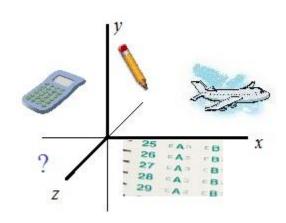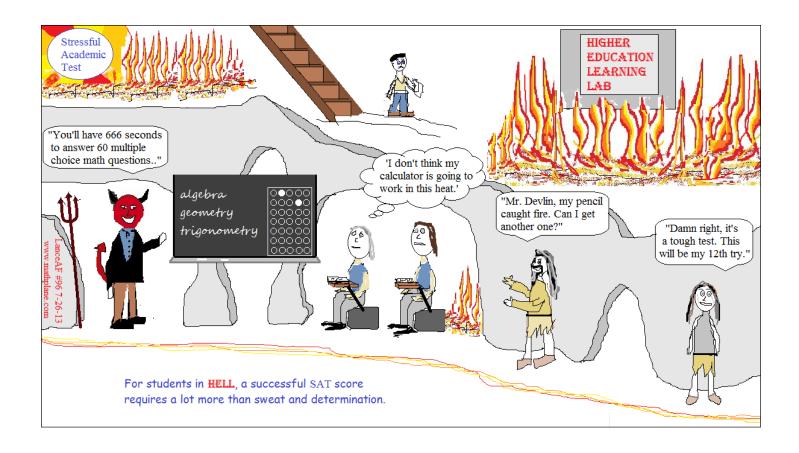# ACT Practice Test 004

29 Multiple choice questions (and, detailed solutions)

Mathplane.com

Topics include linear equations, geometry shapes, word problems, trig ratios, imaginary numbers, factors, radicals, and more.

Questions -→

(Try to answer in 30 minutes)

1) $y = a^2 + b \div 3$

If a = 3 and b = 6, then what is y?

  a) 4

  b) 5

  c) 8

  d) 11

  e) 12

2) $f(x) = -2x + 4$

  $f(3y) =$

  a) -6y + 4

  b) -6y + 12

  c) -6y − 12

  d) 4

  e) -6xy + 4

3) If the following right triangle were rotated around the x-axis, the resulting cone would have a base radius

  a) 3

  b) 4

  c) 5

  d) 6

  e) 8

4) In the system,   2x + 3y = 6
                     x −2y = 10,   the sum of x and y is:

  a) 2

  b) 4

  c) 8

  d) 10

  e) 12

5) How much wrapping paper is needed to cover a boxed gift 3" by 5" by 1 foot?

  a)   15 sq inches

  b)   48 sq inches

  c)   76 sq inches

  d)   180 sq inches

  e)   222 sq inches

6) What is the least common multiple of 3, 6, and 20?

    a) 3

    b) 6

    c) 20

    d) 60

    e) 120

7) 34.50 x .0002 =

    a) 6.9×10^{-4}

    b) 6.9×10^{-3}

    c) 6.9×10^{-2}

    d) 6.9×10^{3}

    e) 6.9×10^{4}

8) 30 is 2% of what number?

    a) 60

    b) 600

    c) 6000

    d) 1500

    e) 15000

9) $(2x - 7)^2 =$

    a) $4x - 49$

    b) $4x + 49$

    c) $4x^2 + 49$

    d) $4x^2 - 18x + 49$

    e) $4x^2 - 28x + 49$

10) The center of a circle is at the origin. If (−4, 6) lies on the circle, the length of the radius is

    a) 2

    b) 10

    c) $\sqrt{10}$

    d) $2\sqrt{5}$

    e) $2\sqrt{13}$

11) Which line is NOT perpendicular to x + y = 5?

    a) x − y = 5

    b) x − y = −5

    c) y = x + 5

    d) (y + 3) = (x + 7)

    e) (y + 5) = −(x + 1)

12) What is the minimum value (y) in the curve $y = 3(x − 4)^2 + 1$?
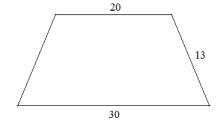
    a) -12

    b) -4

    c) 1

    d) 3

    e) 4

13) $i(3 − 2i) =$ note: $i = \sqrt{-1}$

    a) i

    b) 1

    c) $2 + 3i$

    d) $2 − 3i$
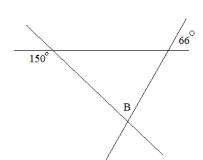
    e) $−5i$

14) Find the area of the isosceles trapezoid

    a) 76

    b) 240
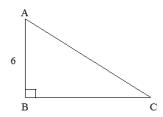
    c) 300

    d) 360

    e) 390

15) The measure of angle B is

    a) 30

    b) 54

    c) 66

    d) 74

    e) 84

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

a) 2

b) $2\sqrt{10}$

c) 8

d) 18

e) $6\sqrt{10}$

A

6

B   C

(The diagram of the triangle doesn't necessarily represent the true shape of the figure.)

17) 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

18) Jim currently has enough money to buy 30 candy bars. If the price of a candy bar dropped by 10 cents, he could buy 4 more candy bars. How much money does he have?

a) $24

b) $24.50

c) $25

d) $25.50

e) $26

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

a) 40

b) 210

c) 400

d) 1260

e) 5040

20) If $-10 < 3x + 6 < 5$,
which is *not* a possible value of x + 2?

a) -2

b) -1

c) 0

d) 1

e) 2

21) Which list of number sets best describes -5 ?

    a) natural, whole, real

    b) natural, whole, integer, rational, real

    c) whole, integer, rational, real

    d) integer, rational, real

    e) integer, real

22) $\log_2 \left(\frac{1}{64} \right)$

    a) 8

    b) -8

    c) 6

    d) -6

    e) 32

23) Cindy wants to find out how much money she will have after 5 years if she invests \$3000 at an annual rate of 8% that is compounded quarterly. Which equation will produce the correct amount?

    a) $A = 3000(.08)^{20}$

    b) $A = 3000(1.08)^{5}$

    c) $A = 3000(1.02)^{20}$

    d) $A = 3000(.02)^{20}$

    e) $A = 3000(1.02)^{5}$

24) $3|x + 5| + 7 = 1$ $x =$

    a) -7

    b) -3

    c) $-7, -3$

    d) -5

    e) no solution

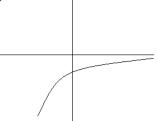25) If $(x + y)^2 = 80$ and $-xy = 2$

    then what is $x^2 + y^2$?

    a) 76

    b) 78

    c) 82

    d) 84

    e) none of above

26) An angle in standard position in the xy-coordinate plane measures 170 degrees.
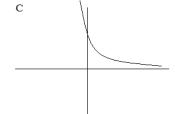The terminal side of the angle is

   a) in Quadrant II

   b) in Quadrant III

   c) in Quadrant IV

   d) on the x-axis

   e) on the y-axis

27) What is the value of h if $\sqrt{10h - 2} = 4$

   a) .4

   b) .6

   c) 1.2

   d) 1.4

   e) 1.8

28) Which graph best represents the exponential function $f(x) = (\frac{1}{2})^{x - 4}$
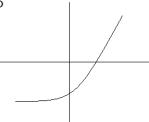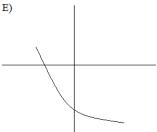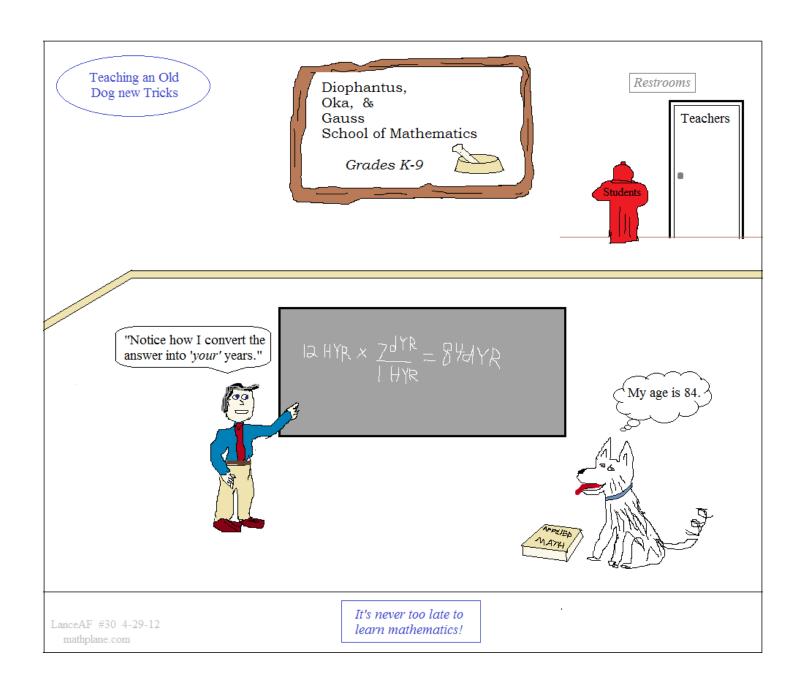
   a) A

   b) B

   c) C

   d) D

   e) E

A

B

C

D

E)

29) If $pq = 2$, then $p^2q^3 + p^3q^5 =$

   a) 12q

   b) $p^5 q^8$

   c) $p^6 q^{15}$

   d) $12p + 40q$

   e) $4q + 8q^2$

Solutions -→

SOLUTIONS

1) $y = a^2 + b \div 3$

   If a = 3 and b = 6, then what is y?

   a) 4

   b) 5

   c) 8

   d) 11

   e) 12

   $(3)^2 + 6 \div 3$ order of operations: PEMDAS

   $9 + 6 \div 3$ division precedes addition...

   $9 + 2$

   11

2) $f(x) = -2x + 4$

   $f(3y) =$

   a) -6y + 4

   b) -6y + 12

   c) -6y − 12

   d) 4

   e) -6xy + 4

   $f(3y) = -2(3y) + 4$ replace the x with the term that is entered

   $= -6y + 4$

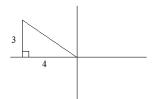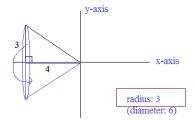3) If the following right triangle were rotated around the x-axis, the resulting cone would have a base radius

   a) 3

   b) 4

   c) 5

   d) 6

   e) 8

   y-axis

   3

   4

   3

   4

   x-axis

   radius: 3
   (diameter: 6)

4) In the system, $2x + 3y = 6$
                      $x - 2y = 10,$ the sum of x and y is:

   a) 2

   b) 4

   c) 8

   d) 10

   e) 12

   Using elimination/combination method:

   $2x + 3y = 6$
   $-2x + 4y = -20$
   $7y = -14$
   $y = -2$

   $2x + 3(-2) = 6$
   $2x = 12$
   $x = 6$

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

5) How much wrapping paper is needed to cover a boxed gift 3" by 5" by 1 foot?

   a) 15 sq inches

   b) 48 sq inches

   c) 76 sq inches

   d) 180 sq inches

   e) 222 sq inches

   3"

   12" (1 foot)

   5"
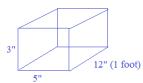
   front/back: 3" x 5" x 2 = 30 sq inches

   left/right: 3" x 12" x 2 = 72 sq inches

   top/bottom: 5" x 12" x 2 = 120 sq inches

   222 sq inches..

SOLUTIONS

6) What is the least common multiple of 3, 6, and 20?

    a) 3

    b) 6

    c) 20

    d) 60

    e) 120

multiples of 3: 3, 6, 9, ...

           6: 6, 12, 18, ...

        20: 20, 40, 60, ...

common multiples include 60, 120, 180, etc..

the *least* common multiple is 60

7) 34.50 x .0002 =

    a) 6.9×10^{-4}

    b) 6.9×10^{-3}

    c) 6.9×10^{-2}

    d) 6.9×10^{3}

    e) 6.9×10^{4}

34.5 x .0002

$34.5 \times (2 \times 10^{-4}) = 69 \times 10^{-4}$

6.9×10^{-3}

8) 30 is 2% of what number?

    a) 60

    b) 600

    c) 6000

    d) 1500

    e) 15000

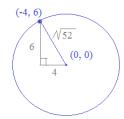$\dfrac{30}{x} = \dfrac{2}{100}$

2x = 3000

x = 1500

"2 per hundred" is
equal to "30 per some number"

note: 10% of 1500 is 150
      then, 1% of 1500 is 15
      so, 2% of 1500 is 30

9) $(2x - 7)^2 =$

    a) $4x - 49$

    b) $4x + 49$

    c) $4x^2 + 49$

    d) $4x^2 - 18x + 49$

    e) $4x^2 - 28x + 49$

$(2x - 7)(2x - 7)$

First $4x^2$
Outer   -14x
Inner   -14x
Last   49

$4x^2 - 28x + 49$

10) The center of a circle is at the origin. If (−4, 6) lies on the circle,
the length of the radius is

    a) 2

    b) 10

    c) $\sqrt{10}$

    d) $2\sqrt{5}$

    e) $2\sqrt{13}$

(-4, 6)

$\sqrt{52}$

6

(0, 0)

4

distance formula: $d = \sqrt{(6 - 0)^2 + (-4 - 0)^2} = \sqrt{52} = \sqrt{4 \cdot 13}$

$2\sqrt{13}$

11) Which line is NOT perpendicular to $x + y = 5$?

    a) $x - y = 5$ 1

    b) $x - y = -5$ 1

    c) $y = x + 5$ 1

    d) $(y + 3) = (x + 7)$ 1

    e) $(y + 5) = -(x + 1)$ -1

slope of $x + y = 5$

        $y = -x + 5$ is -1 slope of perpendicular line is (opposite reciprocal): 1

12) What is the minimum value (y) in the curve $y = 3(x - 4)^2 + 1$?

    a) -12

    b) -4

    c) 1

    d) 3

    e) 4

The minimum of this parabola is the vertex...

    $y = a(x - h)^2 + k$ the vertex of the curve is (h, k)

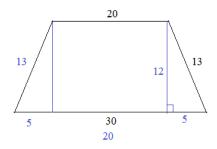   (4, 1) $y = 1$

13) $i(3 - 2i) =$ note: $i = \sqrt{-1}$

    a) i

    b)   1

    c) $2 + 3i$

    d) $2 - 3i$

    e) $-5i$

$3i - 2i^2$

$3i - (-2)$

$2 + 3i$

14) Find the area of the isosceles trapezoid

    a) 76

    b) 240

    c) 300

    d) 360

    e) 390

20

13   12   13

5   30   5

20
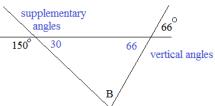
$\frac{1}{2}$ (base1 + base2)height

$\frac{1}{2}$ (30 + 20)(12) = 300

15) The measure of angle B is

    a) 30

    b) 54

    c) 66

    d) 74

    e) 84

supplementary angles

$66°$

$150°$ 30   66

vertical angles

B

$B + 30 + 66 = 180$ (sum of interior angles of triangle = 180 degrees)
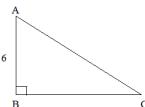
$B = 84$

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

    a)   2

    b) $2\sqrt{10}$

    c)   8

    d)   18

    e) $6\sqrt{10}$

(The diagram of the triangle doesn't necessarily represent the true shape of the figure.)

$$\text{tangent} = \frac{\text{opposite side}}{\text{adjacent side}} \qquad \tan(A) = \frac{1}{3}$$

so, $BC = 2$ because $\dfrac{BC}{AB} = \dfrac{1}{3} = \dfrac{2}{6}$

Then, Pythagorean Theorem:

legs are 2 and 6, so hypotenuse is $\boxed{\sqrt{40}}$

---

17) 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

The common ratio is 1/2

24, 12, 6, 3, 3/2, 3/4, 3/8, 3/16 , ...

    2nd 4th   7th

(also possible, -24, 12, -6, 3, -3/2, 3/4, -3/8, 3/16....)

$$\frac{3}{x} = \frac{x}{12}$$

4th term : 3rd term = 3rd term : 2nd term

3rd term equals 6 (or, -6)

and, the common ratio is 1/2 (or -1/2)

---

18) Jim currently has enough money to buy 30 candy bars. If the price of a candy bar dropped by 10 cents, he could buy 4 more candy bars. How much money does he have?

    a) $24

    b) $24.50

    c) $25

    d) $25.50

    e) $26

(# of candy bars)(price) = Total Cost

(30)(original price) = Jim's money

(30 + 4)(original price - 10 cents) = Jim's money

$$30(P) = 34(P) - 3.4$$
$$3.4 = 4P$$
$$P = .85$$

And, 30 x .85 = $\boxed{25.50}$

---

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

    a) 40

    b) 210

    c) 400

    d) 1260

    e) 5040

This is a "combination" (as opposed to a permutation) because 'order doesn't matter'....

$$_nC_r = \frac{n!}{r!\,(n-r)!}$$

$$_{10}C_4 = \frac{10!}{4!\,6!} = \frac{10 \times 9 \times 8 \times 7 \cdot 6!}{4 \times 3 \times 2 \times 1 \cdot 6!} = \frac{5040}{24} = \boxed{210}$$

---

20) If $-10 < 3x + 6 < 5$, which is *not* a possible value of x + 2?

    a) -2

    b) -1

    c) 0

    d) 1

    e) 2

If we divide the inequality by 3, we get

$$-10/3 < x + 2 < 5/3$$

So, x + 2 is between -10/3 and 5/3... therefore

$\boxed{(x + 2) \text{ cannot be 2}}$

21) Which list of number sets best describes -5 ?

    a) natural, whole, real

    b) natural, whole, integer, rational, real

    c) whole, integer, rational, real

    d) integer, rational, real

    e) integer, real

natural numbers 1, 2, 3, ...
and
whole numbers 0, 1, 2, 3, ...
do not include negative numbers..

integers include negative numbers..
and, rational numbers are numbers that can be
expressed as fractions containing integers...
$\frac{-5}{1}$ is a rational number

22) $\log_2 (\frac{1}{64})$

    a) 8

    b) -8

    c) 6

    d) -6

    e) 32

$2^x = 64^{-1}$

$2^x = 2^{6 \cdot -1}$

$x = -6$

23) Cindy wants to find out how much money she will have after 5 years if she invests $3000 at an annual rate of 8%
that is compounded quarterly. Which equation will produce the correct amount?

    a) $A = 3000(.08)^{20}$

    b) $A = 3000(1.08)^{5}$

    c) $A = 3000(1.02)^{20}$

    d) $A = 3000(.02)^{20}$

    e) $A = 3000(1.02)^{5}$

$A = A_0 (1 + \frac{rate}{n})^{nt}$

$A = 3000(1 + \frac{.08}{4})^{4(5)}$

$A = 3000(1.02)^{20}$

'payment'
per compound   compounded 20 times

A = Amount

A_0 = Initial Amount

t = time

n = number of time amount
    is compounded per year

24) $3|x + 5| + 7 = 1$ $x =$

    a) -7

    b) -3

    c) $-7, -3$

    d) -5

    e) no solution

$3|x + 5| = -6$

$|x + 5| = -2$

since $| x + 5 |$ must be positive, there is no solution..

25) If $(x + y)^2 = 80$ and $-xy = 2$

                 then what is $x^2 + y^2$?

    a) 76

    b) 78

    c) 82

    d) 84

    e) none of above

$x^2 + 2xy + y^2 = 80$

$xy = -2$

$x^2 + 2(-2) + y^2 = 80$

$x^2 + y^2 = 84$

26) An angle in standard position in the xy-coordinate plane measures 170 degrees.
The terminal side of the angle is

   a) in Quadrant II

   b) in Quadrant III

   c) in Quadrant IV

   d) on the x-axis

   e) on the y-axis

SOLUTIONS

II   I

170°

III   IV

"initial side" lies on x-axis

"terminal side" lies in quadrant II

27) What is the value of h if $\sqrt{10h - 2} = 4$

   a) .4

   b) .6

   c) 1.2

   d) 1.4

   e) 1.8

square both sides: $10h - 2 = 16$

$10h = 18$

$h = 1.8$

28) Which graph best represents the exponential function $f(x) = (\frac{1}{2})^{x - 4}$

   a) A

   b) B

   c) C

   d) D

   e) E

Since the growth factor $(\frac{1}{2})$
is between 0 and 1, this is a
decay function ("slopes downward")

So, it cannot be A or D...

B has been reflected over the x-axis,
implying a negative coefficient...

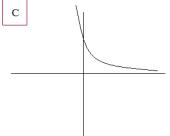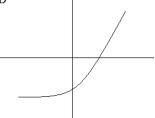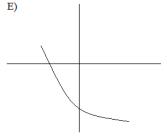x - 4 indicates a shift to the right..
E shifts down...

C is the best fit...

A   B

C   D   E)

29) If pq = 2, then $p^2q^3 + p^3q^5 =$

   a) 12q

   b) p^5q^8

   c) p^6q^{15}

   d) 12p + 40q

   e) $4q + 8q^2$
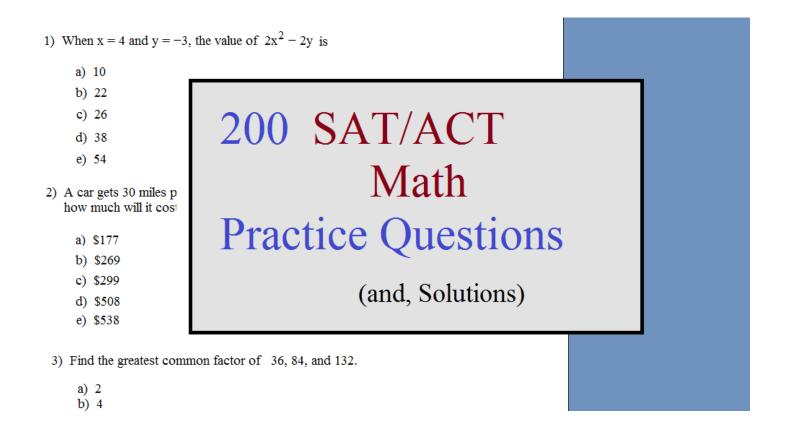
$p^2q^2q + p^3q^3q^2$

$(pq)^2q + (pq)^3q^2$

$(2)^2q + (2)^3q^2$

$4q + 8q^2$

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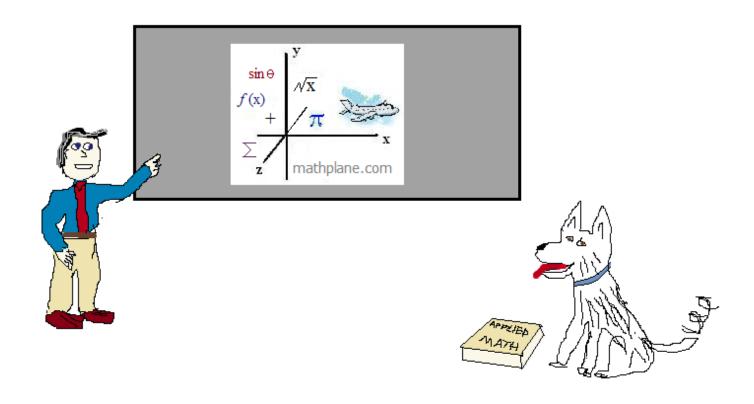
So, how did you do? Want more test prep questions?

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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