ACT Math Prep

Content:

- 14 questions dealing with Pre-Algebra
- 10 questions from Elementary Algebra
- 9 questions based on Intermediate Algebra
- 9 questions from Coordinate Geometry
- 14 questions from Plane Geometry
- 4 Trigonometry questions

Calculators:

ALL PROBLEMS ON THE ACT CAN BE SOLVED WITHOUT USING A CALCULATOR

- You may use a four-function, scientific, or graphing calculator
- Calculators such as TI-89 and TI-92 are *NOT* permitted (see actstudent.org)
- Bring a calculator that you know how to use – bringing a more powerful calculator that you *do not know how to use* isn't going to help you

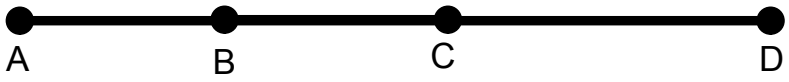
Pace yourself:

- 60 questions
- 60 minutes
- The questions are arranged in order of difficulty
- Take 45 minutes to go through the test
  - > Answer the questions that you know how to do
  - > Guess on the questions you know you'll never get
  - > Mark the harder questions that you'll come back to later
- Spend the last 15 minutes going over the test again
  - > Answer the questions you skipped
  - > Make sure you have answered every question
  - > Spend any remaining time checking your work

General Tips:

- Don't read the directions (know them before you show up!)
- Bring a calculator that you know how to use
- Read the question carefully
- Pay attention to what the question asks you to find
- Watch for unnecessary information
- Draw a picture
- Pace yourself (60 questions/60 minutes)
- Do the easy questions first, then try the hard ones
- Show some work and circle your answers in your test booklet
- Don't waste too much time on one problem
- Eliminate wrong answers before guessing
- Answer every question
- Check your work
- Work for the whole 60 minutes

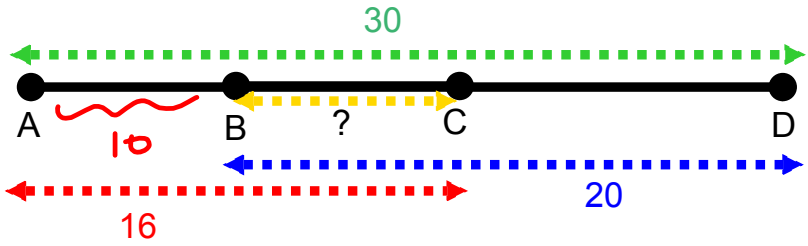
30.



AD = 30
AC = 16
BD = 20
BC = ?

F. 4
G. 6
H. 10
J. 14
K. Cannot be determined from the given information

30.



AD = 30
AC = 16
BD = 20
BC = ?

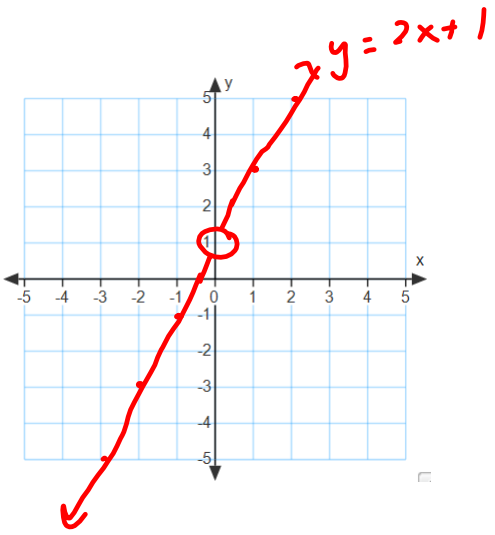
$AB = 30 - 20 = 10$

$BC = 16 - 10 = 6$

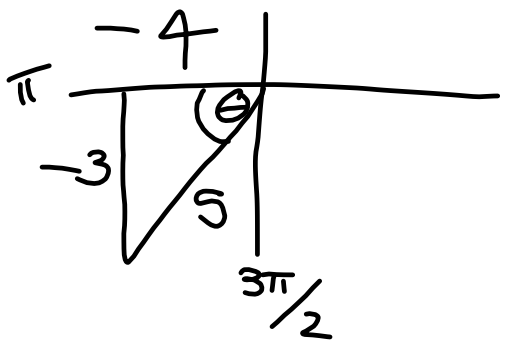
F. 4
G. 6
H. 10
J. 14
K. Cannot be determined from the given information

57.

$$y = \frac{2x^2 + x}{x} = \frac{x(2x+1)}{x} = 2x+1, \quad x \neq 0$$

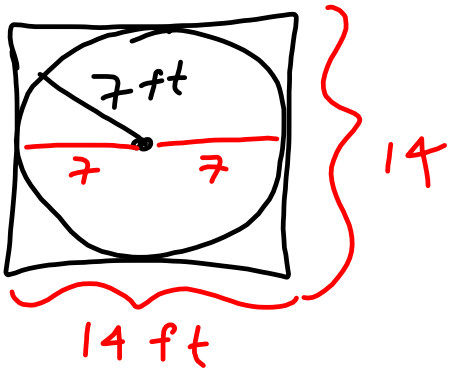


54. If $\sin\theta = -\frac{3}{5}$, $\pi < \theta < \frac{3\pi}{2}$, $\tan\theta = ?$



$= \frac{3}{4}$

38. Area of square?



$= 14^2 = 196\ ft^2$

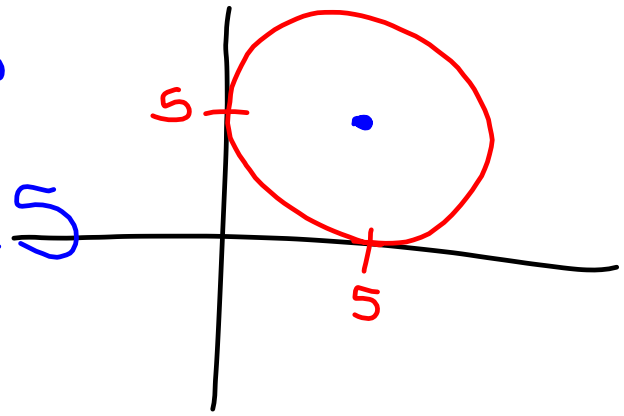
47. equation of circle tangent to x-axis at 5 and tangent to y-axis at 5

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

center: $(h,k) = (5,5)$

radius: $r = 5$

$(x-5)^2 + (y-5)^2 = 25$



48.

$$\frac{(1)(1-i)}{(1+i)(1-i)}$$

$$= \frac{1-i}{1-i^2}$$

$$= \frac{1-i}{1-(-1)} = \boxed{\frac{1-i}{2}} = \frac{1}{2} - \frac{1}{2}i$$

Standard form of a complex #:

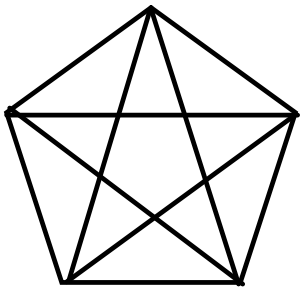
$a+bi$

(conjugate: $a-bi$)

$i^2 = -1$

$(a+b)(a-b) = a^2 - b^2$

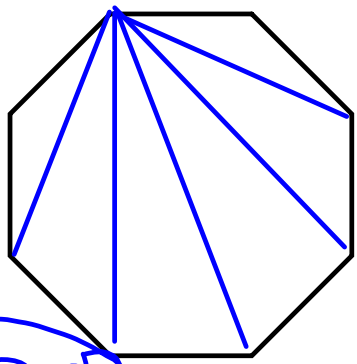
52.



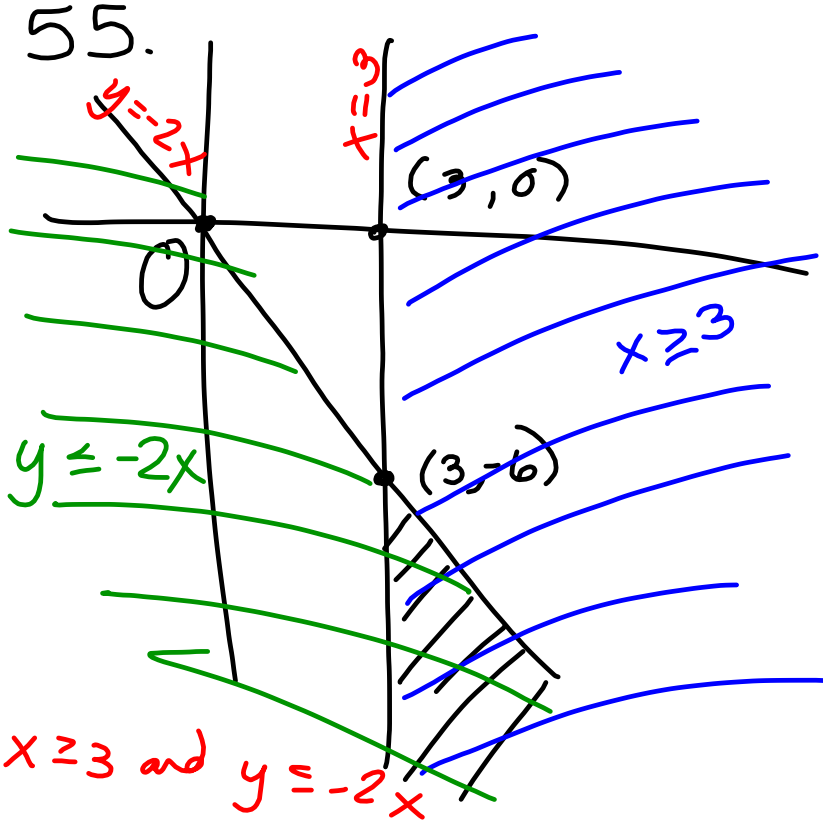
each vertex has 5 diagonals

8 vertices

$$\frac{5 \times 8}{2} = \frac{40}{2} = 20$$



55.



(-1,-1)

y = -2x

$-1 \square -2(-1)$

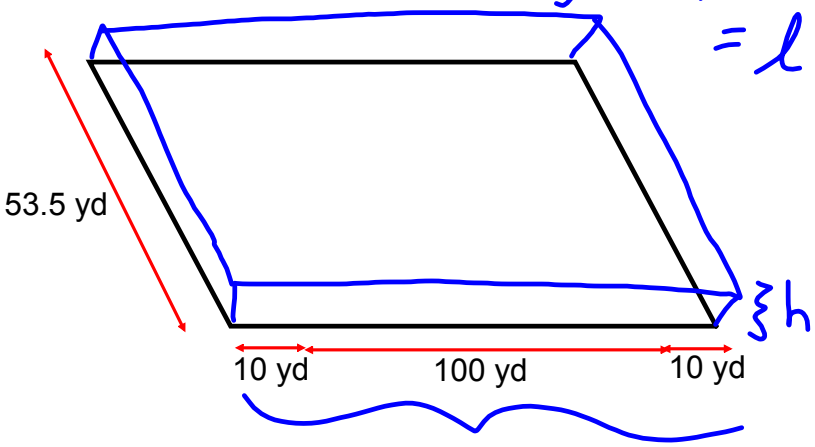
$-1 < 2$

and ↔ intersection

or ↔ union

27. 10,000 cubic yards of snow

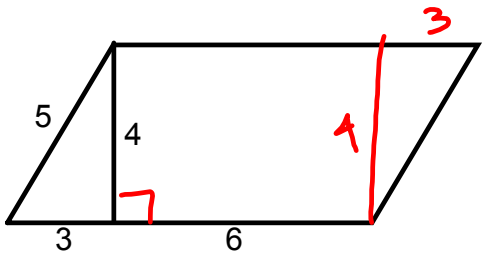
Volume of rectangular prism $= lwh$



$10{,}000 = (53.5)(120)(h)$

$h = \frac{10{,}000}{(53.5)(120)} = 1.55$

33. Area of parallelogram? $bh = 9(4) = \boxed{36}$



$\frac{1}{2}(3)(4) + 6(4) + \frac{1}{2}(3)(4)$

53.

25 % red
30% blue
20 % green
10% purple
% other

85%

15%

Degree measure of "other" sector?

$(0.15)(360^\circ) = \boxed{54^\circ}$

34. $a = b + 2 \Rightarrow -2 = b - a$

$(b-a)^4 = ?$

$= (-2)^4 = \boxed{16}$

36. The larger of two numbers exceeds twice the smaller number by 8. The sum of twice the larger and 3 times the smaller number is 65. If x is the smaller number, which equation determines the correct value of x?

x = smaller #

l = larger #

$l = 2x + 8$

$2l + 3x = 65$

$2(2x+8) + 3x = 65$

13.

# of students participating in sports:

$$\begin{bmatrix} 40 & 60 & 80 & 80 \end{bmatrix}$$

ratio of number of awards to number of students

$$\begin{bmatrix} 0.3 \\ 0.4 \\ 0.2 \\ 0.5 \end{bmatrix}$$

number of awards?

$$\#\text{ of awards} = \#\text{ of students} \cdot \frac{\#\text{ of awards}}{\#\text{ of students}}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} \cdot \begin{bmatrix} a & b & c \end{bmatrix} = xa + yb + zc$$

$40(0.3) + 60(0.4) + 80(0.2) + 80(0.5)$

=

43. GCF x^2y^2 & xy^3 is 45

$y = ?$

~~1~~ or 3

$xy^2 = 45$

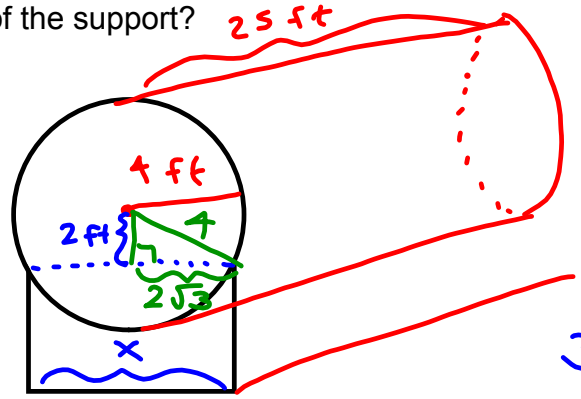
$45 \cdot 1$

$15 \cdot 3$

$5 \cdot 9$

$5^{\frac{11}{32}}$

Test 3, #39-41
end-on view of cylindrical milk tank on its support
radius of tank is 4 feet
length of tank is 25 feet
39. volume of tank
40. if there are 5000 gallons of milk in tank, and a gallon of milk weighs 8 pounds, how many pounds of milk are there?
41. center of circular end of tank is 2 ft above top level of support; what is width in feet of the support?



39. $V = \pi r^2 \cdot h$

$= \pi(4)^2 \cdot 25$

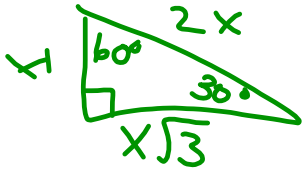
$= 25 \cdot 16 \cdot \pi$

$\approx 25(16)(3.14)$

40. $(5000)\ 8 =$

$40,000\ 16$

41. $x = 4\sqrt{3} \approx$



Test 2, #37

Which is NOT true about the arithmetic sequence 17, 12, 7, 2, ...
A fifth term is -3
B. sum of the first 5 terms is 35
C. eighth term is -18
D. common difference is -5
E. common ratio is -5

common ratio = geometric

$\frac{a_n}{a_{n-1}} = r$

$a_n = a_0 r^{n-1}$

$S_\infty = \frac{a_0}{1-r}$, $|r|<1$

$a_n = a_{n-1} + d$ nth term

$a_n = a_0 + (n-1)d$

$S_n = \frac{n}{2}(a_0 + a_n)$ sum of 1st n terms

60.

$\sin\frac{\pi}{12}$

$\frac{\pi}{12} = \frac{\pi}{3} - \frac{\pi}{4}$

$\sin(a-b) = \sin a\cos b - \cos a\sin b$

$\sin\left(\frac{\pi}{3} - \frac{\pi}{4}\right) = \sin\frac{\pi}{3}\cos\frac{\pi}{4} - \cos\frac{\pi}{3}\sin\frac{\pi}{4}$

$= \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2} - \frac{1}{2}\cdot\frac{\sqrt{2}}{2}$

$= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$

Vertex of a parabola

If given standard form of the quadratic $f(x) = ax^2 + bx + c$

Vertex is $\left(-\frac{b}{2a}, f(-\frac{b}{2a})\right)$

If given vertex form $f(x) = a(x-h)^2 + k$

Vertex is (h, k)