GREATER ATLANTA CHRISTIAN SCHOOL

AP Physics 1 Summer Review

This packet is intended to be review of some fundamental math and science concepts. Students enrolled in AP Physics 1 for the Fall should thoroughly complete this review over the summer to turn in on the first day of school. Students will be formally assessed on this material during the first few days of the new school year.

Multiple Choice

1. The number 0.127 is how much greater than 1/8 ?
A. ½
B. 2/10
C. 1/50
D. 1/500
E. 2/500

2. Which of the following could not be the lengths of the sides of a right-angled triangle?
A. 3, 4, 5
B. 5, 12, 13
C. 8, 15, 17
D. 12, 15, 18
E. 9, 12, 15

3. (a^2 -b^2)/(a + b)
If a and b are both positive, which of the following is a simplification of the expression above?
A. $a^2 + b^2 + 1$
B. a + b
C. a - b
D. ab
E. it cannot be simplified further

4. x = y - (50/y), where x and y are both > 0
If the value of y is doubled in the equation above, the value of x will
A. decrease
B. stay the same
C. increase four-fold
D. double
E. increase to more than double

5. Which of the following could be a solution of the equation $|x| = |4x - 3|$
A. -1
B. -0.6
C. 0
D. 0.6
E. 1.5

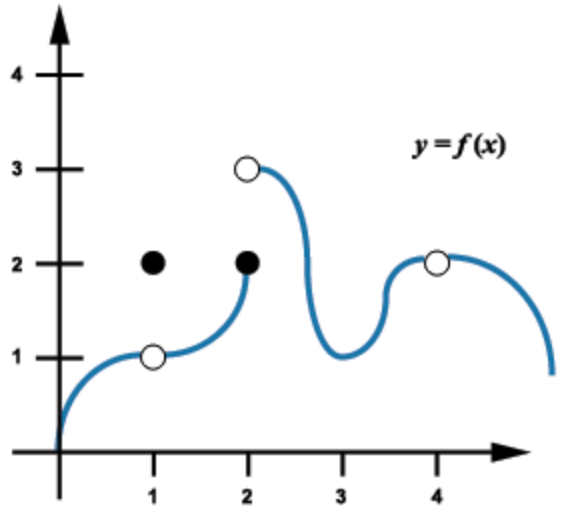
6. The number of degrees that the hour hand of a clock moves through between noon and 2.30 in the afternoon of the same day is
A. 720
B. 180
C. 75
D. 65
E. 60

7. Jeff takes 20 minutes to jog around the race course one time, and 25 minutes to jog around a second time. What is his average speed in miles per hour for the whole jog if the course is 3 miles long?
A. 6
B. 8
C. 10
D. 12
E. 14

8. A wheel has a diameter of x inches and a second wheel has a diameter of y inches. The first wheel covers a distance of d feet in 100 revolutions. How many revolutions does the second wheel make in covering d feet?
A. 100xy
B. 100y - x
C. 100x - y
D. 100y/x
E. 100x/y

Free Response

Using the graph of f as shown,



estimate the following values:

$\lim_{x \to 1} f(x) =$

$\lim_{x \to 3} f(x) =$

$\lim_{x \to 2} f(x) =$

$\lim_{x \to 4} f(x) =$

$\lim_{x \to 2^+} f(x) =$

and compute

$$\lim_{x \to 2} \frac{3x^2 - x - 10}{x^2 - 4}$$

$$\lim_{x \to 3} \frac{x^4 - 81}{2x^2 - 5x - 3}$$

.

$$\lim_{x \to -2} \frac{\frac{1}{x} + \frac{1}{2}}{x^3 + 8}$$

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$$\lim_{x \to 4} \frac{3 - \sqrt{x+5}}{x - 4}$$

$$\lim_{x \to 0} \frac{x^3 - 7x}{x^3}$$

.

$$\lim_{x \to 1} \frac{x^3 - 1}{(x-1)^2}$$

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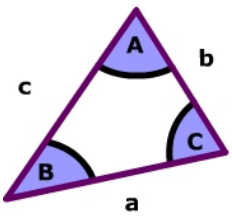
For Reference:

Law of Cosines



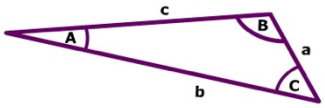
$a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$

$b^2 = a^2 + c^2 - 2ac \cdot \cos(B)$

$c^2 = a^2 + b^2 - 2ab \cdot \cos(c)$

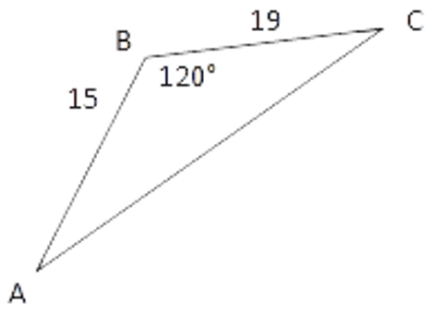
Law of Sines

$$\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$$



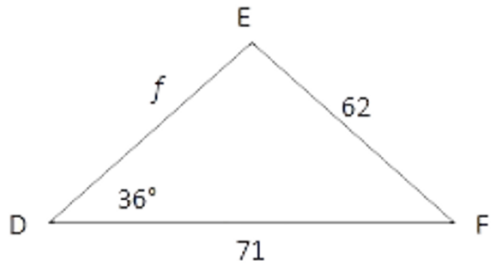
$$\frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$$

12. Find the $m\angle C$ to the nearest whole degree.



13. If a 25^o, 45^o, 110^0 triangle has a leg between the 25^0 angle and the 45^o angle measuring at 56 cm. long, find the length of the other two sides. Draw a to-scale sketch of your triangle.

14. Find the f to the nearest whole number.



15. An airplane going 250 mph is heading due north when it encounters a wind of 60 mph 30 degrees east of north. Sketch the situation – label the pieces – determine the resultant angle and speed of the plane.

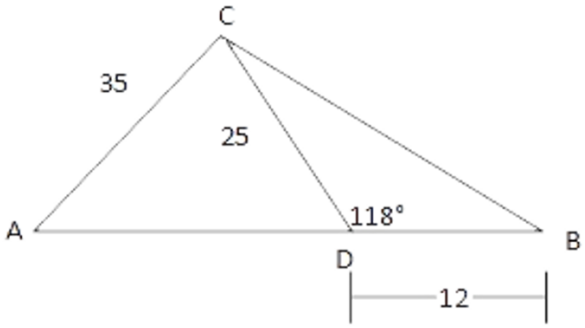
16. Using the concept from Problem 15, what direction would the wind need to be blowing for the final speed of the plane to be 310 mph?

and what direction would the wind need to be blowing for the speed of the plane to be 190 mph?

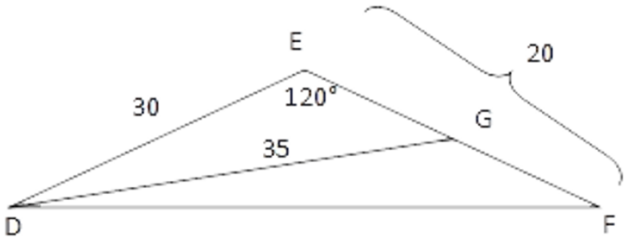
and what direction would the wind need to be blowing for the plane to be going 275 mph?

and why can the plane not ever be going 400 mph under the conditions given?

17. Find the $m\angle A$ to the nearest whole degree.



18. Find the $m\angle DGF$ to the nearest whole degree.



For Problems 19-20, we are given:

mass in kilograms (kg)
distance or radius in meters (m)
time in seconds (sec)

All units are MKS

$P = W/t$ $W = Fd$ $v = d/t$ $I = (1/2)mr^2$ $a = v/t$ $F = ma$ μ = (force applied)/force normal

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19. Solve for G and give units for G (show work)

$F = (Gm_1m_2)/d^2$

20. Show units for each of the following:

(a) F/v

(b) Ft

(c) F/a

(d) F/W

(e) v^2/a

(f) mv

(g) P/a

(h) Wt/d

(i) I/r

(j) Ft^2/m

21. For each of the following, solve for “a”

(a) $(mb)/c = r[\sqrt{a}]$

(b) $apm = (ca^2)/4$

(c) $f/a^2 = n\sin\Theta$

(d) $v/(arp) = (6n^2)/(ba^2)$

(e) $r\sin(a) = 2/(pb)$

(f) $(abc)/(\sqrt{d}) = (\sqrt{nd})/6$

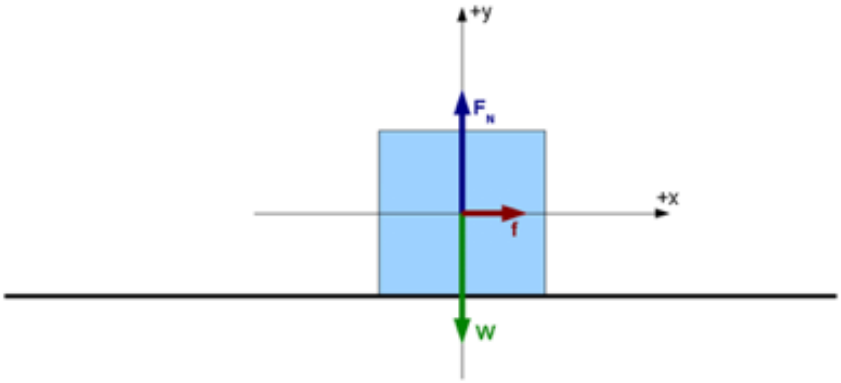
(g) $6a^2 + 2a - 3 = 0$

(h) $a^2 + b^2 - 2ab\cos\Theta = c^2$

(i) $n/(2a) = d/(b\sin\Theta)$

(j) $(rw)/4 = x^a$

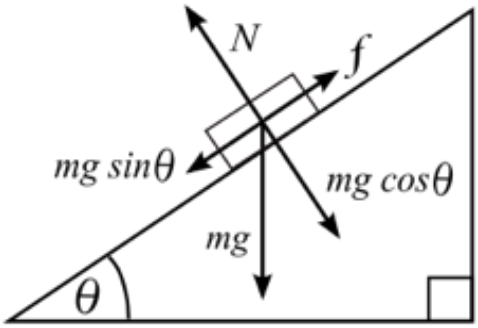
22.



Refer to f as Force applied
Refer to W as Force due to weight or mg
Keep F_N as normal force
Refer to force opposing f as frictional force

This is a flat surface of wood on wood and the block is being pulled to the right
Using this free body diagram, explain each of the 4 forces in a complete sentence each.

23.



Which trig function is used to calculate the height of the board if you know the length of the board?

Show the equation for this calculation:

Θ = _____ degrees

If the board is 3 m long, calculate the height: