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1) If $2(x + 3) = x + 10$, then x equals?
$2x + 6 = x + 10$
$2x = x + 4$
$x = 4$ **Choice 4**

2) The 2 specified angles are alternate interior angles, and are therefore congruent. In other words:
$2x = x + 15$ **Choice 1**

3) $36 - (-14)$ You can also think of it this way. From –14 to
$36 + 14$ 0 is 14, and from 0 to 36 is 36. So the total
14 + 36, or **50**. 14 + 36 is 50. **Choice 1**

4) (1) All quadrilaterals have four right angles.
(2) All quadrilaterals have equal sides.
(3) All quadrilaterals have four sides.
(4) All quadrilaterals are parallelograms.

Let's try each choice. Regarding choice #1, a parallelogram is a quadrilateral and does not necessarily have four right angles.
Regarding choice #2, we can again use a parallelogram as a counter example as it is a quadrilateral having sides that are not equal.
Choice # 4 can be shown to be wrong by picturing a trapezoid. A trapezoid is a quadrilateral and is not a parallelogram. This leaves us with **Choice 3** as the answer**.**
Choice three is actually the definition of a "quadrilateral." "Quadri" means 4, and "lateral" means sides.

5) This is an example involving the "counting principle." If one thing can be done in M ways and the other in N ways, then both can be done in M times N ways. In other words, 10 times 8 = **80**. **Choice 4**

6) What is the value of $\frac{x^2 - 4y}{2}$, if $x = 4$ and $y = -3$?

$\frac{(4)^2 - 4(-3)}{2} = \frac{16 + 12}{2} = 28/2 =$ **14** **Choice 4**

7) **Jason goes shopping or he goes to the movies** is a disjunction.
A disjunction is true if at least one of its parts is true.
Jason does not go to the movies has just negated the second part of the disjunction. Therefore in order for the original stated disjunction to still remain true, its first part **Jason goes shopping**, has to be true. **Choice 2**

8) The equation for the slope intercept form of a line is $y = mx + b$, where m represents the slope and b represents the y intercept. If line has a slope of 3, and a *y*-intercept of –2 its equation would be
$y = 3x - 2$. **Choice 2**

9) The locus of points equidistant from 2 parallel lines will be a third line, midway between the given 2 lines and parallel to them.
The answer therefore is **a line**. **Choice 1**

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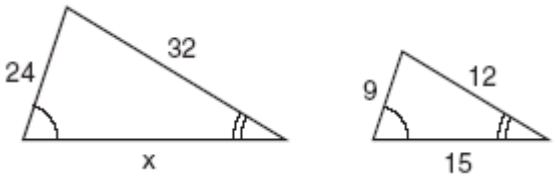
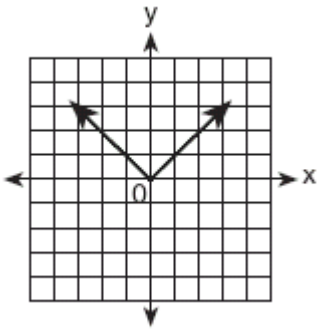
10)



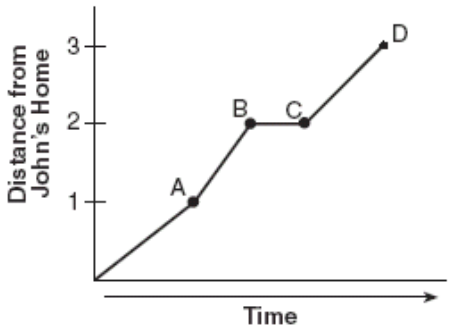
The sides of similar triangles are in proportion. The first choice begins X is to 24. The sides of the smaller triangle corresponding to those two sides would be 15 to 9. . Choice 1, however ends 9 is to 15. Choice 2 begins with the ratio 24 to 9 – large triangle to small triangle. It ends off 15 to x, which is small triangle to large triangle. No good again. Choice 4 is wrong for the same reason. It begins 32 is to 12 (large triangle to small triangle) and ends off 15 to x (small triangle to large triangle). **Choice 3 is correct. 32 is to x as 12 is to 15. The 32 and x correspond to each other, as do the 15 and x.**

11)



Choice number 1 pictured at left is the correct answer. The y-axis is the line of symmetry. The graph is therefore symmetric with respect to the y-axis.

12)



From Point B to C, time is moving but distance remains the same. In other words, John stops walking at point B in time. Choice 2 is therefore correct:
John waited before crossing a busy street.
Choice 2

13)

$8^{-4} \cdot 8^{6}$

When multiplying exponents, we add the exponents: (-4) + (6) = +2
The answer is therefore choice 3 or 8^2.

14) $x^2 - 9$ is factorable as (x+3) (x-3). $x^2 - 5x + 6$ Is factorable as (x-3)(x-2).
The common factor is x – 3. **Choice 2**

15) The converse of a conditional "if P then Q" becomes "if Q then P." The hypothesis and conclusion switch positions. Given the original statement: If the sum of two angles is 180°,then the angles are supplementary," its converse becomes:
If two angles are supplementary, then their sum is 180°. Choice 1

16) The $\sqrt{8}$ is irrational because it can not be represented in the form of a/b where a and b are integers, and b is not equal to 0. **Choice 2**

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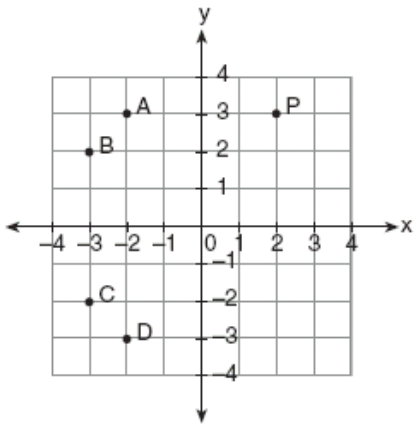
17) The spinning flag would create **the shape of a cone.** **Choice 4**

18)



Point P has the coordinates (2,3). Therefore (2,3) is now represented by (a,b).
(-b,a) would therefore be:
(-3,2) which is point B. **Choice 2**

19) $3x^2 - 34x - 24 = 0$
(3x + 2) (x – 12) = 0
3x + 2 = 0 x – 12 = 0
3x = -2 **x = 12**
x = - 2/3
The correct answer is choice 3.

20) **The diagram depicts the construction of an altitude drawn to base AB.**
Choice 1.

21) 2ax – 5x = 2
x (2a – 5) = 2

$$\mathbf{x = \frac{2}{2a - 5}}$$

Choice 3.

22) The principal square root of $9a^2 + 16a^2$ = the principal square root of $25a^2$.
The principal square root of 25 is 5, and the principal square root of a^2 is a.
The final answer is 5a. If you were to square 5a, the result would be $25a^2$.
Choice 3

23) $\frac{2}{x} + \frac{x}{2}$ The common denominator is 2x.
Multiply the first fraction by 2/2 and the second fraction by x/x.

$$\frac{2(2)}{2(x)} + \frac{x(x)}{x(2)}$$

$$\frac{4}{2x} + \frac{x^2}{2x}$$

$$\frac{4 + x^2}{2x}$$

Choice 4.

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24) This is a combination problem: $_5C_4$ (5)(4)(3)(2) divided by (4)(3)(2)(1) or **5.**
You should also know that a $_5C_4$ is equal to $_5C_1$ which is equal to 5.
Choice 2

25) $\frac{1}{2}x + 3 < 2x - 6$ Multiply all terms by 2.

$x + 6 < 4x - 12$ Subtract 6 from both sides
$-6 \quad -6$

$x < 4x - 18$ Subtract 4x from both sides
$-4x \quad -4x$

$-3x < -18$ Divide both sides by –4 (The "less than" symbol will change)

$x > 6$. **Choice 4**

26) We will first find the length of the diameter and divide by 2 to obtain the length of the radius. Given the 2 endpoints of the radius, (2,2) and (2,12), we can find the distance of the diameter by subtracting 2 from 12. The diameter is 10 units. The radius is therefore half of 10 or **5.** **Choice 1.**

27) 3 feet is one yard. Therefore, when we are given the number of feet and want to convert to yards, we have to divide the feet by 3. Each 3 will be one yard.
So if we are told we have x feet we have to divide the x by 3. The result is **x/3. Choice 2.**

28) $x + y = y + x$ To the left is an example of the commutative property.
$3(x + 2) = 3x + 6$ To the left is an example of the distributive property.
$3 + x = 0$ To the left is an example of the additive inverse.

$(3 + x) + y = 3 + (x + y)$ **This is an example of the associative property**.
An example of the associative property is (2+5) + 6 = 2 + (5 + 6).
Choice 3

29) When A is subtracted from B, we first write down the B and subtract A from it.
$x^2 + 3x - 2 - (2x^2 - x + 6)$
$x^2 + 3x - 2 - 2x^2 + x - 6$
$-x^2 + 4x - 8$ **Choice 4.**

30) $(a^2 + b^2)^2 = (a^2 + b^2)(a^2 + b^2)$ Multiply the firsts, outers, and inners and combine.
$a^4 + a^2 b^2 + a^2 b^2 + b^4$
$a^4 + 2a^2 b^2 + b^4$ **Choice 3.**

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31) In this direct variation we have to set up a proportion:

$$\frac{\text{Wages}}{\text{hours}} = \frac{\text{wages}}{\text{hours}}$$

Let x = wages at 30 hours

$\frac{5}{29.75} = \frac{30}{x}$ The product of the means = product of the extremes

$5x = 30\ (29.75)$

$5x = 892.50$ Divide both sides by 5

$x = \$178.50$

ANS. $178.50

32) If the average (mean) salary of the 5 employees is $360, then the sum of the 5 salaries equals 5 (360) or $1800. The sum of the four given salaries are:
$340 + $340 + $345 + $425 or $ 1450. How much is missing to get the sum to equal $1800?
!800 – 1450 or $ 350

ANS. $350

33) Rate X Time = Distance

Bob's distance is given as 70 miles. His rate is given as 50mph. His time can now be computed: 50 X Time = 70 Time = 70/50 = 7/5 hours

Tom's distance is given as 60 miles. His rate is given as 40mph. His time can now be computed: 40 X Time = 60 Time = 60/40 = 6/4 hours

Bob gets there 7/5 of an hour which is equal to 1 and 2/5 hours. (2/5 is less then half an hour. It is 2/5 X 60 or 24 minutes.

Tom gets there in 6/4 of an hour which is equal to 1 and ½ hours or 1 hour 30 minutes.

Bob gets there first.

34) Given there are 22 vehicles.
8 are vans.
6 are red.
10 are neither vans nor red, that means that 12 ARE vans or red.

We are given that there are 8 vans and 6 red vehicles.
That adds up to 14 that ARE vans or red.
There is an overlap of 2 that are both vans and red.

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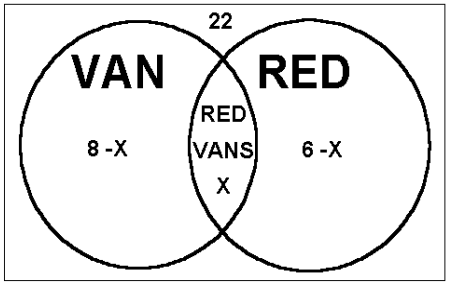

Using Venn diagrams:
There are 22 vehicles in the universe.
Based on the given information, there are
8 vans and 6 red vehicles. Let x = the number of red vans. We were told that 10 were not vans or red, therefore, 22 – 10, or 12 are vans AND red.
Using the diagram at the right,
(8-x)+(x)+(6-x)= 12
14 – x = 12
-x = -2
x = 2

There are therefore 2 red vans

35) This is an easy problem using the counting principle.
The license plate is set up as follows: L L D D D, where L stands for a letter and D stands for a digit. The first position is limited to a J or W. You therefore have **2** choices for that first position. The second position can be filled with any of the **26** letters of the alphabet. The remaining 3 positions have to be filled with digits. There are 10 digits from 0 to 9. The restriction regarding the digits is that they are not to repeat. Therefore the first digit can be any one of **10**; the second, any one of **9**; and the third any one of **8**. Using the counting principle we now have: **(2)(26)(10)(9)(8) or 37,440 different license plates.**

36) Let x= the number of 20-cent stamps.
2x= the number of 32-cent stamps. (He used twice as many)

To calculate the cost of 20-cent stamps we have to multiply the number of stamps by .20, and to calculate the cost of 32-cent stamps we have to multiply their number by .32.
The postage due on the mailed package was $3.36.

Therefore: .20(x) + .32(2x) = 3.36
.20x + .64x = 3.36 (multiply each term by 100)
20x + 64x = 336 (combine like terms)
84x = 336 (divide both sides by 84)
x = 4

ANSWER: 4 20-cent stamps, and 8 32-cent stamps.

37) This question involves the circumference of the wheel. The formula for the circumference of a circle (the shape of the wheel) is given by πd (pi times the diameter). The radius in our case is 5, so the diameter is 10. The circumference of the wheel is therefore 10π or 31.4 (use the pi key on your calculator. Pi is approximately 3.14). In one revolution this particular wheel will travel 31.4 feet. Now divide 1000 by 31.4 to calculate the number of revolutions in 1000 feet = 31.8471. The question asks for COMPLETE revolutions.
ANSWER: 32 revolutions

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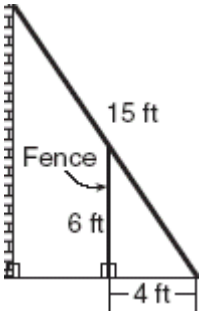
38) **Part "a"** asks for the angle, to the nearest degree, the ladder makes with the ground. You are given a side of 6 which is opposite that angle, and a side of 4 which is adjacent to that angle. The tangent ratio involves the opposite and the adjacent.



$\tan X = \frac{\text{opposite}}{\text{adjacent}} = \frac{6}{4}$ Using the $\tan^{-1}$ key on your calculator, you obtain the angle whose tan is 6/4.

ANSWER: 56 to the nearest degree.

Part "b" asks for the how high up the wall does the 15-foot ladder reach. You are asked to use the angle figured out in part "a" of this problem.

The angle the ladder makes with the ground is 56 degrees. The hypotenuse (the length of the ladder) is 15 feet. You want to find out the wall which is opposite the 56 degree angle. This calls for the sine ratio because it involves the opposite and the hypotenuse.

$\sin 56^\circ = \frac{\text{opposite}}{\text{Hypotenuse}} = \frac{x}{15}$

$X = 15(\sin 56^\circ)$ $(\sin 56^\circ = .8290)$

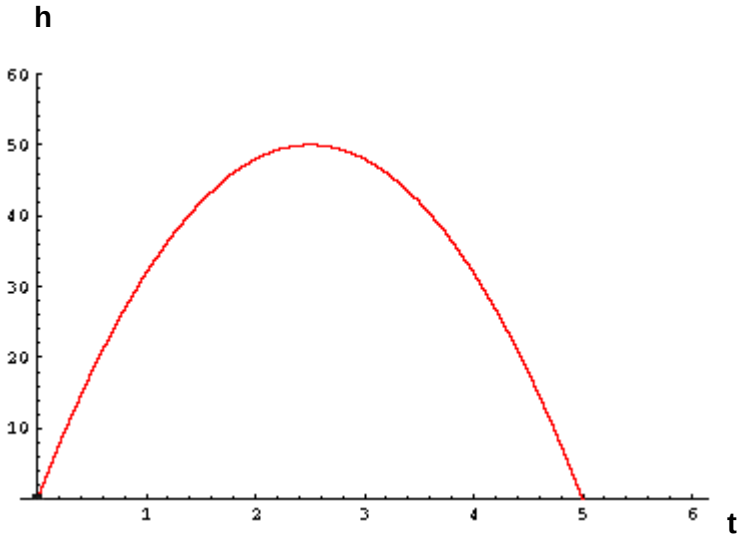
$X = 12.4355$

ANSWER: 12 feet

39) To the right is the graph of:

$h = -8t^2 + 40t$

t	$-8t^2 + 40t$	h
0	$-8(0)^2 + 40(0)$	0
1	$-8(1)^2 + 40(1)$	32
2	$-8(2)^2 + 40(2)$	48
3	$-8(3)^2 + 40(3)$	48
4	$-8(4)^2 + 40(4)$	32
5	$-8(5)^2 + 40(5)$	0



For **part b)** t will be half-way between 2 and 3 for h to reach its maximum.

ANSWER: 2.5