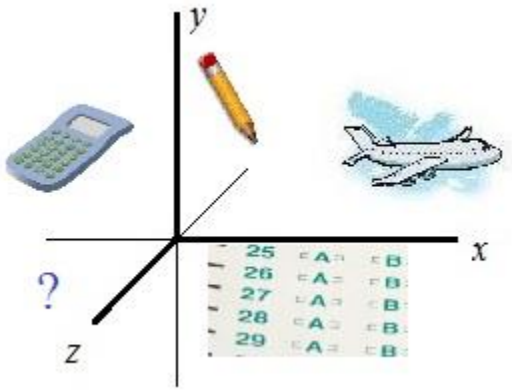
ACT Practice Test 1

28 multiple choice math questions (and solutions)



Mathplane.com

Topics include distance formula, quadratics, greatest common factor, trigonometry concepts, percentages, and more.

ACT Practice Test

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 per gallon. If gas costs $3.90 per gallon, approximately how much will it cost to travel 2300 miles?

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

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

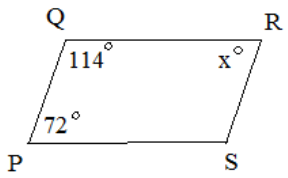
a) 2
b) 4
c) 6
d) 10
e) 12

4) The length of a rectangle is 3 more than twice the width. Which of the following 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) For quadrilateral PQRS, sides PQ and RS are parallel for what value of x ?

a) 66
b) 72
c) 76
d) 88
e) 114



ACT Practice Test

6) How many rational numbers are between 2 and 8?

a) 3
b) 4
c) 6
d) 12
e) infinitely many

7) In the coordinate plane below, two of the vertices of an isosceles triangle are shown. What is the coordinate of the third vertex?

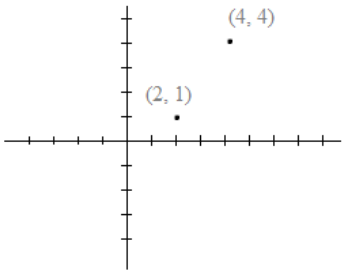
a) (-4, 4)

b) (0, -2)

c) $(3, 2\frac{1}{2})$

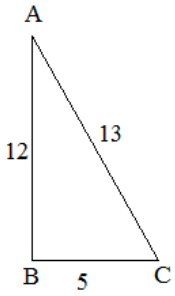
d) (4, -2)

e) (5, 1)



8) What is the cosine of angle A ?

a) 5/13
b) 12/13
c) 5/12
d) 12/5
e) 13/12



9) A combo pack at the movies consists of 1 drink, 1 popcorn, and 1 candy bar. If there are 5 flavors of soda, 1 size of popcorn, and 6 varieties of candy, how many different combo packs are possible?

a) 5
b) 6
c) 11
d) 12
e) 30

10) Which of the following is a factor of $2x^2 + 5x - 7$?

a) $x - 1$
b) $x - 7$
b) $2x + 5$
c) $2x - 5$
d) $5x + 14$

ACT Practice Test

11) What is the 3rd term in the following *geometric* sequence:

3/2, 1/2, *X*, 1/18, ...

(note: In a geometric sequence, the ratio of any term to the following term is constant)

a) -1/2
b) 1/4
c) 1/6
d) 1/10
e) 1/12

12) What is the slope of any line perpendicular to $2x + 3y = 6$

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

13) A shirt's list price is $30. This week, it is on sale for 25% off. If Joe gets an employee discount of 20% off the sale price, how much does he pay for the shirt?

a) $16.50
b) $18.00
c) $19.00
d) $20.00
e) $20.50

14) Find $\sqrt{-(-3)^2}$

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

a) $3i$
b) $9i$
c) $3 + i$
d) $9 + i$
e) - 3

15) What is the degree measure of the angle formed by the hands of a clock that reads exactly 5 o'clock?

a) 30
b) 70
c) 120
d) 150
e) 210

ACT Practice Test

16) What is the probability that a number selected at random from the set {2, 5, 10, 11, 14, 19, 25} will be even *and* divisible by 5?

a) 1/7
b) 3/7
c) 4/7
d) 1
e) 0

17) On a standard (x, y) coordinate plane, what is the distance from (5, -7) to the origin?

a) -1
b) 2
c) 12
d) $2\sqrt{6}$
e) $\sqrt{74}$

18) What is the difference between 3.6 and $2.\overline{36}$?

(note: a (vinculum) bar over the number indicates the digits are repeated)

a) 1.24
b) 1.237
c) $1.2\overline{36}$
d) $1.\overline{24}$
e) $1.23\overline{6}$

19) If $s = 3$ and $8^t = 4^{s+2}$, what is t ?

a) $2\frac{1}{2}$
b) $\frac{2}{3}$
c) $3\frac{1}{3}$
d) 7
e) 10

20) What is the equation of a circle with center at (0, 0) and passes through (3, -4)?

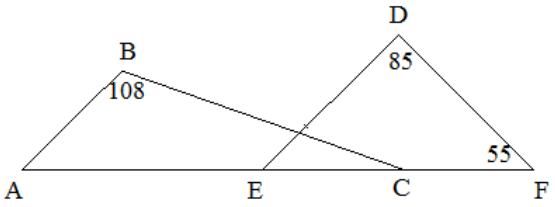
a) $x^2 - y^2 = 7$
b) $x^2 + y^2 = 5$
c) $x^2 + y^2 = 25$
d) $x^2 - y^2 = 25$
e) $x^2 + y^2 = 1$

ACT Practice Test

21) A, E, C, and F are collinear; $\overline{AB}$ is parallel to $\overline{DE}$;

What is the measure of angle C?

a) 22
b) 32
c) 40
d) 55
e) 62

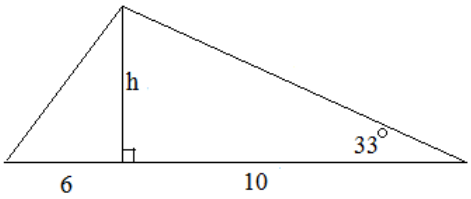


22) For integers a and b, which term is *always* even?

a) a^2
b) $a^2 + b^2$
c) $3a + 3b$
d) $2a + 6b$
e) ab^2

23) Which of the following expressions identifies the area of the triangle?

a) $30\tan(33^\circ)$
b) $80\tan(33^\circ)$
c) $160\tan(33^\circ)$
d) $160\sin(33^\circ)$
e) $300\sin(33^\circ)$



24) What is the y-intercept of $x^2 - 12x + 32$?

a) 1
b) 4
c) 8
d) 12
e) 32

25) $f(x) = x - 3$ $g(x) = |2x + 1|$ What is $f(g(-3))$?

a) 2
b) 4
c) 8
d) 11
e) 13

ACT Practice Test

26) The following figure is a square inside a square.
What is the area of the shaded area?

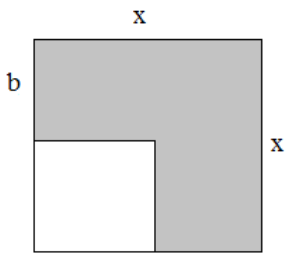
a) $x^2 - b^2$

b) $x^2 - (x - b)^2$

c) $4x - 4b$

d) $\frac{x^2}{4}$

e) $3b^2$



27) Which of the following is $\frac{3}{m} + \frac{m+5}{m+2}$?

a) $\frac{m+8}{2m+2}$

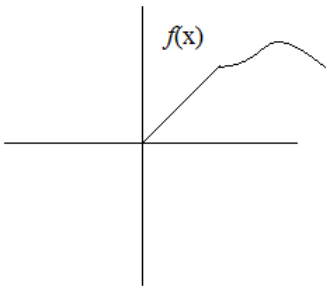
b) $\frac{3m+15}{m^2+2m}$

c) $\frac{4m+11}{m(m+2)}$

d) $\frac{m^2+8m+6}{m(m+2)}$

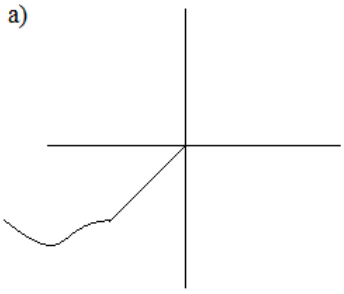
e) $\frac{m+10}{m+2}$

28) The following is the graph of $f(x)$:

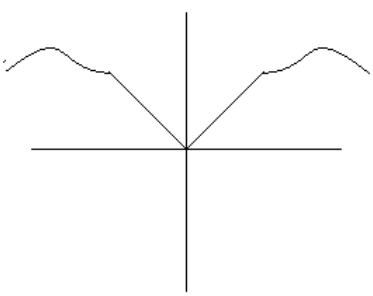


Which is the graph for $-f(x)$?

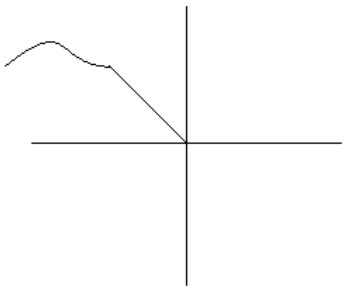
a)



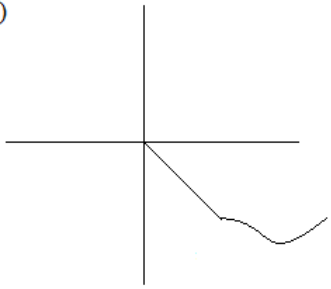
b)



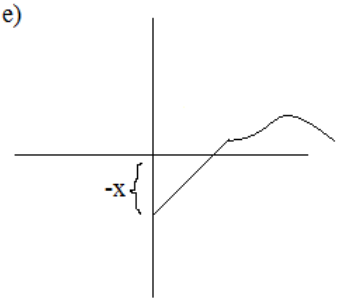
c)

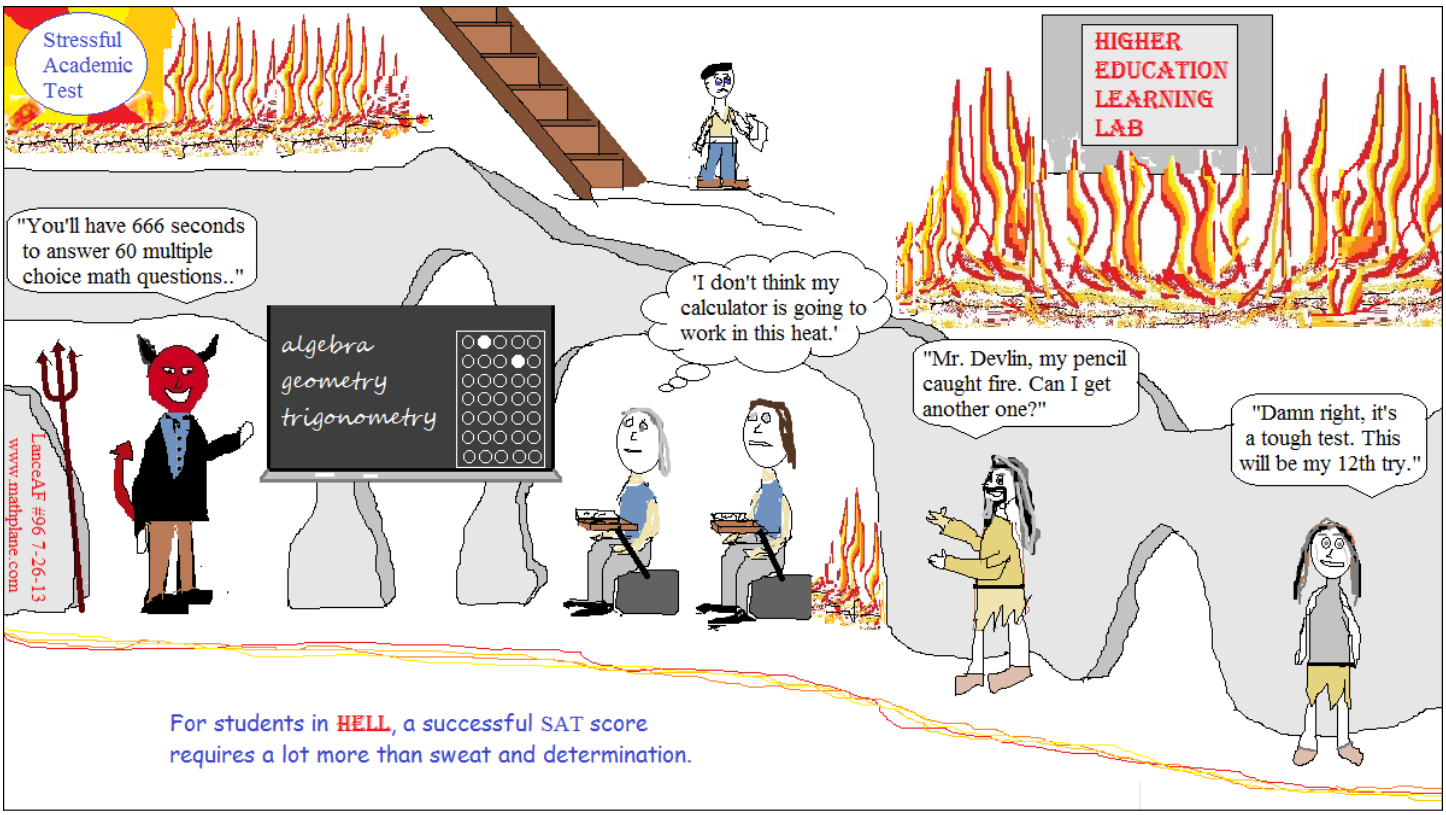


d)



e)

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'I don't think my calculator is going to work in this heat.'
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geometry
trigonometry
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"Damn right, it's a tough test. This will be my 12th try."
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SOLUTIONS -→

ACT Practice Test

SOLUTIONS

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

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

$2(4)^2 - 2(-3) =$

$2 \cdot 16 + 6 =$

$= 38$

2) A car gets 30 miles per gallon. If gas costs $3.90 per gallon, approximately how much will it cost to travel 2300 miles?

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

$\frac{2300 \text{ miles}}{30 \text{ miles/gallon}} = 76.67 \text{ gallons}$

76.67 gallons • $3.90/gallon = $299

(It will take 76.67 gallons to travel 2300 miles..
And, it will cost $299 to buy 76.67 gallons of gas..)

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

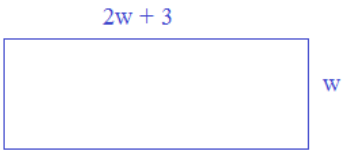
a) 2
b) 4
c) 6
d) 10
e) 12

factors of 36: 1, 2, 3, 4, 6, 9, 12, 18, 36
factors of 84: 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
factors of 132: 1, 2, 3, 4, 6, 11, 12, 22, 33, 44, 66, 132

(1, 2, 3, 4, 6, and 12 are common factors)

4) The length of a rectangle is 3 more than twice the width. Which of the following 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)



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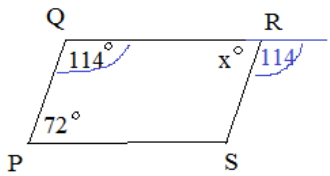


Since PQ and RS are parallel, angles R and Q must be supplementary.

x + 114 = 180
x = 66

ACT Practice Test

SOLUTIONS

6) How many rational numbers are between 2 and 8?

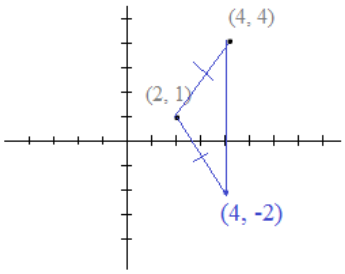
a) 3
b) 4
c) 6
d) 12
e) infinitely many

A rational number is any number that can be expressed as a fraction. (written as a ratio of integers)

there are an infinite number of fractions between 2 and 8...
2.002 2.03 2.000034 etc. are all rational numbers...

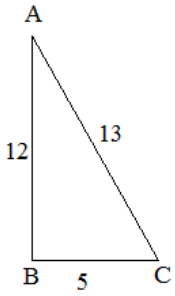
7) In the coordinate plane below, two of the vertices of an isosceles triangle are shown. What is the coordinate of the third vertex?

a) (-4, 4)
b) (0, -2)
c) $(3, 2\frac{1}{2})$
d) (4, -2)
e) (5, 1)



8) What is the cosine of angle A ?

a) 5/13
b) 12/13
c) 5/12
d) 12/5
e) 13/12



$\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{12}{13}$

9) A combo pack at the movies consists of 1 drink, 1 popcorn, and 1 candy bar. If there are 5 flavors of soda, 1 size of popcorn, and 6 varieties of candy, how many different combo packs are possible?

a) 5
b) 6
c) 11
d) 12
e) 30

5 x 1 x 6 = 30

soda choices | popcorn choices | candy choices

10) Which of the following is a factor of $2x^2 + 5x - 7$?

a) $x - 1$
b) $x - 7$
b) $2x + 5$
c) $2x - 5$
d) $5x + 14$

$2x^2 + 5x - 7 = (2x + 7)(x - 1)$

ACT Practice Test

SOLUTIONS

11) What is the 3rd term in the following *geometric* sequence:

3/2, 1/2, *X*, 1/18, ...

(note: In a geometric sequence, the ratio of any term to the following term is constant)

a) -1/2
b) 1/4
c) 1/6
d) 1/10
e) 1/12

$\frac{\text{2nd term}}{\text{1st term}} = \frac{1/2}{3/2} = \frac{1}{3}$

the "geometric ratio" is 1/3

2nd term x geometric ratio = 3rd term

1/2 x 1/3 = 1/6

12) What is the slope of any line perpendicular to $2x + 3y = 6$

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

$3y = 6 - 2x$

$y = -\frac{2}{3}x + 2$

slope is -2/3

slope of perpendicular line is 3/2 (the opposite reciprocal)

13) A shirt's list price is $30. This week, it is on sale for 25% off. If Joe gets an employee discount of 20% off the sale price, how much does he pay for the shirt?

a) $16.50
b) $18.00
c) $19.00
d) $20.00
e) $20.50

25% of $30 is .25 x 30 = $7.50
so, at 25% off, the shirt costs $22.50...

Then, 20% of $22.50 is .20 x 22.50 = $4.50
And, at 20% off, Joe can get the shirt for $18.00

14) Find $\sqrt{-(-3)^2}$

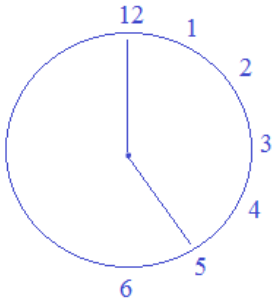
(note: $i = \sqrt{-1}$)

a) $3i$
b) $9i$
c) $3 + i$
d) $9 + i$
e) -3

$\sqrt{-9} = 3i$

15) What is the degree measure of the angle formed by the hands of a clock that reads exactly 5 o'clock?

a) 30
b) 70
c) 120
d) 150
e) 210



the entire clock is 360 degrees;
12 to 6 is 180 degrees

Each hour is 30 degrees (180/6)

therefore, at 5:00, it's 150 degrees

ACT Practice Test

SOLUTIONS

16) What is the probability that a number selected at random from the set {2, 5, 10, 11, 14, 19, 25} will be even *and* divisible by 5?

a) 1/7
b) 3/7
c) 4/7
d) 1
e) 0

$$\text{probability} = \frac{\text{"successes"}}{\text{"possibilities"}} = \frac{1}{7}$$

there are 7 elements in the set; there is only one term that is even and a multiple of 5: 10

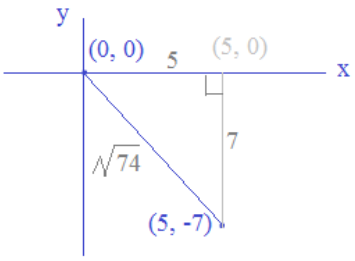
17) On a standard (x, y) coordinate plane, what is the distance from (5, -7) to the origin?

a) -1
b) 2
c) 12
d) $2\sqrt{6}$
e) $\sqrt{74}$

using distance formula:

$$d = \sqrt{(5 - 0)^2 + (-7 - 0)^2}$$

$$= \sqrt{25 + 49}$$



using right triangle and pythagorean theorem

18) What is the difference between 3.6 and $2.\overline{36}$?

(note: a (vinculum) bar over the number indicates the digits are repeated)

a) 1.24
b) 1.237
c) $1.2\overline{36}$
d) $1.\overline{24}$
e) $1.23\overline{6}$

3.60000000
2.36363636
1.23636364

the closest solution is $1.2\overline{36}$

19) If $s = 3$ and $8^t = 4^{s+2}$, what is t ?

a) $2\frac{1}{2}$
b) $\frac{2}{3}$
c) $3\frac{1}{3}$
d) 7
e) 10

$8^t = 4^{3+2}$

$(2^3)^t = (2^2)^5$

$2^{3t} = 2^{10}$

$3t = 10$

$t = 10/3$ or $3\ 1/3$

20) What is the equation of a circle with center at (0, 0) and passes through (3, -4)?

a) $x^2 - y^2 = 7$
b) $x^2 + y^2 = 5$
c) $x^2 + y^2 = 25$
d) $x^2 - y^2 = 25$
e) $x^2 + y^2 = 1$

the radius is the distance from (0, 0) to (3, -4)

radius is 5

equation of a circle (centered at the origin): $x^2 + y^2 = r^2$

$x^2 + y^2 = 25$

ACT Practice Test

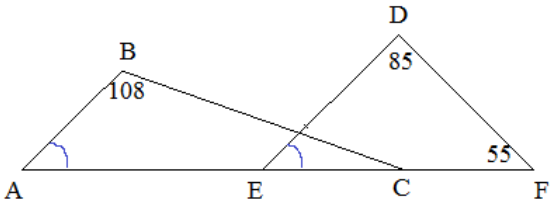
SOLUTIONS

21) A, E, C, and F are collinear; $\overline{AB}$ is parallel to $\overline{DE}$;

What is the measure of angle C?

a) 22
b) 32
c) 40
d) 55
e) 62

because AB||DE, angles A and E are congruent...
and, since D = 85 and F = 55, E = 40... $\triangle = 180$
Then, A = 40 and B = 108, so, C = 32
$\triangle = 180$



22) For integers a and b, which term is *always* even?

a) a^2
b) $a^2 + b^2$
c) 3a + 3b
d) 2a + 6b
e) ab^2

let a = 3 b = 2
$a^2 = 9$
$a^2 + b^2 = 13$
3a + 3b = 15
let a = 3 b = 5
$ab^2 = 75$

23) Which of the following expressions identifies the area of the triangle?

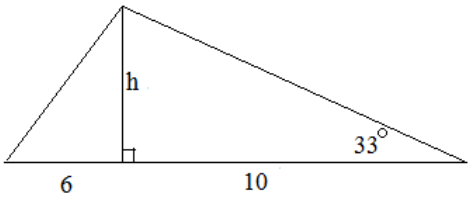
a) $30\tan(33^\circ)$
b) $80\tan(33^\circ)$
c) $160\tan(33^\circ)$
d) $160\sin(33^\circ)$
e) $300\sin(33^\circ)$

area of a triangle = 1/2 (bh)
base = 16

$\tan 33 = \frac{h}{10}$

$h = 10\tan(33)$

area = 1/2 (16)(10tan33) = 80tan(33)



24) What is the y-intercept of $x^2 - 12x + 32$?

a) 1
b) 4
c) 8
d) 12
e) 32

y-intercept: where the function crosses the y axis. it's coordinate will be (0, y)

$(0) - 12(0) + 32 = 32$

25) $f(x) = x - 3$ $g(x) = |2x + 1|$ What is $f(g(-3))$?

a) 2
b) 4
c) 8
d) 11
e) 13

$g(-3) = |2(-3) + 1| = 5$

$f(5) = (5) - 3 = 2$

ACT Practice Test

SOLUTIONS

26) The following figure is a square inside a square.
What is the area of the shaded area?

a) $x^2 - b^2$

b) $x^2 - (x - b)^2$

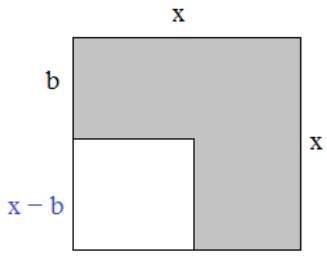
c) $4x - 4b$

d) $\frac{x^2}{4}$

e) $3b^2$

area of entire square: x^2

area of small square $(x - b)^2$



27) Which of the following is $\frac{3}{m} + \frac{m+5}{m+2}$?

a) $\frac{m+8}{2m+2}$

b) $\frac{3m+15}{m^2+2m}$

c) $\frac{4m+11}{m(m+2)}$

d) $\frac{m^2+8m+6}{m(m+2)}$

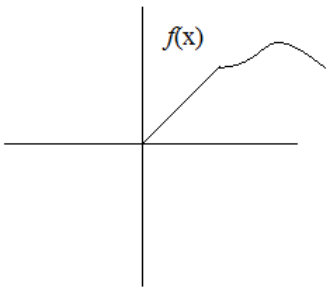
e) $\frac{m+10}{m+2}$

$\frac{3(m+2)}{m(m+2)} + \frac{(m+5)m}{(m+2)m} =$

$\frac{3m+6 \ + \ m^2+5m}{m(m+2)} =$

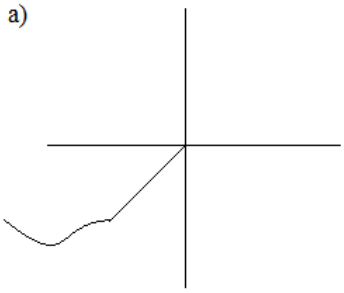
$\frac{m^2+8m+6}{m(m+2)}$

28) The following is the graph of $f(x)$:

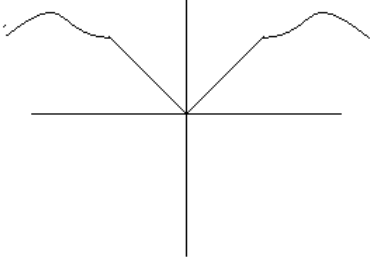


Which is the graph for $-f(x)$?

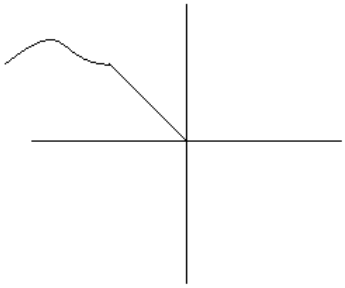
a)



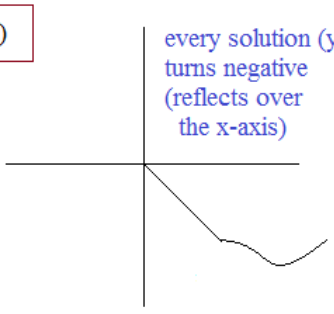
b)



c)

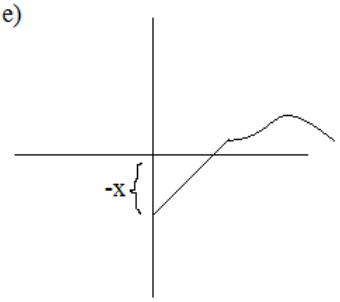


d)



every solution (y) turns negative (reflects over the x-axis)

e)



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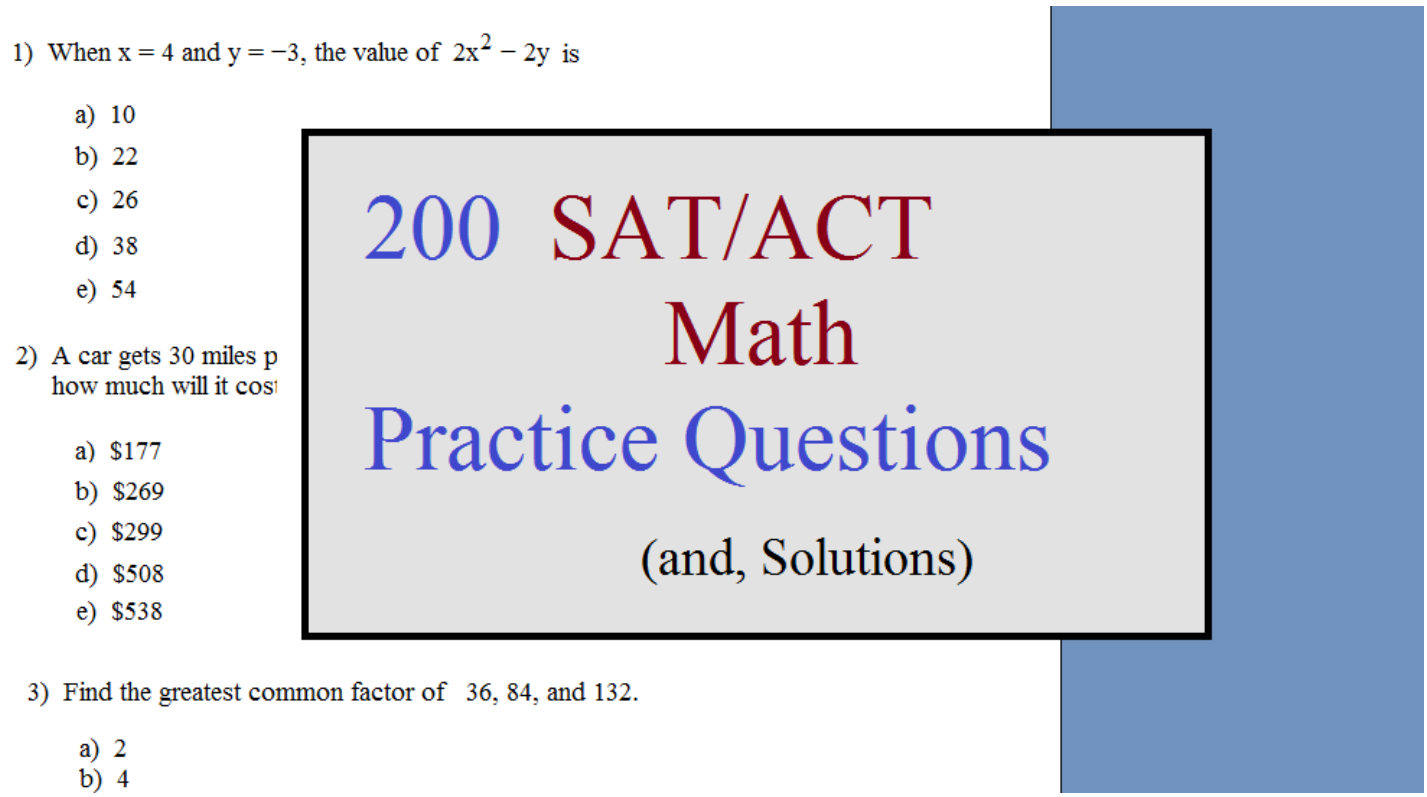

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The proceeds go to site maintenance and treats for Oscar the dog.

We appreciate the support!