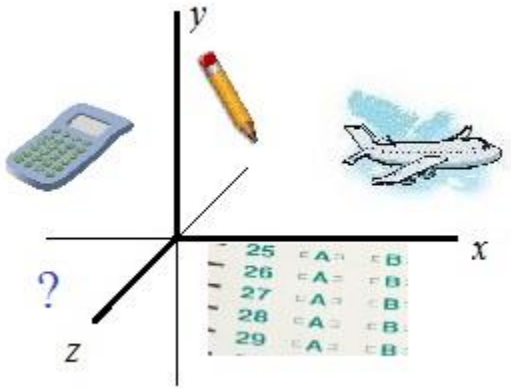
SAT Practice Test 3

20 Multiple choice questions (and, detailed solutions)



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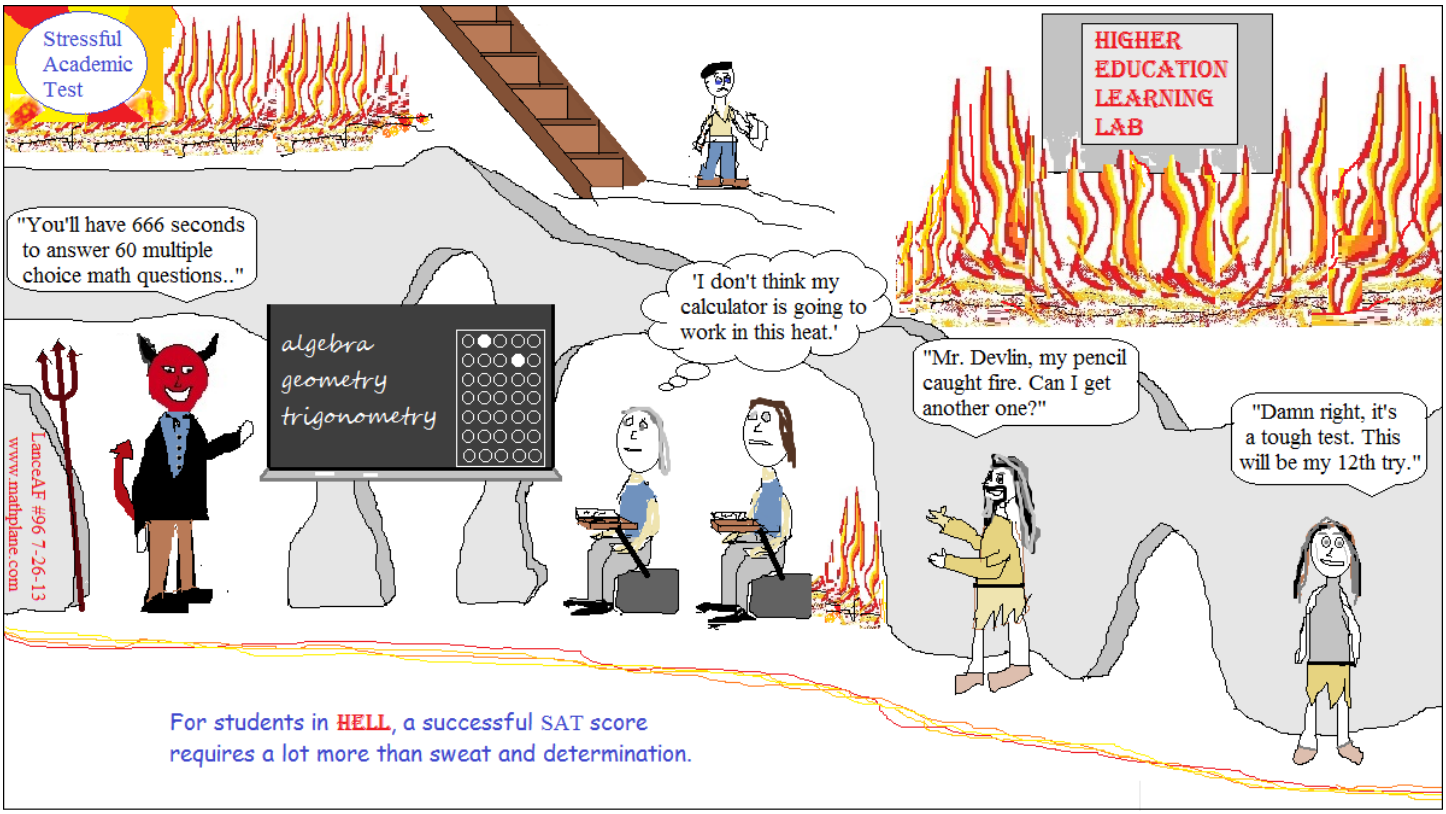
Topics include Pythagorean Theorem, ratios, word problems, linear equations, radicals, and more.



Questions -→

(Try to answer in 25 minutes)

SAT Practice Test 3

1) What is X?

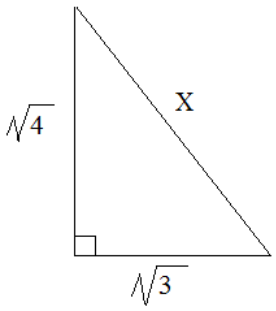
a) $\sqrt{5}$

b) 5

c) $\sqrt{7}$

d) 7

e) 11



2) A vertical yardstick casts a 2 foot shadow.
A nearby tree casts a 20 foot shadow. How tall is the tree?

a) 6 2/3 feet

b) 10 feet

c) 15 feet

d) 30 feet

e) 60 feet

3) Find the ratio of the area of the *smaller figure to the larger figure.*

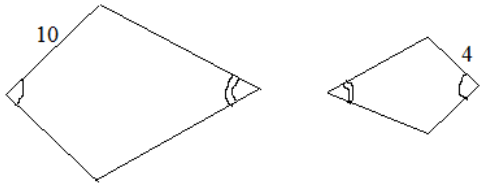
a) 5:2

b) 2:5

c) 4:25

d) 100:16

e) 2: $\sqrt{10}$



4) Given a square pyramid with a base perimeter of 40 and altitude 12.
What is the diagonal of the base?

a) $5\sqrt{2}$

b) 8

c) $10\sqrt{2}$

d) 13

e) 240

5) Jack traveled through D to get from F to B.
How much shorter is the direct route versus the route he took?

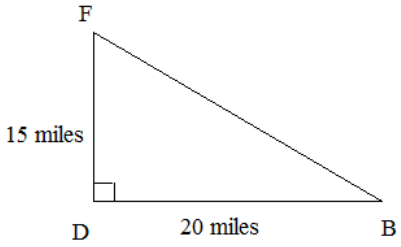
a) 5

b) 10

c) 15

d) 20

e) 25



6) A box has 50 A's, 50 B's, and 50 C's.
How many ways can you choose 3 letters?
(Note: Order does not matter)

a) 3
b) 9
c) 10
d) 12
e) 27

7) The sum of the first 20 integers is 210.
What is the sum of the first 40 integers?

a) 210^2
b) 420
c) 820
d) 840
e) 8400

8) In a restaurant, there are 12 booths that seat up to 4 people each. If 25 people are seated in the restaurant, and there are NO empty booths, what is the *maximum* number possible of filled booths?

a) 2
b) 3
c) 4
d) 5
e) 6

9) A wall is 8 feet high and 16 feet long.
We want to tile the wall with 4 inch x 4 inch square tiles.

How many tiles do we need to cover the rectangular wall?
(Assume there are no gaps between tiles and no broken tiles!)

a) 96
b) 256
c) 374
d) 512
e) 1152

10) Speedy drove 240 miles in 6 hours. If he drove 20 miles per hour faster, how many hours could he have saved?

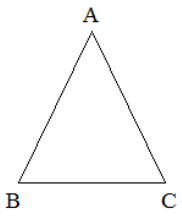
a) 1/2
b) 1
c) 2
d) 2 1/2
e) 4

11) There are 2 bottles of catsup on the dining room table.
Bottle A is small and 1/2 full. Bottle B is twice as large and 1/4 full.
If you pour the remainder of Bottle A into Bottle B, how full will Bottle B be?

a) 1/4
b) 3/8
c) 1/2
d) 5/8
e) 3/4

12) For triangle ABC, $\overline{AB} = \overline{BC}$

Which statement MUST be true?



a) $\angle ABC \cong \angle ACB$
b) $\angle ABC \ncong \angle ACB$
c) $\overline{AC} \neq \overline{AB}$
d) $\overline{AC} = \overline{AB}$
e) $\angle BCA \cong \angle CAB$

13) $C = 3A - 2B - 5$

If A increases by 2 and B decreases by 3,
then C:

a) remains the same
b) decreases by 1
c) increases by 6
d) decreases by 5
e) increases by 12

14) What is the sum of the y-intercept and the slope of $4x - 8y = 6$?

a) -2
b) -1/2
c) -1/4
d) 2
e) 6

15) What is the equation of a line perpendicular to $x = 2$ and goes through (-1, 4)?

a) $y = 2$
b) $x = -1$
c) $y = 4$
d) $x = 4$
e) $y = -1$

16) Which equation creates an infinite number of solutions when solved for a system with $y = 8x - 9$?

a) $y = 9x - 8$

b) $3y - 24x = -36$

c) $4y + 24x = -27$

d) $4y - 32x = -36$

e) $2y + 16x = -18$

17) If you shifted $y = 3x + 6$ five units to the right, what would the new linear equation be?

a) $y = 3x + 11$

b) $y = 8x + 6$

c) $y = 3x + 1$

d) $y = 3x - 9$

e) $y = 8x + 11$

18) $\sqrt{45} + 2\sqrt{20} + \frac{1}{2}\sqrt{500} =$

a) $12\sqrt{5}$

b) $\frac{5}{2}\sqrt{565}$

c) $67\sqrt{5}$

d) $12\sqrt{15}$

e) $30\sqrt{3}$

19) Simplify $\frac{5\sqrt{6}}{2\sqrt{3}}$

a) 5

b) 5/2

c) $5\sqrt{2}$

d) $\frac{5\sqrt{2}}{3}$

e) $\frac{5\sqrt{2}}{2}$

20) Solve for x: $x^2 - 3x = 10x$

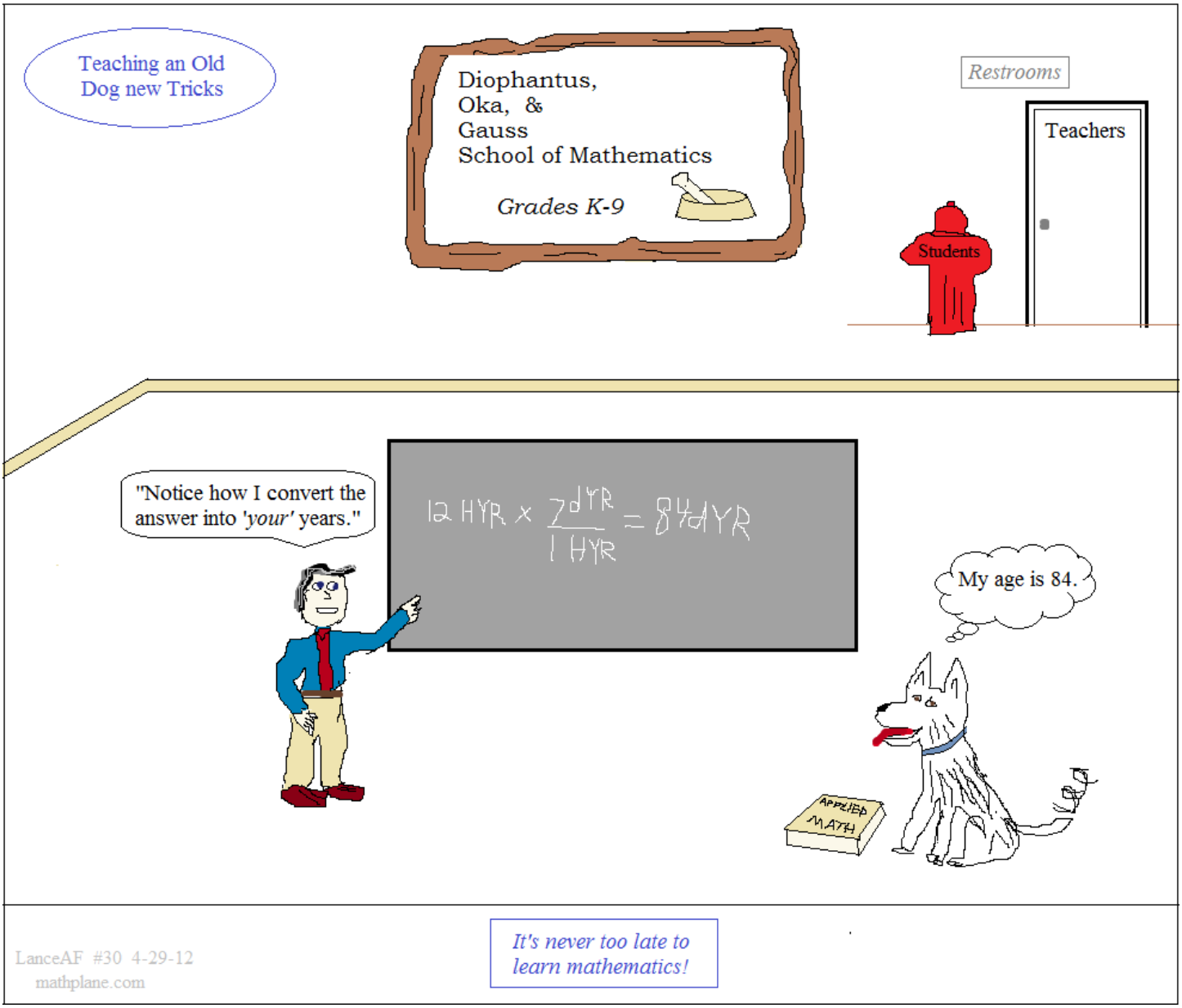
a) $\sqrt{13}$

b) 13

c) 0, 13

d) 7

e) -7, 7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Diophantus, Oka, & Gauss School of Mathematics
Grades K-9
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Teachers
Students
"Notice how I convert the answer into 'your' years."
12 HYR x 7 dYR / 1 HYR = 84 dYR
My age is 84.
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Solutions -→

SAT Practice Test 3

SOLUTIONS

1) What is X?

a) $\sqrt{5}$

b) 5

c) $\sqrt{7}$

d) 7

e) 11

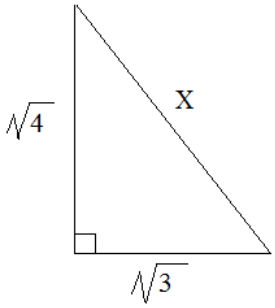
This is not a 3-4-5 Pythagorean Triple!

$a^2 + b^2 = c^2$

$(\sqrt{3})^2 + (\sqrt{4})^2 = c^2$

$7 = c^2$

$c = \sqrt{7}$



2) A vertical yardstick casts a 2 foot shadow.
A nearby tree casts a 20 foot shadow. How tall is the tree?

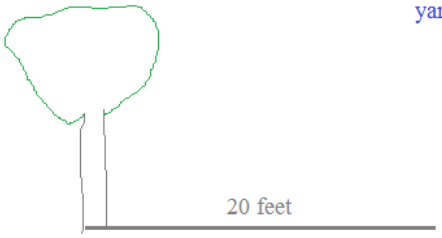
a) 6 2/3 feet

b) 10 feet

c) 15 feet

d) 30 feet

e) 60 feet



yardstick is 3 feet...

$\frac{3 \text{ feet}}{2 \text{ feet}} = \frac{\text{tree}}{20 \text{ feet}}$

tree is 30 feet

3) Find the ratio of the area of the *smaller figure to the larger figure.*

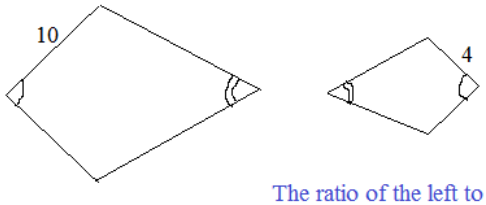
a) 5:2

b) 2:5

c) 4:25

d) 100:16

e) 2: $\sqrt{10}$



Since ratio of sides is 2:5, then the ratio of the areas is

$2^2 : 5^2$

The ratio of the left to right (bigger to smaller) is 10:4
BUT, the ratio of the 'smaller to bigger' is 4:10 or 2:5

4) Given a square pyramid with a base perimeter of 40 and altitude 12.
What is the diagonal of the base?

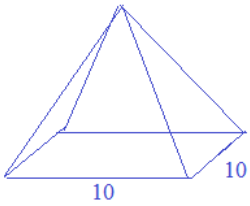
a) $5\sqrt{2}$

b) 8

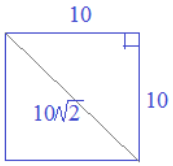
c) $10\sqrt{2}$

d) 13

e) 240



(note: the altitude is irrelevant!)



5) Jack traveled through D to get from F to B.
How much shorter is the direct route versus the route he took?

a) 5

b) 10

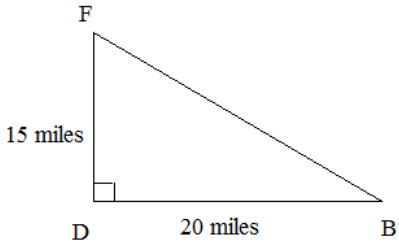
c) 15

d) 20

e) 25

The distance from F to B (directly) is 25 miles...

Since the long way is 35 miles, the short-cut is 10 miles less!



SAT Practice Test 3

6) A box has 50 A's, 50 B's, and 50 C's.
How many ways can you choose 3 letters?
(Note: Order does not matter)

a) 3
b) 9
c) 10
d) 12
e) 27

3 A's
3 B's
3 C's

2 A's 1 B
2 A's 1 C
2 B's 1 A
2 B's 1 C
2 C's 1 A
2 C's 1 B

1 A 1 B 1 C

Ten different outcomes...

SOLUTIONS

7) The sum of the first 20 integers is 210.
What is the sum of the first 40 integers?

a) 210^2
b) 420
c) 820
d) 840
e) 8400

method 1:

41

1 + 2 + 3 + ... + 38 + 39 + 40

41

41 in each 'pair'

$\frac{40}{2}$ = 20 'pairs' 20 x 41 = 820

method 2:

1 - 20: 210

21 - 40: 20 20 20 20 20 ... 20 20 400 (20 x 20)

1 2 3 4 5 ... 19 20 210 (sum of 1 - 20)

8) In a restaurant, there are 12 booths that seat up to 4 people each. If 25 people are seated in the restaurant, and there are NO empty booths, what is the *maximum* number possible of filled booths?

a) 2
b) 3
c) 4
d) 5
e) 6

4 4 4 4 16 people...

9 left...

2 1 1 1

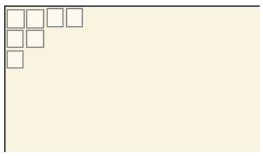
1 1 1 1

If there were 5 filled booths, then there would be 5 people remaining and 7 booths --- i.e. empty boots..

9) A wall is 8 feet high and 16 feet long.
We want to tile the wall with 4 inch x 4 inch square tiles.

How many tiles do we need to cover the rectangular wall?
(Assume there are no gaps between tiles and no broken tiles!)

a) 96
b) 256
c) 374
d) 512
e) 1152



First, convert the units from feet to inches...

8 feet = 96 inches
16 feet = 192 inches

Then, determine the area of the wall (in square inches)....

96 inches x 192 inches = 18432 square inches...

Since each tile is 16 square inches, we'll need 18,432/16 = 1152 tiles

10) Speedy drove 240 miles in 6 hours. If he drove 20 miles per hour faster, how many hours could he have saved?

a) 1/2
b) 1
c) 2
d) 2 1/2
e) 4

distance = rate x time
240 miles = rate x 6 hours
rate = 40 mph..

20mph faster ----> rate = 60mph
distance = rate x time
240 miles = 60mph x time
time = 4 hours

6 hours to 4 hours is saving 2 hours

SOLUTIONS

11) There are 2 bottles of catsup on the dining room table.
Bottle A is small and 1/2 full. Bottle B is twice as large and 1/4 full.
If you pour the remainder of Bottle A into Bottle B, how full will Bottle B be?

a) 1/4
b) 3/8
c) 1/2
d) 5/8
e) 3/4

For ease, we'll quantify both bottles...

Assume bottle A is 16 oz and bottle B is 32 oz...

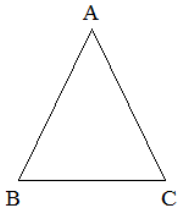
Since bottle A is 1/2 full, it contains 8 oz...
bottle B is 1/4 full, so it contains 8 oz..

When you pour the remainder of A into B, you'll have 16 total oz in bottle B...

16oz out of 32oz is 1/2 full!

12) For triangle ABC, $\overline{AB} = \overline{BC}$

Which statement MUST be true?

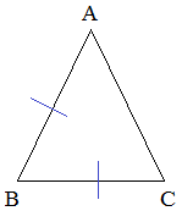


a) $\angle ABC \cong \angle ACB$
b) $\angle ABC \ncong \angle ACB$
c) $\overline{AC} \neq \overline{AB}$
d) $\overline{AC} = \overline{AB}$
e) $\angle BCA \cong \angle CAB$

Note: The shape of the triangle in the diagram isn't drawn to scale...

If triangle is equilateral, then AC = AB = BC..
If triangle is isosceles, then AC ≠ AB

Therefore, the ONLY statement that MUST be true is e)
(If sides are congruent, then their opposite angles are congruent)



13) C = 3A − 2B − 5

If A increases by 2 and B decreases by 3, then C:

a) remains the same
b) decreases by 1
c) increases by 6
d) decreases by 5
e) increases by 12

general approach:

C = 3A - 2B - 5

increase A by 2; decrease B by 3:

3(A + 2) - 2(B - 3) - 5

3A + 6 - 2B + 6 - 5

then, substitution: C + 12

try a number:

let A = 3 and B = 4

C = 3(3) - 2(4) - 5 = -4

then, let A = 5 and B = 1

C = 3(5) - 2(1) - 5 = 8

an increase of 12!

14) What is the sum of the y-intercept and the slope of 4x − 8y = 6 ?

a) -2
b) -1/2
c) -1/4
d) 2
e) 6

The y-intercept occurs when x = 0...
y-intercept is (0, -3/4)

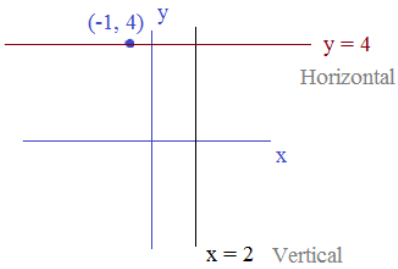
then, to find the slope: -8y = -4x + 6
y = (1/2)x - 3/4
slope is 1/2

the sum of slope and y-intercept

1/2 + (-3/4) = -1/4

15) What is the equation of a line perpendicular to x = 2 and goes through (-1, 4)?

a) y = 2
b) x = -1
c) y = 4
d) x = 4
e) y = -1



16) Which equation creates an infinite number of solutions when solved for a system with y = 8x - 9 ?

SOLUTIONS

a) y = 9x - 8 — slope is 9 NO

b) 3y - 24x = -36 — slope is 8, but intercept is -12 NO

c) 4y + 24x = -27 — slope is -6 NO

d) 4y - 32x = -36 — slope is 8, intercept is -9 YES (this is the same equation)

e) 2y + 16x = -18 — y + 8x = -9 ⟶ y = -8x - 9 close, but NO

17) If you shifted y = 3x + 6 five units to the right, what would the new linear equation be?

a) y = 3x + 11

b) y = 8x + 6

c) y = 3x + 1

d) y = 3x − 9

e) y = 8x + 11

Since the entire line is shifted, the slope is the SAME... slope is 3

If the line is shifted 5 units to the right, then presumably, the x-intercept would move 5 units to the right...

original x-intercept is (-2, 0)... Then, new x-intercept is (3, 0)

therefore, equation is y - 0 = 3(x - 3) or y = 3x - 9

18) $\sqrt{45} + 2\sqrt{20} + \frac{1}{2}\sqrt{500} =$

a) $12\sqrt{5}$

b) $\frac{5}{2}\sqrt{565}$

c) $67\sqrt{5}$

d) $12\sqrt{15}$

e) $30\sqrt{3}$

$\sqrt{5 \cdot 9} + 2\sqrt{5 \cdot 4} + \frac{1}{2}\sqrt{5 \cdot 100}$

$\sqrt{5} \cdot \sqrt{9} + 2 \cdot \sqrt{5} \cdot \sqrt{4} + \frac{1}{2} \cdot \sqrt{5} \cdot \sqrt{100}$

$\sqrt{5} \cdot 3 + 2 \cdot \sqrt{5} \cdot 2 + \frac{1}{2} \cdot \sqrt{5} \cdot 10$

$3\sqrt{5} + 4\sqrt{5} + 5\sqrt{5}$

$12\sqrt{5}$

19) Simplify $\frac{5\sqrt{6}}{2\sqrt{3}}$

a) 5

b) 5/2

c) $5\sqrt{2}$

d) $\frac{5\sqrt{2}}{3}$

e) $\frac{5\sqrt{2}}{2}$

$\frac{5\sqrt{6}}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{18}}{2\sqrt{9}} =$

$\frac{5\sqrt{2 \cdot 9}}{2 \cdot 3} = \frac{15\sqrt{2}}{6} = \frac{5\sqrt{2}}{2}$

20) Solve for x: $x^2 - 3x = 10x$

a) $\sqrt{13}$

b) 13

c) 0, 13

d) 7

e) -7, 7

Collect "like terms" $x^2 - 13x = 0$

GCF (DO NOT divide by x) $x(x - 13) = 0$

$x = 0$ and 13

So, how did you do? Want more test prep questions?

1) When x = 4 and y = −3, the value of $2x^2 - 2y$ is

a) 10
b) 22
c) 26
d) 38
e) 54

2) A car gets 30 miles p
how much will it cos

a) $177
b) $269
c) $299
d) $508
e) $538

3) Find the greatest common factor of 36, 84, and 132.

a) 2
b) 4

200 SAT/ACT Math Practice Questions

(and, Solutions)

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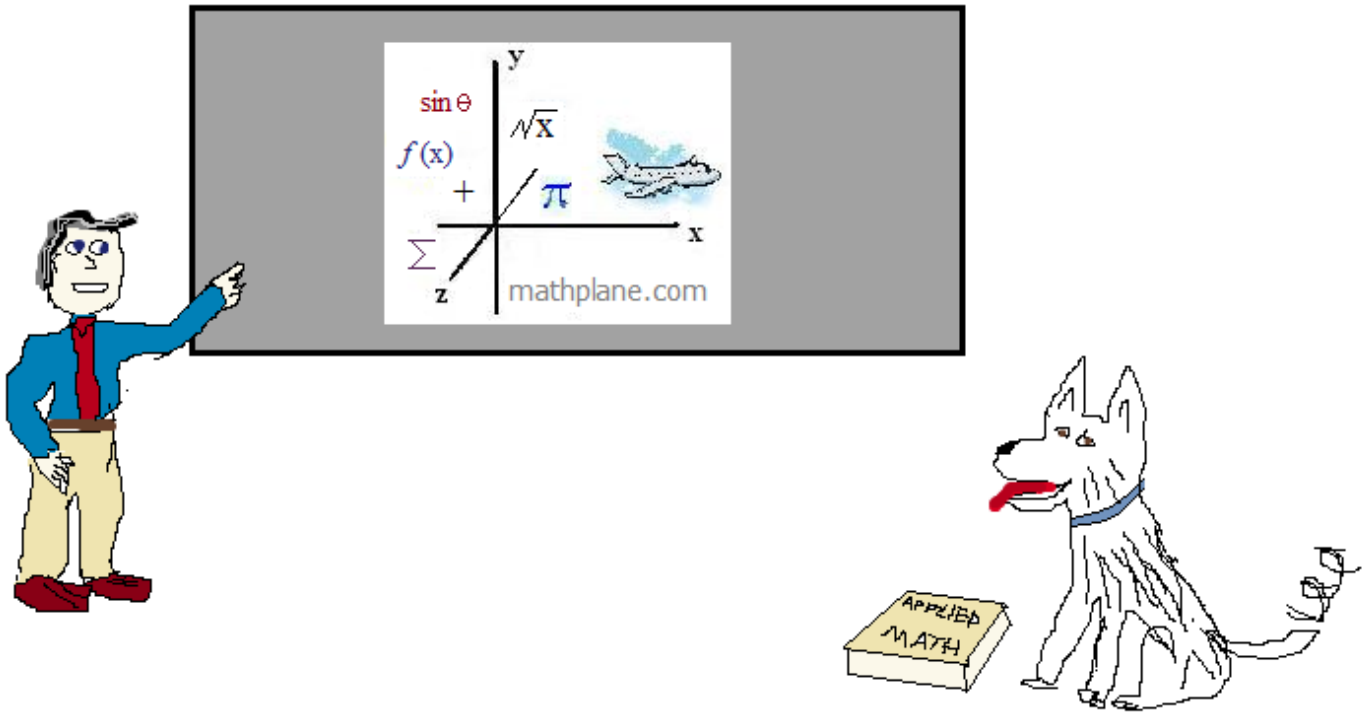

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