



53C

MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

but some of the problems may best be done without using a calculator.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

Note: Unless otherwise stated, all of the following should be assumed.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

- 1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word line indicates a straight line.
4. The word average indicates arithmetic mean.

1. What is the average of 3, 3, and 4?

DO YOUR FIGURING HERE.

A. 3

B. 3 1/3

C. 3 1/2

D. 3 2/3

E. 4

6+4 = 10 / 3 = 3 1/3

B

2. A positive number plus its square is equal to 56. What is the number?

F. 5

G. 6

H. 7

J. 8

K. 9

n + n^2 = 56 same as n^2 + n - 56 = 0
Solving quadratic (n+8)(n-7) = 0
n = -8 or n = 7

H

Must be positive

3. For all x, (2x - 3)(x + 5) = ?

A. x^2 + 2x - 15

B. 2x^2 - 13x - 15

C. 2x^2 + 2x - 15

D. 2x^2 + 2x + 15

E. 2x^2 + 7x - 15

Looking at answers, you need to multiply
you can quickly multiply in your head.
if not, 2x^2 + 10x - 3x - 15
FOIL 2x^2 + 7x - 15

E

4. A beaker of liquid cools from 19° to -6°. By how many degrees has it cooled?

F. 6°

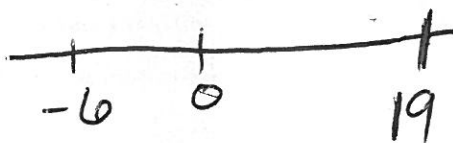
G. 13°

H. 19°

J. 25°

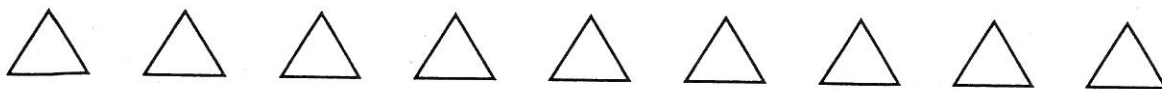
K. 26°

19 - (-6) = 19 + 6 = 25



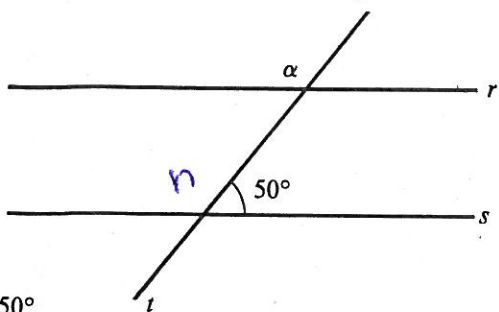
To find distance between any two points, subtract the end points

J



5. In the figure below, parallel lines r and s are intersected by line t . What is the measure of angle α ?

DO YOUR FIGURING HERE.



$n = \alpha$
 $n + 50 = 180$
 $n = 130 = \alpha$

- C
 A. 50°
 B. 100°
 → C. 130°
 D. 140°
 E. 150°

6. Ticket sales for this year's annual concert at County Stadium were \$350,000. The promoter is predicting that next year's ticket sales, in dollars, will be 60% greater than this year's. How many dollars in ticket sales is the promoter predicting for next year?

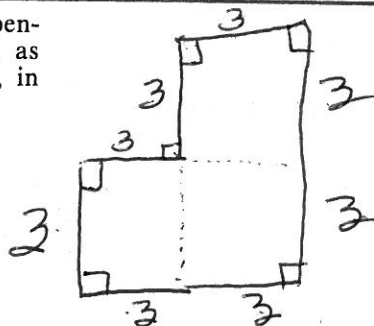
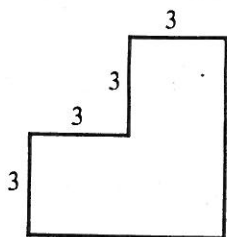
slow method → % change formula = $\frac{x - 350,000}{350,000} = 60\%$
 $= x - 350,000 = 210,000$
 $x = 560,000$

- H
 → F. \$350,060
 G. \$410,000
 → H. \$560,000
 J. \$583,333
 K. \$950,000

Quick Method $\$350,000 \times 1.6 = \$560,000$

7. Adjacent segments in the hexagon below are perpendicular, and 4 segments are each 3 yards long, as marked. What is the perimeter of the hexagon, in yards?

- C
 → A. 12
 B. 18
 → C. 24
 D. 27
 E. 30



$8 \times 3 = 24$

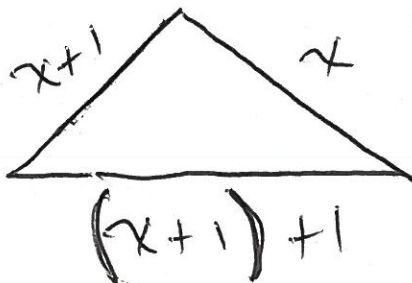
8. For all a and b , $3a^2b^3(2a^3b^3) = ?$

- J
 → F. $5a^5b^6$
 G. $5a^6b^9$
 H. $6a^2b^3$
 → J. $6a^5b^6$
 K. $6a^6b^9$

Multiply $3a^2b^3(2a^3b^3) = 6a^5b^6$

9. In a certain triangle, the longest side is 1 foot longer than the second-longest side, and the second-longest side is 1 foot longer than the shortest side. If the perimeter is 21 feet, how many feet long is the shortest side?

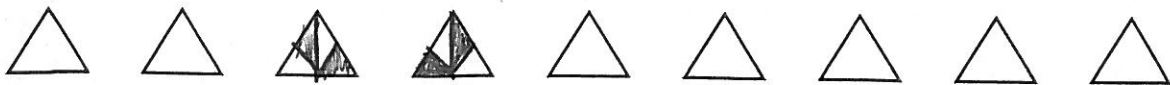
- A. 6
 B. 7
 C. 8
 D. 9
 E. 10



$x + (x+1) + (x+1) + 1 = 21$



$2x + 3 = 21$
 $2x = 18$
 $x = 6$



10. What is 5% of 50?

DO YOUR FIGURING HERE.

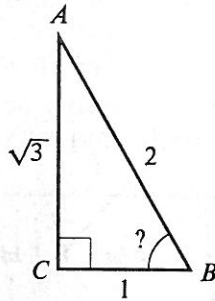
- F. 0.5
- G. 2.5
- H. 5
- J. 10
- K. 25

"of" Means Multiply

50 * 0.05 = 2.5

11. What is the measure of angle ABC in the triangle below?

If this is a 90 degree triangle and the sides are 1, 2 + sqrt(3), then the angle opposite the sqrt(3) side is 60 degrees



- A. 15 degrees
- B. 30 degrees
- C. 45 degrees
- D. 60 degrees
- E. 75 degrees

12. Anna wants to completely cover the rectangular ceiling of her room with soundproof tile so she can play her stereo as loudly as she wants. Her ceiling is 16 feet long and 10 feet wide. The tiles are 2-feet-by-2-feet squares. How many tiles does Anna need to cover her ceiling with one layer of soundproof tiles?

TOTAL Square feet of ceiling 160 / 4 = 40

Each tile is 4 feet square

- F. 20
- G. 26
- H. 40
- J. 52
- K. 80

13. What is the midpoint of the line segment with endpoints of (-3,5) and (5,9)?

Mid Point Formula

((x1+x2)/2 , (y1+y2)/2) (-3+5)/2 , (5+9)/2 => (1, 7)

- A. (-3,7)
- B. (1,5)
- C. (1,7)
- D. (4,7)
- E. (5,7)

14. What is the smallest positive integer x such that |2-x| >= 6?

When solving for x, you must split the absolute value 2-x >= 6 and 2-x >= -6 -4 >= x and 8 >= x Remember 8 = x

- F. 3
- G. 5
- H. 6
- J. 7
- K. 8

15. What is the greatest prime factor of 520?

START with Largest Number and work to smallest. Question asks for greatest. 17 is not a factor, but 13 is

- A. 5
- B. 7
- C. 11
- D. 13
- E. 17

16. What is the value of x^3 - x^2 - x when x = -1?

Plug and chug

(-1)^3 - (-1)^2 - (-1) -1 - 1 + 1

- F. -3
- G. -1
- H. 0
- J. 1
- K. 3



17. Running at a steady pace of 90 seconds per quarter mile, how many minutes would it take to run 2 miles?

- A. 12.0
 B. 8.0
 C. 7.2
 D. 4.5
 E. 3.0

90 seconds = $\frac{1}{2}$ Min.

$\frac{\frac{1}{2} \text{ MIN}}{\frac{1}{4} \text{ Mile}} = \frac{x}{2 \text{ mile}}$

DO YOUR FIGURING HERE.
 Proportion \rightarrow MUST HAVE SAME corresponding units
 $\Rightarrow 2(\frac{3}{2}) = \frac{x}{4} \Rightarrow 12 = x$

18. If $a = 0.3$ and $b = 0.4$, then $ab^2 = ?$

substitution

$(0.3)(0.4)(0.4) = \text{using calculator} = 0.048$

19. $\sqrt{x-5}$ is a real number if and only if:

REAL VS. IMAGINARY NUMBERS

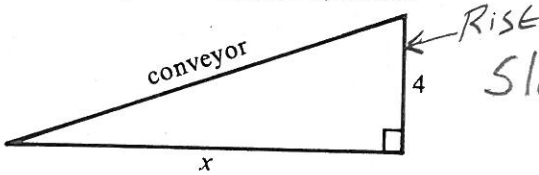
- A. $x \leq -5$
 B. $-5 < x < 0$
 C. $x = 0$
 D. $0 < x < 5$
 E. $x \geq 5$

if $\sqrt{x} < 0$, then number is imaginary

This is the only answer that will ALWAYS produce REAL

20. The manufacturer of an airport baggage conveyor recommends a slope of no more than 0.25. If the baggage conveyor in the figure below rises 4 feet, what is the minimum acceptable value for x , in feet?

Slope = $\frac{\text{rise}}{\text{run}}$



Slope of 0.25 is $\frac{25}{100}$ or $\frac{1}{4}$

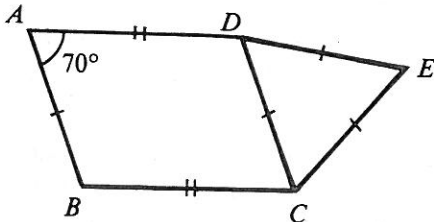
- F. $4\frac{1}{4}$
 G. 5
 H. 16
 J. 25
 K. 29

Run

$\frac{\text{Rise}}{\text{Run}} = \frac{1}{4} = \frac{4}{x}$

$x = 16$

21. The figure below is made from a parallelogram, $ABCD$, and an equilateral triangle, $\triangle CDE$. What is the measure of $\angle ADE$?



opposite angles of \square 's are \cong .

\square angles TOTAL 360°

$\therefore 360^\circ - 140^\circ = 220$

$220 \div 2 = 110^\circ = \angle ADC$

$110^\circ + 60^\circ = \angle ADE = 170^\circ$

D

- A. 110°
 B. 130°
 C. 150°
 D. 170°
 E. 190°

$\triangle CDE$ is equilateral

\therefore All the angles are equal or 60°

22. Which equation below has the solutions $x = p$ and $x = q$?

DO YOUR FIGURING HERE.

- F — F. $(x-p)(x-q) = 0$
 G. $(x-p)(x-q) = 1$
 H. $(x+p)(x+q) = 0$
 J. $x+p+q = 0$
 K. $x+pq = 0$

Luckily, the first one is true
 $(0-0)(0-0) = 0$ kind of a silly question.

23. Which of the following is an irrational number?

- A. $|-1.9|$
 B. 0
 E C. $\frac{1}{7}$
 D. 0.3
 → E. $\sqrt{6}$

Square roots of all prime numbers are irrational
 Two irrationals multiplied will produce another irrational

24. In the (x,y) coordinate plane, what is the slope of the line $y = x - 5$?

- J F. -5
 G. -1
 H. $\frac{1}{5}$
 → J. 1
 K. 5

slope / intercept form
 $y = mx + b$ $m = \text{slope}$
 $b = y\text{-intercept}$
 $y = x - 5$ is the same as $y = 1x - 5$ $m = 1$

25. What is the smallest number greater than 1 that, when divided by 2, 3, 4, 5, or 6, leaves a remainder of 1 in each case?

- C A. 7
 B. 31
 → C. 61
 D. 121
 E. 721

Calculator Fun
 with 60 all remainder have ONE
 60 seconds is used because 60 has all those factors

26. A car rental company charges \$50.00 per day plus \$0.80 per mile for a full-size car, and charges \$30.00 per day plus \$0.50 per mile for a compact car. Which expression below gives the amount, in dollars, that the charge for a full-size car exceeds the charge for a compact car, when each is rented for x days and y miles?

- G → F. $-20x - 0.30y$
 G. $20x + 0.30y$
 H. $20x + 30y$
 J. $20x + 1.30y$
 K. $80x + 1.30y$

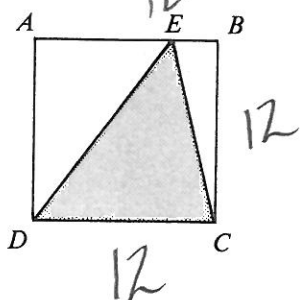
FACTORS
 $50x + 0.80y$
 $- 30x + 0.50y$
 Difference says subtract
 $20x + 0.30y$

27. A square has an area of 41.3 square centimeters. If s is the side length of the square in centimeters, then s must lie between which 2 consecutive integers?

- B → A. $4 < s < 5$
 B. $6 < s < 7$
 C. $10 < s < 11$
 D. $20 < s < 21$
 E. $41 < s < 42$

$S^2 = \text{Area of square, therefore}$
 $S = \sqrt{A}$
 if $S^2 = 41.3$ then $S = \sqrt{41.3}$
 S is somewhere between $\sqrt{36}$ and $\sqrt{49}$ or 6+7

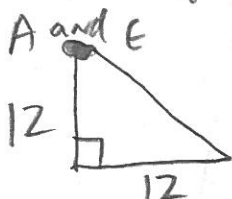
28. In the figure below, square $ABCD$ has sides 12 centimeters long, and E is on side \overline{AB} . In square centimeters, what is the area of $\triangle DEC$?



- H.
- F. 36
 - G. 48
 - H. 72
 - J. 96
 - K. 144

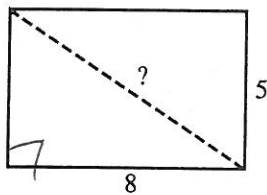
DO YOUR FIGURING HERE.

No Matter Where E is on \overline{AB} , the Area of $\triangle DEC$ is the SAME.



$$\frac{1}{2}bh = \frac{12 \cdot 12}{2} = 72$$

29. How many centimeters long is the diagonal of a rectangle that is 5 centimeters wide and 8 centimeters long, as shown below?



- D
- A. 13
 - B. $\sqrt{13}$
 - C. $\sqrt{40}$
 - D. $\sqrt{89}$
 - E. $\sqrt{99}$

Pythagorean Theorem

$$5^2 + 8^2 = (?)^2$$

$$25 + 64 = (?)^2$$

$$89 = (?)^2$$

$$\sqrt{89} = ?$$

30. Near a large city, planes take off from two airfields. One of the fields is capable of sending up a plane every 3 minutes. The other field is capable of sending up 2 planes every 7 minutes. At these rates, which of the following is the most reasonable estimate of the total number of planes the two airfields could send up in 90 minutes?

- K
- F. 18
 - G. 27
 - H. 36
 - J. 44
 - K. 55

$$\frac{2}{7} = \frac{x}{90} \quad 180 = 7x \quad 25.7 = x$$

$$\frac{1}{3} = \frac{y}{90} \quad 30 = y$$

Find out how many PLANTS EACH AIRFIELD CAN TAKE OFF in 90 minutes then Add them together

Can't have 0.7 of a plant $30 + 25 = 55$

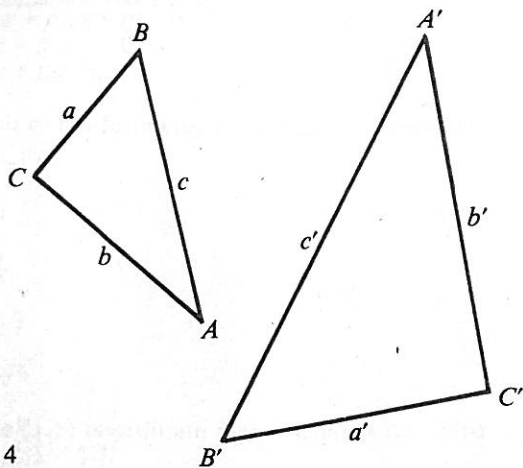
31. What are the (x,y) coordinates of the unique point on the graph of $x + 4y = 18$ such that the y -coordinate of that point is twice the x -coordinate?

- A. (1,2)
- B. (2,4)
- C. (3,6)
- D. (4,8)
- E. (9,18)

You can quickly try each one and see what works. Start with the SMALL ONES first (B) works



32. The figure below shows 2 triangles, where $\triangle ABC \sim \triangle A'B'C'$. In these similar triangles, $a = 9$, $b = 12$, $c = 15$, and $a' = 15$, with all dimensions given in feet. What is the value of b' ?



- F. 14
G. 16
H. 18
→ J. 20
K. 22

DO YOUR FIGURING HERE.

Similar means figures are equal in proportion

Set up corresponding sides in proportion

$$\frac{a=9}{b=12} = \frac{a'=15}{b'}$$

$$\frac{5}{3} \times 12 = b' = 20$$

33. In the (x,y) coordinate plane, if the point $(-4,2)$ is on the graph of $y = ax^2$, what is the value of a ?

- A. -1
B. 1
C. $-\frac{1}{2}$
D. $-\frac{1}{8}$
→ E. $\frac{1}{8}$

Plug in $(-4,2)$ into equation and solve for a

$$2 = a(-4)^2$$

$$\frac{2}{16} = \frac{a(16)}{16}$$

$$a = \frac{1}{8}$$

34. The two parabolas $y = ax^2 + n$ and $y = x^2 + q$ have the same vertex when graphed in the (x,y) coordinate plane. Which of the following *must* be true?

- F. $n + q = 0$
G. $nq = a$
H. $nq = 1$
J. $a = 1$
→ K. $n = q$

ANALYZING graphs

a determines how far or thin

n and q determine how from origin

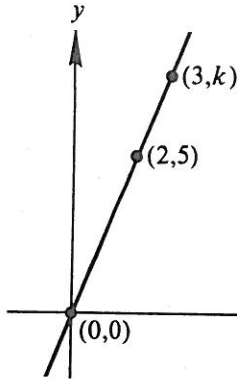
F) $n+q$ could be anything same with (h)
G) nq has no relationship with a

K) If same vertex, n must equal q



35. In the (x,y) coordinate plane below, a straight line passes through the 3 indicated points. What is the value of k ?

DO YOUR FIGURING HERE.



⁵
 You can look at points and tell immediately that the slope of line is $\frac{5}{2}$. Because $\frac{5-0}{2-0} = \frac{5}{2}$
 Set up equation $\frac{5}{2} = \frac{k-5}{3-2} = k-5$
 These two are wrong because line has positive slope

E

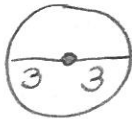
- A. $-\frac{15}{2}$
- B. $-\frac{6}{5}$
- C. $\frac{6}{5}$
- D. 6
- E. $\frac{15}{2}$

$$\frac{5}{2} = k - 5$$

$$5 + \frac{5}{2} = k = \frac{15}{2}$$

36. A circle has a diameter of 6 inches. What is the circle's area, in square inches?

- F. 6π
- G. 9π
- H. 12π
- J. 18π
- K. 36π



$$D = 2r$$

$$6 = 2r$$

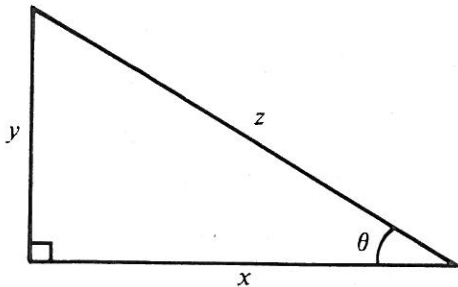
$$3 = r$$

$$\text{Area} = \pi r^2$$

$$\text{Area} = \pi (3)^2$$

$$\text{Area} = 9\pi$$

37. For the right triangle below, which of the following expressions is equal to $\cos \theta$?



SOHCAHTOA

$$\cos = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$

$$\cos \theta = \frac{x}{z}$$

B

- A. $\frac{x}{y}$
- B. $\frac{x}{z}$
- C. $\frac{y}{x}$
- D. $\frac{y}{z}$
- E. $\frac{z}{x}$



38. For all $x > 0$, which of the following is a simplified

DO YOUR FIGURING HERE.

form of $\frac{3x^2 + 14x + 8}{x^2 + 6x + 8}$?

F. $\frac{3x+2}{x+2}$

G. $\frac{(3x+1)(x+8)}{(x+2)(x+4)}$

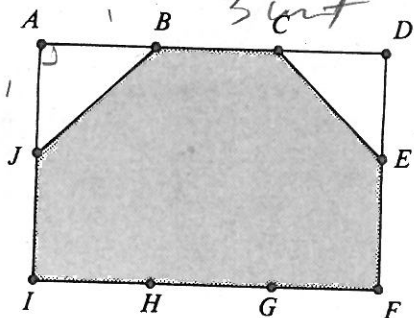
H. $3x+2$

J. $2x^2 + 8x$

K. $6\frac{1}{3}$

Factor Denominator First
So you find factor that will
cancel. $\frac{(3x+2)(x+4)}{(x+4)(x+2)} = \frac{3x+2}{x+2}$

39. In rectangle $ADFI$ below, the 10 labeled points are equally spaced along the perimeter. What is the ratio of the shaded area to the area of the entire rectangle?



To find shaded region,
Find Area of entire region
and subtract unshaded
region.

$(3 \times 2) - \left[\left(\frac{1}{2}\right) + \left(\frac{1}{2}\right) \right] = \text{shaded} = 5$
Region

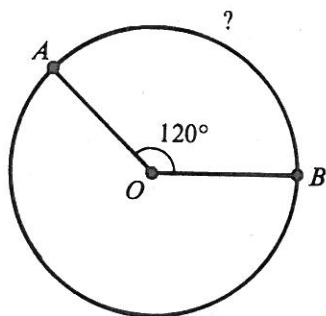
$\frac{\text{Shaded Region}}{\text{Entire Region}} = \frac{5}{8}$

The only answer that has 5 in Numerator

- A. $\frac{7}{8}$
- B. $\frac{5}{6}$
- C. $\frac{4}{5}$
- D. $\frac{3}{4}$
- E. $\frac{2}{3}$

(B)

40. If the circumference of the circle below is 93 parsecs, and O is the center of the circle, how many parsecs long is minor arc \widehat{AB} ?



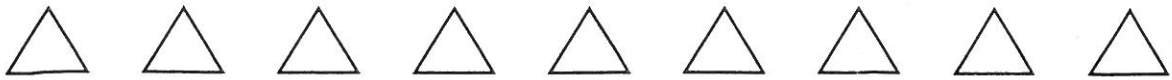
$\frac{\text{Central angle}}{360^\circ} = \frac{\text{arc length}}{\text{Circumference}}$ is B

$\frac{120^\circ}{360^\circ} = \frac{\text{arc length}}{93}$

$\frac{1}{3} = \frac{\text{arc}}{93}$

- F. 31
- G. 31π
- H. $\frac{93}{\pi}$
- J. 213
- K. 11,160

F



41. One of the angles in an isosceles triangle measures 24° . Which of the following is a possible measure for another of the triangle's angles?

DO YOUR FIGURING HERE.

D

- A. 42°
- B. 52°
- C. 66°
- D. 78°
- E. 156°

SINCE 24° is NOT ONE OF THE CHOICES, 24° IS THE VERTEX ANGLE $180 - 24^\circ = 156 \div 2 = 78^\circ$

42. For all real x and m , if $(x - 1)(x + m) = x^2 + kx - m$, then $k = ?$

K

- F. 0
- G. 1
- H. m
- J. $m + 1$
- K. $m - 1$

The K coefficient results from adding the x products together

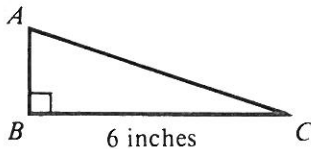
43. If the product of 5 integers is positive, at least how many of these 5 integers must be positive?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

4 of the integers could be negative and one positive and you could still end up with a positive number.

44. In the right triangle below, if $\angle C$ has a sine of $\frac{2}{\sqrt{29}}$, a cosine of $\frac{5}{\sqrt{29}}$, and a tangent of $\frac{2}{5}$, how many inches long is \overline{AB} ?

G



- F. $\frac{2}{5}$
- G. $\frac{12}{5}$
- H. $\frac{12}{\sqrt{29}}$
- J. $\frac{30}{\sqrt{29}}$
- K. 6

The tangent would produce a nice proportion to solve for \overline{AB}

$$\frac{\overline{AB}}{6} = \frac{2}{5} \quad 5(\overline{AB}) = 12$$

$$\overline{AB} = \frac{12}{5}$$

45. A 45-foot wire is cut into 2 pieces whose lengths are in the ratio 2:3. What is the length of the shorter piece, in feet?

C

- A. 9
- B. 15
- C. 18
- D. $22\frac{1}{2}$
- E. 30

With a 2:3 ratio, the shorter to the whole is $\frac{2}{2+3}$ or $\frac{2}{5}$

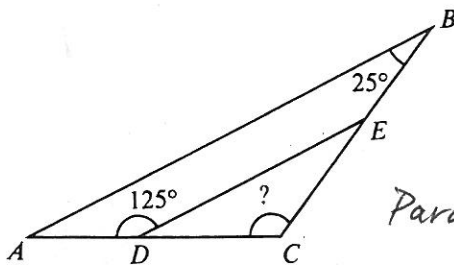
Set up Proportion to solve for 45 feet

$$\frac{2}{5} = \frac{x}{45}$$

$$x = [45(2)] \div 5 = 18$$



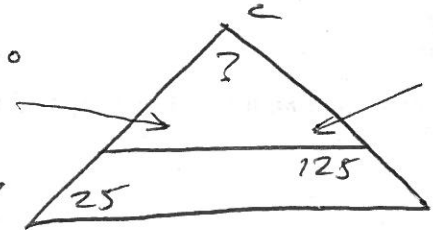
46. For $\triangle ABC$ below, D and E are points on the sides of the triangle. If \overline{AB} is parallel to \overline{DE} , what is the measure of $\angle ACB$?



DO YOUR FIGURING HERE.

Sometimes, this form is easier to deal with

Due to Parallel lines



$$\angle C = 180 - (25^\circ + 125^\circ) = 30^\circ$$

G

- F. 80°
- G. 100°
- H. 125°
- J. 150°
- K. 155°

47. The distance around a circular path is 1,000 meters. Which of the following most nearly approximates the radius of the path, in meters?

(Note: $\pi \approx 3.14$)

$$C = 2\pi r$$

$$1000 = 2\pi r$$

$$\frac{1000}{2\pi} = r \approx 159$$

D

- A. 10
- B. 18
- C. 32
- D. 159
- E. 318

48. What is the value of $(x+2)(x-3)+5$ when $x^2-x-6=-4$?

$$(x+2)(x-3) = x^2 - x - 6 = -4$$

Substitute $(x+2)(x-3)$ with -4

$$(-4) + 5 = 1$$

H

- F. -2
- G. -1
- H. 1
- J. 2
- K. 3

49. Elkville High won a Friday night basketball game by 10 points; the next night they scored 25 points more than on Friday and again won by 10 points. The sum of the opponents' scores for the 2 games was 109. How many points did Elkville score on Friday?

WARNING \Rightarrow TIME WASTER if you don't set up properly.

- A. 37
- B. 41
- C. 46
- D. 52
- E. 72

$$E_1 + E_2 - 109 = 20$$

$$E_1 + E_1 + 25 = 109 \Rightarrow 2E_1 = 154$$

They won by ten both nights $E_2 = E_1 + 25$

D

50. If $x = 3^a$ and $y = 3^{-a}$ then what is y in terms of x ?

Great Logarithm Question

- F. $y = \frac{1}{x}$
- G. $y = -\frac{1}{x}$
- H. $y = \frac{3}{x}$
- J. $y = -x$
- K. $y = x^{-3}$

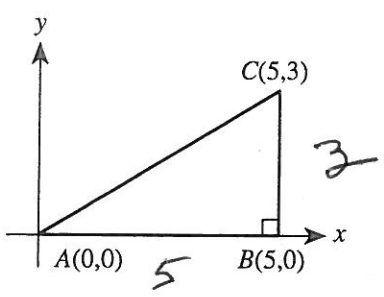
$x = 3^a$ $y = 3^{-a}$
 $\log_3 x = a$ and $\log_3 y = -a$ or $-\log_3 y = a$
 Set the two equal to each other
 $\log_3 x = -\log_3 y$ or $\log_3 x + \log_3 y = 0$
 $\log_3 xy = 0$ becomes $3^0 = xy$ when converted
 $1 = xy \therefore y = \frac{1}{x}$

F

51. In the figure below, what is the sine of $\angle BAC$?

DO YOUR FIGURING HERE.

- A. $\frac{3}{5}$
- B. $\frac{3}{4}$
- C. $\frac{5}{3}$
- D. $\frac{3}{\sqrt{34}}$
- E. $\frac{5}{\sqrt{34}}$



$$3^2 + 5^2 = H^2$$

$$34 = H^2$$

$$\sqrt{34} = H$$

$$S = \frac{O}{H} = \frac{3}{\sqrt{34}}$$

52. While watching TV from 7:00 P.M. to 8:00 P.M., you count 20 commercials, each 30 seconds long. To the nearest percent, what percent of the hour is taken up by commercials?

20 * 30 = 600 seconds of Commercial
 60 MIN. * 60 sec = 3,600 seconds in an hour

- F. 6%
- G. 10%
- H. 17%
- J. 50%
- K. 60%

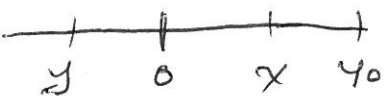
$$\frac{600}{3600} = \frac{1}{6} \approx 17\%$$

53. The sum of the 3 integers x , y , and z is 100. If $0 < x < 40$, and $y < 0$, what is the smallest possible value for z ?

$$x + y + z = 100$$

- A. 58
- B. 59
- C. 60
- D. 61
- E. 62

All numbers are integers. If x were largest integer possible x would be 39
 $39 + y + z = 100$ becomes $y + z = 61$
 y could be -1 so $z = 62$



54. If $(x + m)^2 = x^2 + 12x + n$, where m and n are integers, what is the value of n ?

$x^2 + 2xm + m^2$ is same as $x^2 + 12x + n$
 If $m = 6$, then $n = 6^2 = 36$

- F. 36
- G. 30
- H. 24
- J. 18
- K. 12

Therefore $2xm = 12x$
 $m = 6$

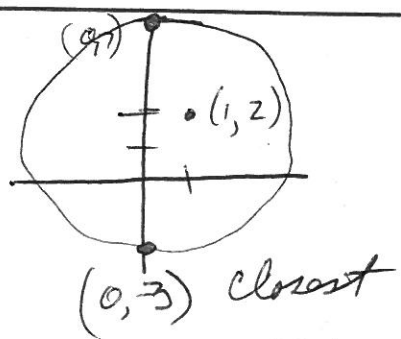
55. What is the length, in coordinate units, of the diameter of a circle whose endpoints have coordinates $(12,3)$ and $(6,-5)$ in the standard (x,y) coordinate plane?

DISTANCE FORMULA

- A. $\sqrt{28}$
- B. $\sqrt{80}$
- C. $\sqrt{82}$
- D. $\sqrt{100}$
- E. $\sqrt{202}$

$$\sqrt{(12-6)^2 + (3-(-5))^2} = \sqrt{36 + 64} = \sqrt{100}$$

56. The circle $(x - 1)^2 + (y - 2)^2 = 26$ intersects the y -axis in two points, one of which is $(0,7)$. At what other point does the circle intersect the y -axis?



- F. $(0,-7)$
- G. $(0,-3)$
- H. $(0,3)$
- J. $(0,\sqrt{26})$
- K. $(7,0)$

eliminate because all points that lie on y -axis have 0 as x value



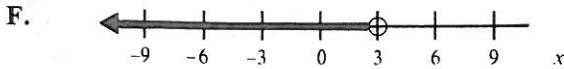
57. If $x + y = 6$, then $x^2 = ?$

DO YOUR FIGURING HERE.

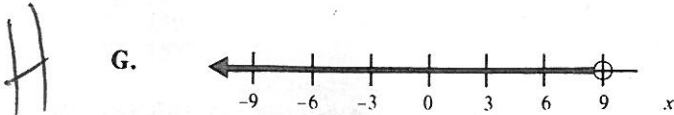
- E
- A. $y^2 - 12y - 36$
 - B. $y^2 - 36$
 - C. $6 - y^2$
 - D. $36 - y^2$
 - E. $36 - 12y + y^2$

$x + y = 6$ therefore $x^2 = (6 - y)^2 = 36 - 12y + y^2$
 $x = 6 - y$

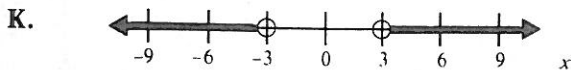
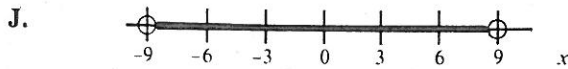
58. Which of the following is the graph of the solution set for $x^2 < 9$?



$x^2 < 9$
 Solving for x
 $\sqrt{x^2} < \sqrt{9}$ $\sqrt{x^2} = |x|$



$|x| < 3$
 split
 $x < 3$ and $-x < 3$
 $x < 3$ and $x > -3$



59. There is a pattern in the units digit of the positive integer powers of each whole number. Some powers of 2 are shown below. What is the units digit of 3^{45} ?

Make similar chart for 3

Powers of 2	Units digit
$2^1 = 2$	2
$2^2 = 4$	4
$2^3 = 8$	8
$2^4 = 16$	6
$2^5 = 32$	2
$2^6 = 64$	4
$2^7 = 128$	8
$2^8 = 256$	6

Powers	Units Digit
3^1	3
3^2	9
3^3	7
3^4	1
3^5	3

B

- A. 1
 B. 3
 C. 5
 D. 7
 E. 9



60. Whenever $\frac{2 \cos \alpha \sin \alpha}{\cos^2 \alpha + 1 - \sin^2 \alpha}$ is defined, it simplifies to:

DO YOUR FIGURING HERE.

F. $\tan \alpha$

G. $\cot \alpha$

H. 2

J. $\frac{2}{\cos \alpha - \sin \alpha}$

K. $\sin \alpha \cos \alpha$

Becomes \rightarrow

$$\frac{2 \cos \alpha \sin \alpha}{\cos^2 \alpha + \cos^2 \alpha} =$$

$$\frac{2 \cos \alpha \sin \alpha}{2 \cos^2 \alpha} =$$

$$\frac{\cos \alpha \sin \alpha}{\cos \alpha \cos \alpha} =$$

$$\frac{\sin \alpha}{\cos \alpha} = \tan \alpha$$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.