

1) In a geometric sequence, the 2nd term is 12 and the 4th term is 3.
The seventh term is

- a) $-13/2$
- b) -6
- c) $3/8$
- d) $1/2$
- e) $3/4$

2) A car gets 30 miles per gallon. How much will it cost to drive 1000 miles?

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

3) How many different 4-person committees can be selected from a 10-member club?

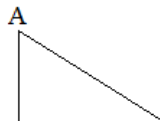
- a) 40
- b) 210
- c) 400
- d) 1260
- e) 5040

4) The length of a rectangle is 3 more than twice the width. Which gives the perimeter (p) of the rectangle in terms of the width (w)?

- a) $p = w(2w + 3)$
- b) $p = w(2w - 3)$
- c) $p = 3w + 3$
- d) $p = 3w - 3$
- e) $p = 2(3w + 3)$

5) If the tangent of angle A is $1/3$, what is the length of the hypotenuse?

- a) 2
- b) $2\sqrt{10}$
- c) 8



200 (MORE) SAT/ACT Math Practice Questions (and, Solutions)

by Lance Friedman

PREVIEW/SAMPLE

200 (*MORE*) SAT/ACT Math Questions (and, Solutions)

Introduction

Three key aspects of a standardized test are knowledge of content, time management, and accuracy. The following practice quizzes will address all 3 aspects and likely improve your scores.

1) *Content* – The questions are composed from algebra, geometry, and basic trigonometry. Also, there are analytical problems, statistics, and modeling. You may discover specific math subjects you need to review or relearn. (**Note: Some of the questions are difficult and meant to challenge you. Don't get discouraged!). Solutions follow each test.

2) *Time Management* – Each section is 20-34 questions and should be completed at a rate of 1 minute per question. (e.g. if the quiz is 20 questions, try to complete the quiz in 20 minutes or less). Practice working with a time limit. (**Suggestion: Do the easy questions first! Skip the time-consuming, difficult problems – save them for later.)

3) *Accuracy* – Read the questions carefully!

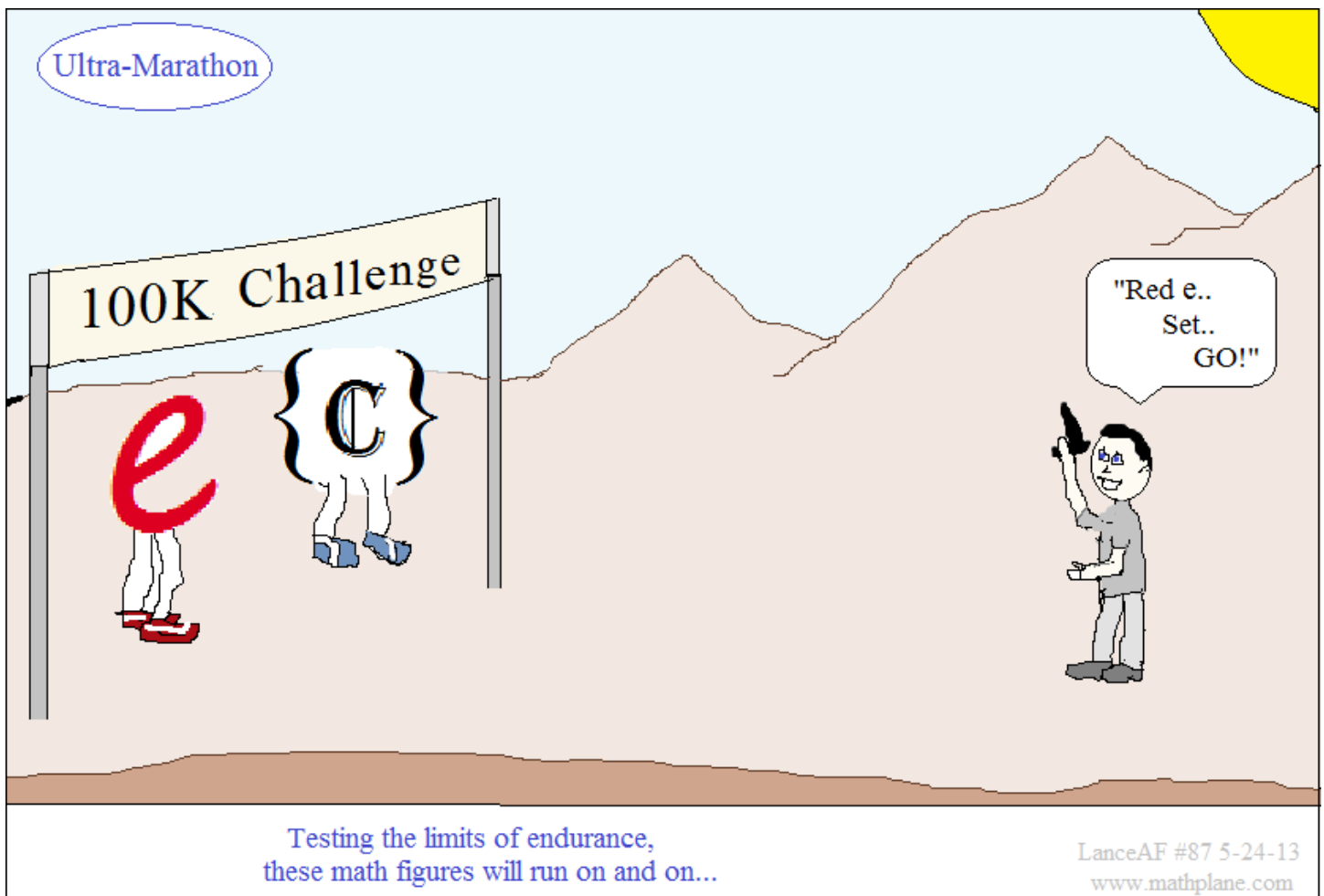
Best of luck!

Lance

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1) If $x = 3$ and $y = -1$, then how much does $2x + 3y^2$ exceed $x - y$?

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

2) What is the greatest common factor (GCF) of 32, 80, and 96?

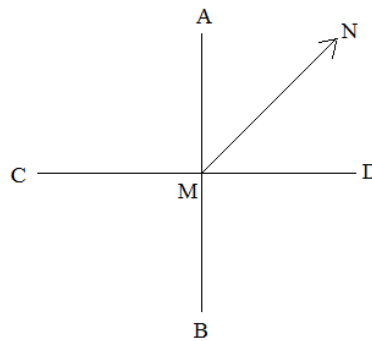
- a) 2
- b) 4
- c) 8
- d) 16
- e) 32

3) $\overline{AB} \perp \overline{CD}$

\overrightarrow{MN} bisects $\angle AMD$

Which statement is NOT true?

- a) $\angle AMN \cong \angle DMN$
- b) $\angle CMB$ is a right angle
- c) $\angle AMN$ and $\angle DMN$ are supplementary angles
- d) $m\angle AMN = \frac{1}{2} m\angle CMB$
- e) $m\angle AMC = 90^\circ$



4) The x-intercept of a line that passes through $(5, 7)$ and has slope 2 is

- a) -3
- b) $3/2$
- c) 0
- d) 1
- e) 5

5) Find the mean and median of: 8, -6, -4, 2

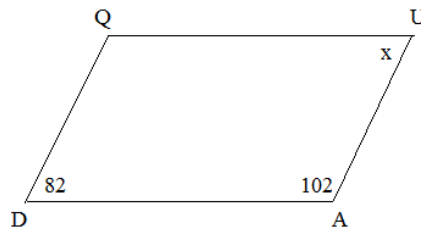
- a) mean: -5 median: -5
- b) mean: 0 median: -5
- c) mean: 0 median: -1
- d) mean: 0 median: 1
- e) mean: -5 median: 0

- 6) A rectangular prism has a length 5 inches greater than the width and a height that is 3 inches less than the width. What is the volume of the prism in terms of width (w)?

- a) $V = w^3 + 2w^2 - 15w$
- b) $V = w^3 - 2w^2 - 15w$
- c) $V = 3w + 2$
- d) $V = 3w - 2$
- e) $V = 3w^3 + 5$

- 7) If \overline{QU} and \overline{AD} are parallel, then what is x ?

- a) 78
- b) 82
- c) 98
- d) 102
- e) QU and AD cannot be parallel



- 8) The fifth term in the sequence $8/9, 4/3, 2, \dots$ is

- a) $1/2$
- b) $3/4$
- c) $8/9$
- d) 3
- e) $9/2$

- 9) $|-5 + 3| - |-8| =$

- a) -6
- b) 0
- c) 6
- d) 10
- e) 16

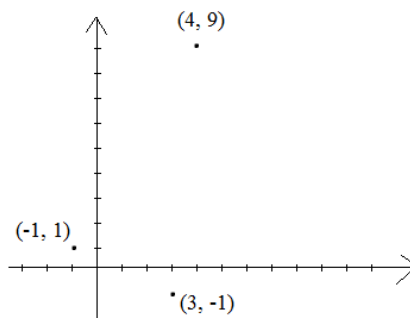
- 10) A cell phone company charges \$15 for the first 1000 text messages. Then, it charges 10 cents for each additional text.

If the bill is \$48.50, how many text messages were sent?

- a) 335
- b) 485
- c) 515
- d) 1335
- e) 1485

11) In the standard xy -coordinate plane below, 3 of the vertices of a rectangle are shown. Which of these is the 4th vertex of the rectangle?

- a) (6, 7)
- b) (6, 8)
- c) (7, 8)
- d) (8, 6)
- e) (8, 7)



12) If the solution of $2x - 3y = 7$ is (a, b) , what is $\frac{b}{a}$?

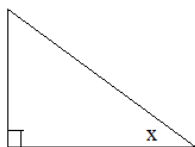
- a) $\frac{1}{5}$
- b) $\frac{1}{3}$
- c) 1
- d) 3
- e) 5

13) Find $4i(3 - 6i)$ Note: $i = \sqrt{-1}$

- a) $12i + 24$
- b) $12i - 24$
- c) $24 - 12i$
- d) $12 + 24i$
- e) $12 - 24i$

14) If $\sin x = \frac{3}{5}$, what is $\tan x$?

- a) $\frac{2}{5}$
- b) $\frac{5}{3}$
- c) $\frac{4}{5}$
- d) $\frac{3}{4}$
- e) $\frac{3}{2}$

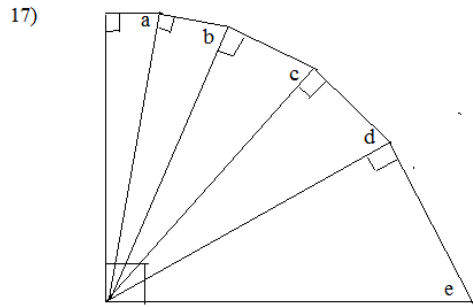


15) $\frac{1}{9^{-2}} =$

- a) 81
- b) -81
- c) 18
- d) $-\frac{1}{81}$
- e) $\frac{1}{81}$

- 16) $f(x) = -3x$
 $g(x) = -x + 4$ What is $(g \circ f)(x)$?

- a) $3x - 4$
- b) $-3x - 4$
- c) $3x + 4$
- d) $3x^2 + 4$
- e) $-3x^2 + 4$



- a) 180
- b) 240
- c) 270
- d) 360
- e) 450

$a + b + c + d + e = ?$

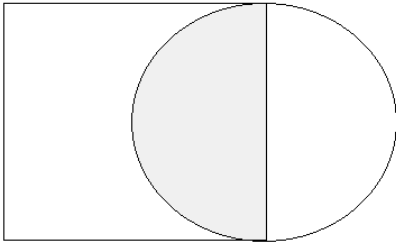
- 18) If p percent of 300 is 60,
 what is 40% of p ?

- a) 4
- b) 5
- c) 8
- d) 16
- e) 20

- 19) A bacterial culture contains 1000 bacteria initially.
 If it triples every 4 days, write a model representing
 the bacteria count (t) days from now.

- a) $B(t) = 1000(3)^t$
- b) $B(t) = 1000(3)^{4t}$
- c) $B(t) = 1000(3)^{t/4}$
- d) $B(t) = 3 \cdot (1000)^{4t}$
- e) $B(t) = 4 \cdot (1000)^{3t}$

- 20) If the area of the square is 64 square feet, what is the shaded area?



- a) 4π
- b) 8π
- c) 16π
- d) 32π
- e) 64π

- 21) The mean of 5 numbers is 20. If one number is removed, the mean is 18. Which number was removed?

- a) 20
- b) 22
- c) 24
- d) 26
- e) 28

22) $\frac{6 + 6\sqrt{7}}{6} =$

- a) $\sqrt{7}$
- b) $1 + 6\sqrt{7}$
- c) $1 + \sqrt{7}$
- d) $6 + \sqrt{7}$
- e) $6\sqrt{7}$

23) $x^2 - y^2 = 36$

$x - y = 4$

What is y?

- a) 2
- b) 2.5
- c) 6
- d) 6.5
- e) 9

- 24) What is the value of $6 + 8 \div 2 - 4 \times 5$?

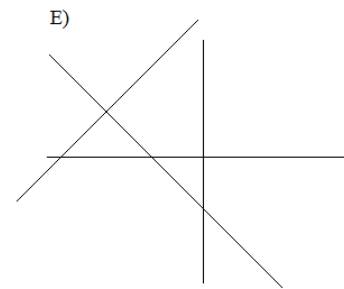
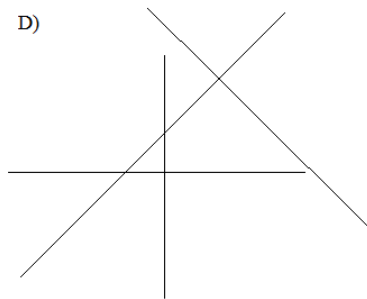
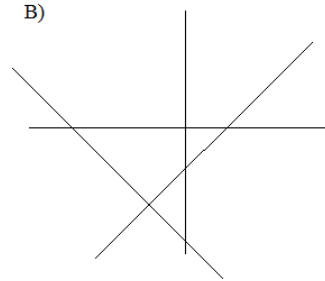
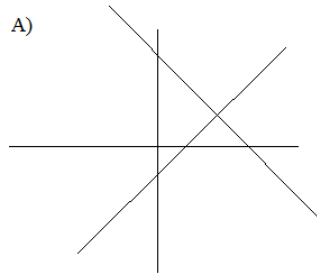
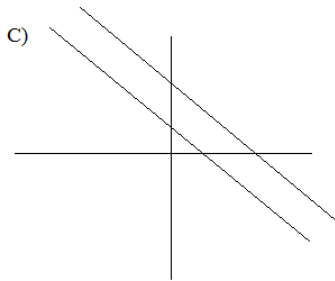
- a) -13
- b) -10
- c) 6
- d) 15
- e) 40

25) If $\log_x \left(\frac{1}{9} \right) = -\frac{2}{3}$

- a) -9
- b) -6
- c) 3
- d) 6
- e) 27

26) Which graph best represents the system

$$\begin{aligned} x + y &= 3 \\ x - y &= 1 \end{aligned}$$



27) $\frac{10!}{2!8!} =$

- a) 5/8
- b) 1
- c) 45
- d) 90
- e) 120

28) 0.0003405 is expressed as 3.405×10^n

$n = ?$

- a) -5
- b) -4
- c) -3
- d) 4
- e) 5

SOLUTIONS

1) If $x = 3$ and $y = -1$, then how much does $2x + 3y^2$ exceed $x - y$?

- a) 1
 - b) 2
 - c) 3
 - d) 4
 - e) 5
- $$2(3) + 3 \cdot (-1)^2 \qquad (3) - (-1)$$
- $$6 + 3 \cdot 1 \qquad 3 + 1$$
- $$9 \qquad 4$$
- $$9 - 4 = 5$$

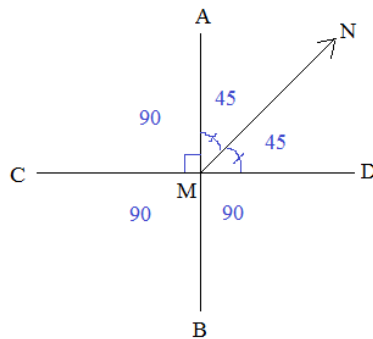
2) What is the greatest common factor (GCF) of 32, 80, and 96?

- a) 2
 - b) 4
 - c) 8
 - d) 16
 - e) 32
- Factors of 32: 1, 2, 4, 8, 16, 32
- Factors of 80: 1, 2, 4, 5, 8, 10, 16, 20, 40, 80
- Factors of 96: 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96
- common factors: 1, 2, 4, 8, 16
 GREATEST common factor: 16

3) $\overline{AB} \perp \overline{CD}$
 \overrightarrow{MN} bisects $\angle AMD$

Which statement is NOT true?

- a) $\angle AMN \cong \angle DMN$
- b) $\angle CMB$ is a right angle False
- c) $\angle AMN$ and $\angle DMN$ are supplementary angles
- d) $m\angle AMN = \frac{1}{2} m\angle CMB$
- e) $m\angle AMC = 90^\circ$



Angles AMN and DMN are not supplementary... They are complementary...

4) The x-intercept of a line that passes through (5, 7) and has slope 2 is

- a) -3
 - b) 3/2
 - c) 0
 - d) 1
 - e) 5
- $$y = mx + b$$
- $$y = 2x - 3$$
- $$7 = 2(5) + b$$
- the x-intercept occurs when $y = 0$.
- $$b = -3$$
- $$0 = 2x - 3$$
- $$x = 3/2$$

5) Find the mean and median of: 8, -6, -4, 2

- a) mean: -5 median: -5
- b) mean: 0 median: -5
- c) mean: 0 median: -1
- d) mean: 0 median: 1
- e) mean: -5 median: 0

The mean is the "average": $\frac{8 + (-6) + (-4) + 2}{4} = \frac{0}{4} = 0$

The median is the "middle term":

in ascending order: -6, -4, 2, 8
 since there is an even number of terms, take the average of the middle terms

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

SOLUTIONS

- 6) A rectangular prism has a length 5 inches greater than the width and a height that is 3 inches less than the width. What is the volume of the prism in terms of width (w)?

a) $V = w^3 + 2w^2 - 15w$

b) $V = w^3 - 2w^2 - 15w$

c) $V = 3w + 2$

d) $V = 3w - 2$

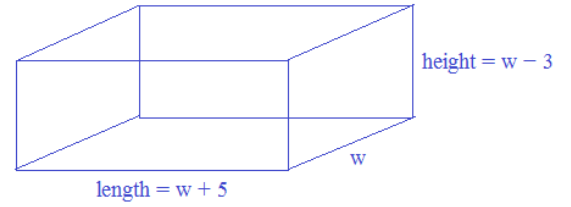
e) $V = 3w^3 + 5$

Volume = $(w + 5)(w)(w - 3)$

$(w + 5)(w - 3) =$
 $w^2 + 5w - 3w - 15 =$
 $w^2 + 2w - 15$

then multiply by w:
 $w^3 + 2w^2 - 15w$

Volume = $(l)(w)(h)$



- 7) If \overline{QU} and \overline{AD} are parallel, then what is x?

a) 78

b) 82

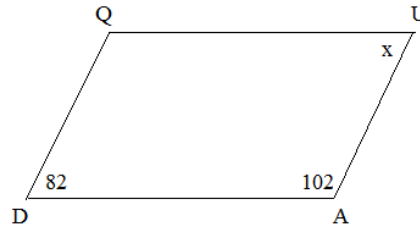
c) 98

d) 102

e) QU and AD cannot be parallel

If QU and AD are parallel, then same side interior angles must be supplementary.. angles U and A must add up to 180 degrees..

$x = 78$



Note: if QU and AD are parallel, then QUAD is a trapezoid and, angle Q is 98 degrees

- 8) The fifth term in the sequence $8/9, 4/3, 2, \dots$ is

a) $1/2$

b) $3/4$

c) $8/9$

d) 3

e) $9/2$

This is a geometric sequence with common ratio $3/2$

$\frac{8}{9} \times \frac{3}{2} = \frac{4}{3}$ second term

$\frac{4}{3} \times \frac{3}{2} = 2$ third term

$2 \times \frac{3}{2} = 3$ fourth term

$3 \times \frac{3}{2} = \frac{9}{2}$

- 9) $|-5 + 3| - |-8| =$

a) -6

b) 0

c) 6

d) 10

e) 16

$|-2| - |-8| = 2 - 8 = -6$

- 10) A cell phone company charges \$15 for the first 1000 text messages. Then, it charges 10 cents for each additional text.

If the bill is \$48.50, how many text messages were sent?

a) 335

b) 485

c) 515

d) 1335

e) 1485

Let T = # of additional texts

$\$15 + \$.10(T) = \$48.50$

$\$.10(T) = \33.50

$T = 335$

So, the total texts = first 1000 + additional texts

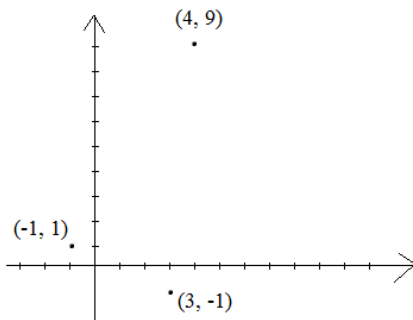
$= 1000 + 335$

$= 1335$

SOLUTIONS

11) In the standard xy-coordinate plane below, 3 of the vertices of a rectangle are shown. Which of these is the 4th vertex of the rectangle?

- a) (6, 7)
- b) (6, 8)
- c) (7, 8)
- d) (8, 6)
- e) (8, 7)



Using slope/distance,
 (-1, 1) --> (3, -1)
 4 units to the right and 2 units down..
 therefore, (4, 9) ---> (x, y)
 4 units to the right and 2 units down..
(8, 7)

12) If the solution of $2x - 3y = 7$ is (a, b), what is $\frac{b}{a}$?

- a) 1/5
- b) 1/3
- c) 1
- d) 3
- e) 5

Using substitution: $2x - 3(3x - 14) = 7$
 $2x - 9x + 42 = 7$
 $-7x = -35$
 $x = 5$
 then, since $x = 5$, $y = 3(5) - 14$
 $y = 1$

solution is (5, 1); so, b/a = 1/5

13) Find $4i(3 - 6i)$ Note: $i = \sqrt{-1}$

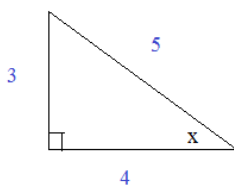
- a) $12i + 24$
- b) $12i - 24$
- c) $24 - 12i$
- d) $12 + 24i$
- e) $12 - 24i$

$12i - 24i^2$
 $12i - 24(-1)$
12i + 24

14) If $\sin x = \frac{3}{5}$, what is $\tan x$?

- a) 2/5
- b) 5/3
- c) 4/5
- d) 3/4
- e) 3/2

$\frac{3}{4}$



$\sin = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{3}{5}$ 3-4-5 pythagorean triple
 $\tan = \frac{\text{opposite}}{\text{adjacent}} = \frac{3}{4}$

15) $\frac{1}{9^{-2}} =$

- a) 81
- b) -81
- c) 18
- d) -1/81
- e) 1/81

$\frac{1}{\frac{1}{81}} =$ 81

- 16) $f(x) = -3x$
 $g(x) = -x + 4$ What is $(g \circ f)(x)$?

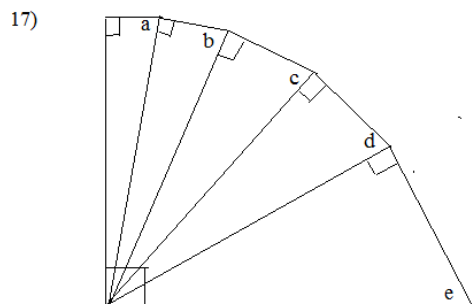
SOLUTIONS

- a) $3x - 4$
- b) $-3x - 4$
- c) $3x + 4$**
- d) $3x^2 + 4$
- e) $-3x^2 + 4$

$$f(x) = -3x$$

$$g(f(x)) = -(-3x) + 4$$

$$= 3x + 4$$



- a) 180
- b) 240
- c) 270
- d) 360**
- e) 450

5 triangles, so the sum of the interior angles must be $5 \times 180 = 900$

We know there are 5 (small) 90 degree angles..
 And, the sum of the lower angles is one (large) 90 degree angle..
 So, we know the 6 angles add up to 540...

therefore, the remaining angles are **360...**

$$a + b + c + d + e = ?$$

- 18) If p percent of 300 is 60,
 what is 40% of p ?

- a) 4
- b) 5
- c) 8**
- d) 16
- e) 20

$$p\% \text{ of } 300 = 60$$

$$\frac{p}{100} = \frac{60}{300} \quad p = 20$$

$$\text{then, } 40\% \text{ of } 20 \text{ is } .40 \times 20 = \mathbf{8}$$

- 19) A bacterial culture contains 1000 bacteria initially.
 If it triples every 4 days, write a model representing
 the bacteria count (t) days from now.

- a) $B(t) = 1000(3)^t$
- b) $B(t) = 1000(3)^{4t}$
- c) $B(t) = 1000(3)^{t/4}$**
- d) $B(t) = 3 \cdot (1000)^{4t}$
- e) $B(t) = 4 \cdot (1000)^{3t}$

Since it "triples", this is an exponential model. $y = ab^x$

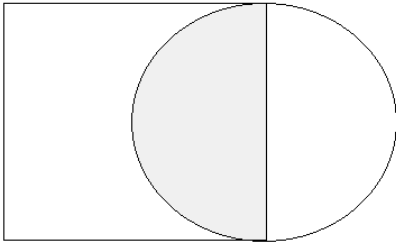
The initial amount (a) is 1000
 The growth factor (b) is 3

Since the growth occurs every 4 days, the x value is $\frac{t}{4}$

$$y = 1000(3)^{t/4}$$

20) If the area of the square is 64 square feet, what is the shaded area?

SOLUTIONS



- a) 4π
- b) 8π
- c) 16π
- d) 32π
- e) 64π

Since area of square is 64 sq. feet, each side is 8 feet...

Therefore, radius of circle is 4 feet...

Since radius of circle is 4 feet, the area of entire circle is

$$16\pi$$

Therefore, area shaded semicircle is 8π

21) The mean of 5 numbers is 20. If one number is removed, the mean is 18. Which number was removed?

- a) 20
- b) 22
- c) 24
- d) 26
- e) 28

If the mean of 5 numbers is 20, then the total is $5 \times 20 = 100$

If one number is removed, there are 4 numbers remaining...
If the mean of 4 numbers is 18, then the total is $4 \times 18 = 72$

therefore, 28 was removed

22) $\frac{6 + 6\sqrt{7}}{6} =$

- a) $\sqrt{7}$
- b) $1 + 6\sqrt{7}$
- c) $1 + \sqrt{7}$
- d) $6 + \sqrt{7}$
- e) $6\sqrt{7}$

factor the top: $\frac{6(1 + \sqrt{7})}{6}$

then, simplify...

$$1 + \sqrt{7}$$

23) $x^2 - y^2 = 36$
 $x - y = 4$ What is y?

- a) 2
- b) 2.5
- c) 6
- d) 6.5
- e) 9

$$(x + y)(x - y) = 36$$

$$(x + y)(4) = 36$$

$$(x + y) = 9$$

$$x - y = 4$$

$$x + y = 9$$

$$2x = 13$$

$$x = 6.5 \text{ so, } y = 2.5$$

24) What is the value of $6 + 8 \div 2 - 4 \times 5$?

- a) -13
- b) -10
- c) 6
- d) 15
- e) 40

Using order of operations (PEMDAS)

$$6 + 8/2 - 4(5) \quad (\text{division/multiplication before addition/subtraction})$$

$$6 + (4) - (20) = -10$$

SOLUTIONS

25) If $\log_x\left(\frac{1}{9}\right) = -\frac{2}{3}$

- a) -9
- b) -6
- c) 3
- d) 6

e) 27

Convert to exponential form:

$$x^{-\frac{2}{3}} = \frac{1}{9}$$

$$x^{\frac{2}{3}} = 9$$

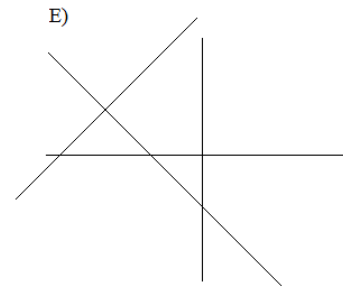
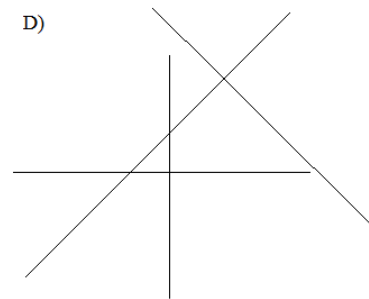
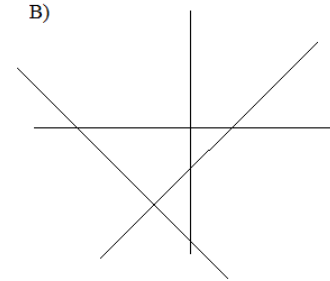
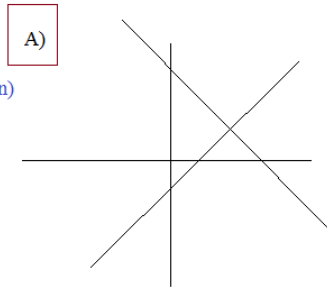
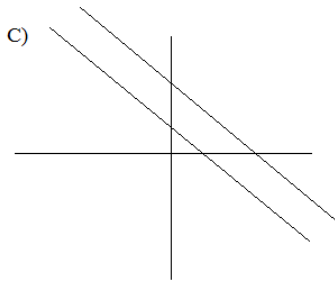
$$x = 9^{\frac{3}{2}}$$

$$x = \left(9^{\frac{1}{2}}\right)^3 = 27$$

26) Which graph best represents the system

$$\begin{aligned} x + y &= 3 \\ x - y &= 1 \end{aligned}$$

A) Intersection (solution) is (2, 1) the graphs x and y intercepts match the linear equations



27) $\frac{10!}{2!8!} =$

- a) 5/8
- b) 1
- c) 45
- d) 90
- e) 120

$$\frac{10 \times 9 \times 8 \times 7 \times \dots}{2 \times 1 \times 8 \times 7 \times 6 \dots} = \frac{10 \times 9}{2 \times 1} = 45$$

28) 0.0003405 is expressed as 3.405×10^n

n = ?

- a) -5
- b) -4
- c) -3
- d) 4
- e) 5

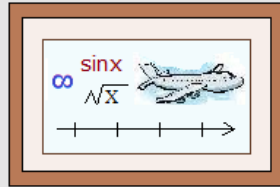
since the decimal moved 4 places to the right (making the number larger), the n value is (decreased by 4) --> -4

How many questions did you answer correctly?!?!

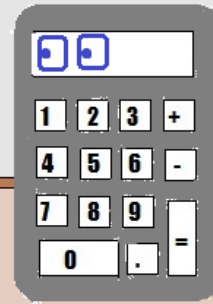
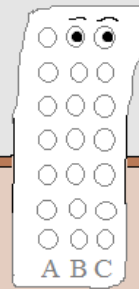
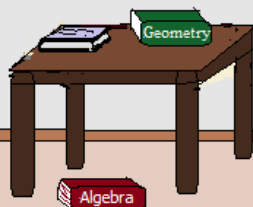
Waiting Room

Patients, thank you
for your patience!

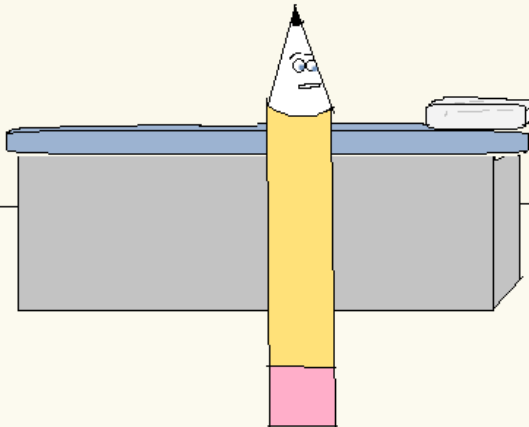
Registration



"I'm feeling drained.
Hopefully, the doc
can give me a boost."



"I have anxiety...
Can't eat.. Can't sleep...
I feel tense and stiff..."



i Chart
* π
* $\ominus R$
* S A T
* E X A M
* H E L P M E



Doctorate
Degree

Masters
in Number
Theory

Math Medicine
for dummies



"I see yellow discoloration, and a bit
of a pink rash -- which is common.
But, let's get to the point, on top,
where it matters, you look sharp!"

Standardized
Test Prep

Thanks for checking out this preview packet. If you'd like to view the other tests and resources, they are available at the mathplane site (Gate B ACT/SAT Topics). The .png images are posted and free to use.

Or, if you prefer the convenient .pdf or .docx file – and, you'd like to support mathplane.com – then download the product file. We appreciate the support.

Good luck on the test!

