + 24$   
 $-24 = -24$   
 $-16 = \frac{a(16)}{16}$   
 $a = -1$
- $g(x) = -1x^2 + 24$   
 $= -1(-4)^2 + 24$   
 $= -1(16) + 24$   
 $= -16 + 24$   
 $= 8$

11

$$\begin{aligned} b &= 2.35 + 0.25x \text{ (8)} \\ c &= 1.75 + 0.40x \text{ (5)} \end{aligned}$$

In the equations above,  $b$  and  $c$  represent the price per pound, in dollars, of beef and chicken, respectively,  $x$  weeks after July 1 during last summer. What was the price per pound of beef when it was equal to the price per pound of chicken?

- A) \$2.60
  - B) \$2.85
  - C) \$2.95
  - D) \$3.35
- $2.35 + .25x = 1.75 + .4x$   
 $-1.75 - .25x \quad -1.75 - .25x$   
 $\frac{.60}{.15} = \frac{.15x}{.15}$

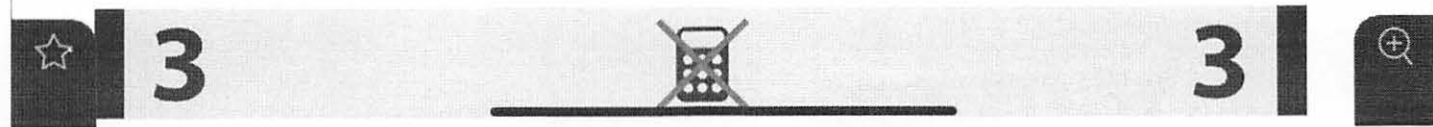
$$\begin{aligned} 4 &= x \\ b &= 2.35 + .25(x) \\ &= 2.35 + 1 \\ &= 3.35 \end{aligned}$$

12

A line in the  $xy$ -plane passes through the origin and has a slope of  $\frac{1}{7}$ . Which of the following points lies on the line?

- A)  $(0, 7)$
  - B)  $(1, 7)$
  - C)  $(7, 7)$
  - D)  $(14, 2)$
- $y = \frac{1}{7}x$  ← Equation of line  
 so...  
 $2 = \frac{1}{7}(14) \checkmark$   
 $2 = 2 \checkmark$

$$\begin{aligned} y &= mx + b \\ y &= \frac{1}{7}x + b \\ 0 &= \frac{1}{7}(0) + b \\ &= b \end{aligned}$$



COLLEGE BOARD; TEST #1; SECTION #3; Q11

$$b = 2.35 + 0.25(x) \quad \text{---} \quad \textcircled{1}$$

$$c = 1.75 + 0.40(x) \quad \text{---} \quad \textcircled{2}$$

When equal after 'x' weeks,  
 $b = c$

THEREFORE, RHS of eqs ① & ② will ALSO BE EQUAL.

$$\begin{aligned} \therefore 2.35 + 0.25(x) &= 1.75 + 0.40(x) \\ - 1.75 & \quad - 1.75 \\ \hline 0.60 & \quad - 0.25(x) \end{aligned} = \begin{aligned} & \quad - 0.25(x) \\ & \quad - 0.25(x) \\ \hline & \quad 0.15(x) \end{aligned}$$

SUBTRACT 1.75  
 from both sides

& 0.25(x) FROM BOTH SIDES

$$\boxed{4 = x}$$

∴ FROM EQ # ①

$$b = 2.35 + 0.25(x)$$

$$= 2.35 + 0.25(4)$$

$$= 2.35 + 1.00$$

$$\boxed{b = 3.35}$$

← PRICE IN \$  
 ANSWER  $\textcircled{D}$

COLLEGEBOARD; TEST #1; SECTION #3; Q12

$$y = mx + b$$

$$\Rightarrow m = \frac{\text{RISE}}{\text{RUN}} = \frac{1}{7}$$

$$y = \frac{1}{7}x + 0$$

since it passes through the ORIGIN  
; THE INTERCEPT = 0

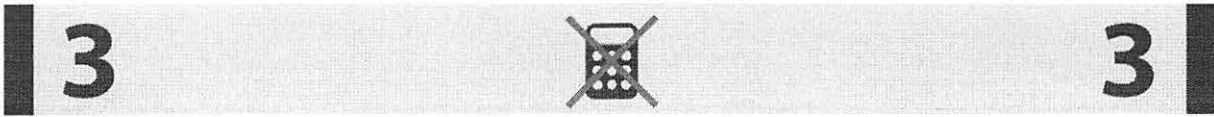
$$\boxed{y = \frac{1}{7}x}$$

only point  $\textcircled{D}$  satisfies the equation.  
 $(14, 2)$

$$y = \left(\frac{1}{7}\right)(14) \quad \boxed{x=14}$$

$$\boxed{y = 2}$$

SATISFIES THE GOOD FOR POINT  $\textcircled{D}$ .  
ANSWER.



13 Relevance of x > 3 Statement?

If  $x > 3$ , which of the following is equivalent

to  $\frac{1}{\frac{1}{x+2} + \frac{1}{x+3}}$  ?  $\frac{1}{\frac{x+3 + x+2}{x^2+3x+2x+6}}$

A)  $\frac{2x+5}{x^2+5x+6}$   $\frac{1}{x^2+5x+6} \div \frac{2x+5}{x^2+5x+6}$

B)  $\frac{x^2+5x+6}{2x+5}$   $\frac{x^2+5x+6}{2x+5}$

C)  $2x+5$

D)  $x^2+5x+6$

14

If  $3x - y = 12$ , what is the value of  $\frac{8^x}{2^y}$  ?

A)  $2^{12}$   $\frac{3x-y=12}{3} = \frac{12}{3}$   $\frac{2^{3x}}{2^y} = 2^{3x-y}$   
 B)  $4^4$   $x-y=4$   $\frac{2^{3x}}{2^y} = 2^{3(x-y)}$   
 C)  $8^2$   $2^{12}$

D) The value cannot be determined from the information given.

15

If  $(ax+2)(bx+7) = 15x^2 + cx + 14$  for all values of  $x$ , and  $a+b=8$ , what are the two possible values for  $c$  ?

$\frac{a+b}{15}x^2 + 7ax + 2bx + 14$

- A) 3 and 5
- B) 6 and 35
- C) 10 and 21
- D) 31 and 41

~~$\frac{15}{3} = 5$~~

$(ax+2)(bx+7) = (5x+2)(3x+7)$

$15x^2 + 35x + 6x + 14$

$\blacktriangleright 15x^2 + 41x + 14$

$(ax+2)(bx+7) = (3x+2)(5x+7)$

$15x^2 + 21x + 10x + 14$

$\blacktriangleright 15x^2 + 31x + 14$

10 possible  $c$  values

$41$  or  $31$



COLLEGEBOARD; TEST #1; SECTION #3; Q 13

FIVE STAR  
\*\*\*\*\*

$$\frac{1}{x+2} + \frac{1}{x+3}$$

$$= \frac{1}{(x+3) + (x+2)}$$
$$\frac{1}{(x+2)(x+3)}$$

FIVE STAR  
\*\*\*\*\*

$$= \frac{x^2 + 5x + 6}{(x+3) + (x+2)}$$

$$= \frac{x^2 + 5x + 6}{2x + 5}$$

← ANSWER (B)

FIVE STAR  
\*\*\*\*\*

FIVE STAR  
\*\*\*\*\*

COLLEGE BOARD, TEST # 1, SECTION # 3, Q 14

Q14

GIVEN.  
 $3x - y = 12$

AND.

$$\frac{8^x}{2^y}$$

$$= \frac{(2^3)^x}{(2)^y}$$

$$= \frac{3x}{2}$$

$$= \frac{2^y}{2^{3x-y}}$$

$$= 2^{12} \leftarrow \text{ANSWER } \textcircled{A}$$

$$(ax+2)(bx+7) = 15x^2 + cx + 14$$

$$abx^2 + (7a+2b)x + 14 = (15)x^2 + (c)x + 14$$

∴  $ab = 15$  ————— ①

$7a + 2b = c$  ————— ②

GIVEN

$a + b = 8$  ————— ③

∴  $a = 8 - b$  ————— ③b

∴  $7a + 2b = c$

NEEDS WORK.

FIVE STAR.  
\*\*\*\*\*

FIVE STAR.  
\*\*\*\*\*

FIVE STAR.  
\*\*\*\*\*

FIVE STAR.  
\*\*\*\*\*

4



4

20 Alma bought a laptop computer at a store that gave a 20 percent discount off its original price. The total amount she paid to the cashier was  $p$  dollars, including an 8 percent sales tax on the discounted price. Which of the following represents the original price of the computer in terms of  $p$ ?

A)  $0.88p$

B)  $\frac{p}{0.88}$

C)  $(0.8)(1.08)p$

D)  $\frac{p}{(0.8)(1.08)}$

D

$p = (1.08)$

$p(0.8)(1.08)$

21 Dreams Recalled during One Week

	None	1 to 4	5 or more	Total
Group X	15	28	57	100
Group Y	21	11	68	100
Total	36	39	125	200

The data in the table above were produced by a sleep researcher studying the number of dreams people recall when asked to record their dreams for one week. Group X consisted of 100 people who observed early bedtimes, and Group Y consisted of 100 people who observed later bedtimes. If a person is chosen at random from those who recalled at least 1 dream, what is the probability that the person belonged to Group Y?

A)  $\frac{68}{100}$

B)  $\frac{79}{100}$

C)  $\frac{79}{164}$

D)  $\frac{164}{200}$

Group Y  
@ least 1      79  
164

4



4



✓

$$= (O.P. - 20\%)$$
$$= (O.P.) (0.80)$$

FIVE STAR  
\*\*\*\*\*

$$(O.P.) (0.80) (1.08) = P \quad \leftarrow \text{GIVEN}$$

$$(O.P.) (0.80) = \frac{P}{(1.08)}$$

FIVE STAR  
\*\*\*\*\*

FIVE STAR  
\*\*\*\*\*

FIVE STAR  
\*\*\*\*\*

FIVE STAR  
\*\*\*\*\*

$$\boxed{(O.P.) = \frac{P}{(1.08) (0.80)}}$$

ANS (D)

TEST # 1, SECTION # 4; Q 21

$$\begin{aligned} \text{probability} &= \frac{11 + 68}{39 + 125} \\ &= \frac{79}{164} \end{aligned}$$

ANS (C)

4



4

Questions 22 and 23 refer to the following information.

Annual Budgets for Different Programs in Kansas, 2007 to 2010

Program	Year			
	2007	2008	2009	2010
Agriculture/natural resources	373,904	358,708	485,807	488,106
Education	2,164,607	2,413,984	2,274,514	3,008,036
General government	14,347,325	12,554,845	10,392,107	14,716,155
Highways and transportation	1,468,482	1,665,636	1,539,480	1,773,893
Human resources	4,051,050	4,099,067	4,618,444	5,921,379
Public safety	263,463	398,326	355,935	464,233

The table above lists the annual budget, in thousands of dollars, for each of six different state programs in Kansas from 2007 to 2010.

22

Which of the following best approximates the average rate of change in the annual budget for agriculture/natural resources in Kansas from 2008 to 2010?

- A) \$50,000,000 per year
- B) \$65,000,000 per year
- C) \$75,000,000 per year
- D) \$130,000,000 per year

diff.  
2  
or  
diff  
3

23

Of the following, which program's ratio of its 2007 budget to its 2010 budget is closest to the human resources program's ratio of its 2007 budget to its 2010 budget?

- A) Agriculture/natural resources
- B) Education
- C) Highways and transportation
- D) Public safety

\* quadratic SAT math on 4t

4



4

AVERAGE RATE OF CHANGE 2008 → 2010

ONLY FOR AGRICULTURE/NAT. RESC.

$$\begin{array}{r} 488 \\ - 358 \\ \hline 130 \end{array}$$

TABLE SHOWS 2007 to 2010  
WE NEEDED TO  
CONSIDER ONLY 2008 to 2010

$$\therefore \text{AMT of change} = \$130,000 \quad \text{APPROX. THOUSANDS of \$}$$

$$\begin{array}{l} \text{# of YEARS} \\ \rightarrow = \$130,000,000 \\ = \frac{\quad}{2} \end{array}$$

$$\therefore \text{RATE OF CHANGE} = \frac{130,000,000}{2}$$

$$= \$65,000,000.$$

ANS.

(B)

QUESTION # 23

WE ARE BEING

QUESTION # 23

WE ARE BEING ASKED TO COMPARE  
THE RATIO OF 2007 TO 2010

NOT AMT

A  
E  
G  
H  
I  
J  
K  
L  
M

374	488
2164	3008
14347	1471.6
1468	\$1773
4051	5923
263	464

- 1.25
- 1.5
- 1.1
- 1.25
- 1.5
- 2



ANS (B)

4



4

24

Which of the following is an equation of a circle in the  $xy$ -plane with center  $(0, 4)$  and a radius with endpoint  $(\frac{4}{3}, 5)$ ?

- A)  $x^2 + (y - 4)^2 = \frac{25}{9}$
- B)  $x^2 + (y + 4)^2 = \frac{25}{9}$
- C)  $x^2 + (y - 4)^2 = \frac{5}{3}$
- D)  $x^2 + (y + 4)^2 = \frac{3}{5}$



$(x-h)^2 + (y-k)^2 = r^2$

\* incorporate mid point r distance formula

\* mid point/distance formula!

(A)

25

$h = -4.9t^2 + 25t$

The equation above expresses the approximate height  $h$ , in meters, of a ball  $t$  seconds after it is launched vertically upward from the ground with an initial velocity of 25 meters per second. After approximately how many seconds will the ball hit the ground?

- A) 3.5
- B) 4.0
- C) 4.5
- (D) 5.0

$0 = -4.9t^2 + 25t$

$0 = t(-4.9t + 25)$

$t = \frac{-25}{-4.9} = 5.1 = t$

26

Katarina is a botanist studying the production of pears by two types of pear trees. She noticed that Type A trees produced 20 percent more pears than Type B trees did. Based on Katarina's observation, if the Type A trees produced 144 pears, how many pears did the Type B trees produce?

- A) 115
- (B) 120
- C) 124
- D) 173

A)  $1.2x$   $\frac{1.2x = 144}{1.2} = 120$

B)  $1x$   $x = 120$

27

A square field measures 10 meters by 10 meters. Ten students each mark off a randomly selected region of the field; each region is square and has side lengths of 1 meter, and no two regions overlap. The students count the earthworms contained in the soil to a depth of 5 centimeters beneath the ground's surface in each region. The results are shown in the table below.

Region	Number of earthworms	Region	Number of earthworms
A	107	F	141
B	147	G	150
C	146	H	154
D	135	I	176
E	149	J	166

Which of the following is a reasonable approximation of the number of earthworms to a depth of 5 centimeters beneath the ground's surface in the entire field?

- (A) 150
- B) 1,500
- C) 15,000
- D) 150,000

total = 1471

(C)



4



4



please look at example # 15: Coordinate Geometry, Circles.

We know that

$$(x-0)^2 + (y-0)^2 = r^2$$

co. od. of center = (0, 0)  
radius = r

$$(x-5)^2 + (y-4)^2 = 6^2$$

co. od. of center = (5, 4)  
radius = 6

∴ for our scenario

$$(x-0)^2 + (y-4)^2 = (\text{radius})^2$$

center = (0, 4)

If circle passes through  $(\frac{4}{3}, 5)$

$$\therefore (\text{radius})^2 = (y_2 - y_1)^2 + (x_2 - x_1)^2$$

$$= (5 - 4)^2 + (\frac{4}{3} - 0)^2$$

$$= 1^2 + (\frac{4}{3})^2$$

$$= 1 + \frac{16}{9}$$

$$= \frac{9 + 16}{9}$$

$$r^2 = \frac{25}{9}$$

$$r = \frac{5}{3}$$

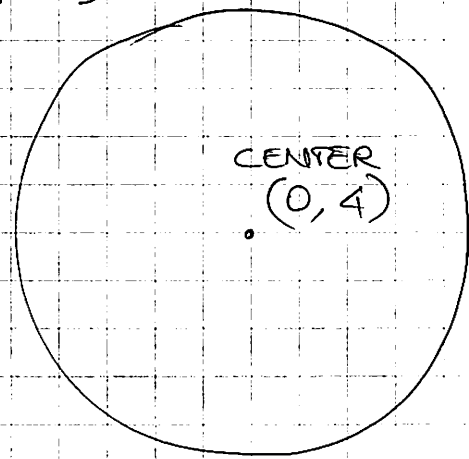
∴ EQ OF THE CIRCLES IS

$$(x-0)^2 + (y-4)^2 = (\frac{5}{3})^2$$

$$(x)^2 + (y-4)^2 = (\frac{5}{3})^2$$

$$x^2 + (y-4)^2 = \frac{25}{9}$$

ANSWER (A)



∴ COMPARE ∴  
QUESTION:  
FIND EQ OF  
CIRCLE IF  
ENDPOINT IS  
 $(\frac{3}{4}, 5)$

FIVE STAR  
\*\*\*\*\*

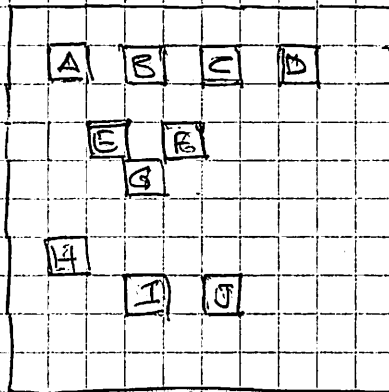
FIVE STAR  
\*\*\*\*\*

FIVE STAR  
\*\*\*\*\*

FIVE STAR  
\*\*\*\*\*

## QUESTION # 27

SQUARE FIELD, SHOWN BELOW.



- TEN STUDENTS MARK OFF  
RANDOMLY SELECTED REGIONS  
OF THE FIELD.

- EACH REGION IS SQUARE  
2 HAS

- SIDE LENGTHS OF 1 METER

- NO TWO REGIONS OVERLAP

THE TABLE SHOWS THE NUMBER OF EARTHWORMS  
IN INDIVIDUAL REGIONS, (1 METER x 1 METER)

QUESTION BEING ASKED,

WHICH OF THE FOLLOWING IS A REASONABLE  
APPROXIMATION . . . . .

IN THE ENTIRE FIELD, (10 M x 10 METER)

$$\therefore \text{AVERAGE OF ONE REGION} \times 10 \times 10 =$$

150

"

$$\times 100 =$$

150

$$\times 100 =$$

$$15000 =$$

ANSWER (C)

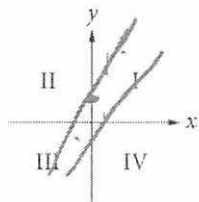
COMPARABLE QUESTION,

FIND ANSWER IF ENTIRE FIELD WAS

100 METERS x  
100 METERS



28



If the system of inequalities  $y \geq 2x + 1$  and  $y > \frac{1}{2}x - 1$  is graphed in the  $xy$ -plane above, which quadrant contains no solutions to the system?

- A) Quadrant II
- B) Quadrant III
- C) Quadrant IV
- D) There are solutions in all four quadrants.

(C)

29

For a polynomial  $p(x)$ , the value of  $p(3)$  is  $-2$ . Which of the following must be true about  $p(x)$ ?

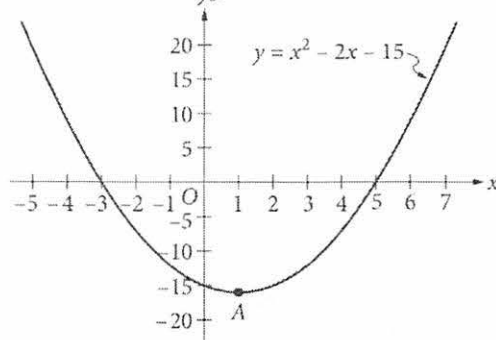
- A)  $x - 5$  is a factor of  $p(x)$ .
- > B)  $x - 2$  is a factor of  $p(x)$ .
- > C)  $x + 2$  is a factor of  $p(x)$ .
- > D) The remainder when  $p(x)$  is divided by  $x - 3$  is  $-2$ .

$p(3) = -2$        $p(3) = -2$   
 $y = -2$            $y = -2$   
 $x = -2$

(D)

30

und. why



Which of the following is an equivalent form of the equation of the graph shown in the  $xy$ -plane above, from which the coordinates of vertex  $A$  can be identified as constants in the equation?

- A)  $y = (x + 3)(x - 5)$
- B)  $y = (x - 3)(x + 5)$
- C)  $y = x(x - 2) - 15$
- D)  $y = (x - 1)^2 - 16$

$-5 \times 3 = -15$   
 $-2$   
 $(x - 5)(x + 3)$

$x^2 - x + 1 - 16$

$x^2 - 2x - 15$

review quadratic is ~~is~~

SAT notebook

(D)

GIVEN TWO INEQUALITIES,

$$y \geq 2x + 1$$

—————

① intercept is +1

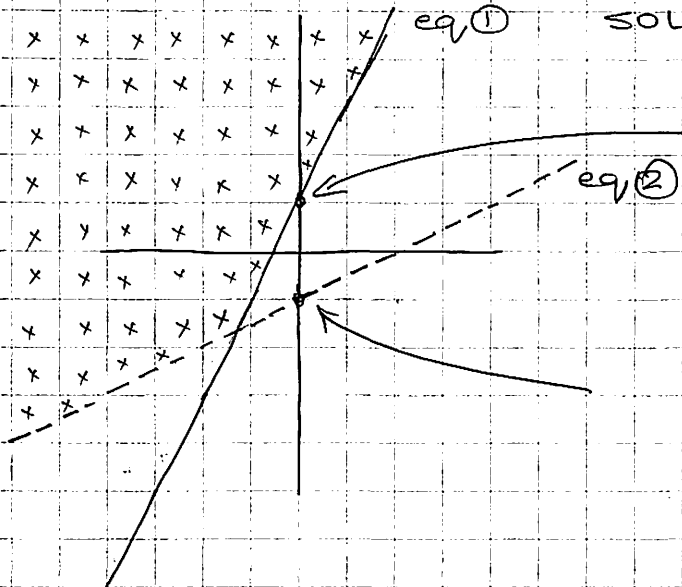
$$y > \frac{1}{2}x - 1$$

—————

② " -1

FIVE STAR.  
\*\*\*\*\*

FIVE STAR.  
\*\*\*\*\*



SOLID LINE FOR  $\geq$

intercept for eq ①

DASHED LINE FOR  $>$

intercept for eq ②

eq ① REPRESENTS SOLUTIONS IN QUADRANTS 1, 2, 3  
" ② " " " " " " 1, 2, 3, 4

FIVE STAR.  
\*\*\*\*\*

eq ① REPRESENTS SOLUTIONS ABOVE LINE 1  
" ② " " " " " 2

REGION WITH "x"  
SATISFIES BOTH EQUATIONS.

IT IS IN QUAD 1, 2, 3  
BUT NOT IN 4

FIVE STAR.  
\*\*\*\*\*

ANSWER (C)

ABOVE BECAUSE  
 $y >$  OR  
 $y \geq$

answer

38 ✓

Jessica's friend Tyshaun found an account that earns 2.5 percent interest compounded annually. Tyshaun made an initial deposit of \$100 into this account at the same time Jessica made a deposit of \$100 into her account. After 10 years, how much more money will Tyshaun's initial deposit have earned than Jessica's initial deposit? (Round your answer to the nearest cent and ignore the dollar sign when gridding your response.)

= 0

J	▲	T
$100(1.02)^{10}$		$100(1.025)^{10}$
121.8999442		128.00843

6.01846

6.02

**STOP**

You may check your work on this section only.  
 Do not check your work on any other section.

