MYP Physics Summer Packet

Welcome to MYP Physics! You might be wondering why you're getting summer work for a subject you haven't seen before. The short answer is that although I don't expect you to come into MYP Physics with any prior knowledge about physics, I do need you to come into MYP Physics with prior knowledge about some math concepts.

Here's the short list of math that you need to feel comfortable with in order to have success in physics:

- Algebra and basic equation manipulations
- Quadratic equations
- Pythagorean theorem
- Basic trigonometry (SOHCAHTOA)
- Exponent rules

In this packet you'll find practice problems for all of the above math concepts, as well as links to Khan Academy so that you can watch videos and get even more practice problems if you need more help.

If at any point in this packet you feel stuck, please reach out to me by email (lesch@cdspatriots.org) or Schoology and I'll be more than happy to help you through it.

Once you are comfortable with these math concepts, then you have enough math skills to make it through MYP and DP Physics.

Looking forward to a great year together!
Mrs. Esch

Algebra

You'll need to be able to solve algebraic equations.

https://www.khanacademy.org/math/algebra

1. $5280 = 44t$; find t
2. $v_f^2 = v_0^2 + \frac{1}{2}at^2$; find a if $v_f = 0$, $v_0 = 20$, and $t = 4$
3. $F = \frac{mv^2}{r}$; find r if F = 455, m = 94, and v = 22
4. $KE = \frac{1}{2}mv^2$; find KE if m = 9.1 and v = 3.2
5. $T = \frac{1}{2\pi}\sqrt{\left(\frac{1.5}{9.8}\right)}$; find T
6. $F = ma$; find a if F = 25 and m = 2
7. $P = \frac{W}{t}$; find t if P = 150 and W = 35
8. $F = \frac{kq_1q_2}{r^2}$; Find F if k = 9, q_1 = 7, q_2 = 5, and r = 4
9. $\frac{1}{2}mv^2 = \frac{1}{2}kx^2$; find v if m = 5, k = 100, and x = 0.01
10. $g = \frac{GM}{r^2}$; find g if G = 6.73, M = 5.97, and r = 6.37

Quadratic Equations

You'll need to be able to solve quadratic equations.

https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:quadratic-formula-a1/v/using-the-quadratic-formula

11. $3 = \frac{a}{2} + a^2$; find a

12. $0 = 400 + 12t - 4.9t^2$; find t

13. $24x^2 - 6x = 36$; find x

14. $0 = -3.2 - 1.3a + 4.7a^2$; find a

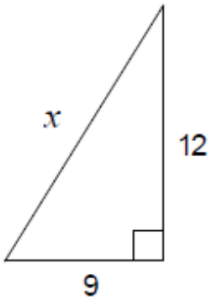
15. $t^2 - 14.3t + 37.2 = 0$; find t

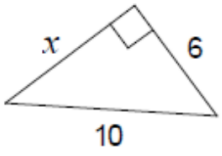
Pythagorean Theorem

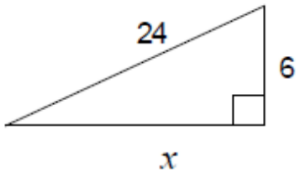
You will need to know how to solve for missing sides in a right triangle.

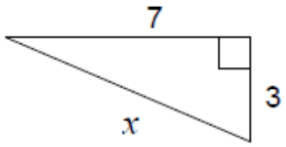
https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-geometry/cc-8th-pythagorean-theorem/v/the-pythagorean-theorem

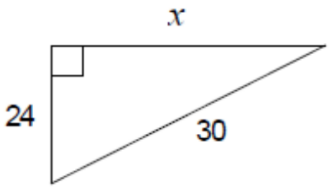
Find x in each of the triangles below.

16. 

17. 

18. 

19. 

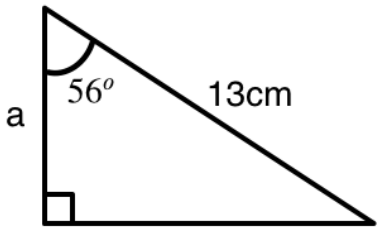
20. 

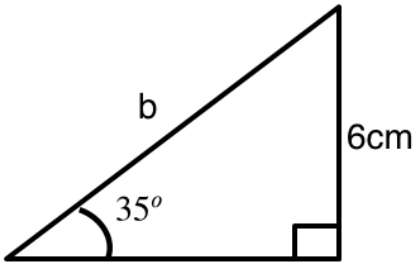
Trigonometry

You will need to know the basic trigonometry of right triangles. Specifically you'll need to know how to find missing sides and angles given other sides and angles (SOHCAHTOA).

https://www.khanacademy.org/math/geometry-home/right-triangles-topic#intro-to-the-trig-ratios-geo

In each of the questions below, calculate either the missing angle or side stated. Give your answer correct to 1 decimal place.

21. 

22. 

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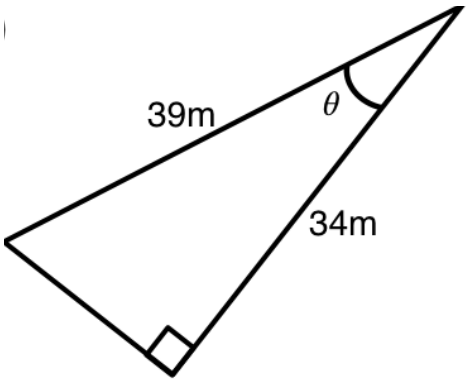

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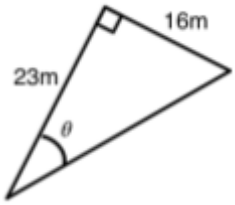

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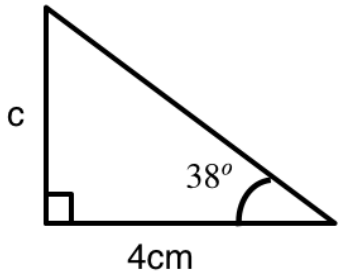

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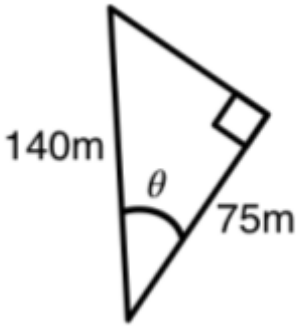

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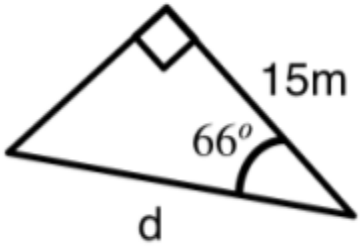

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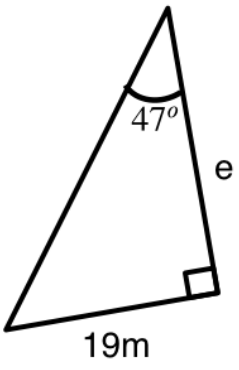
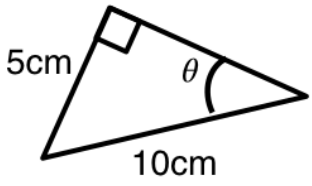
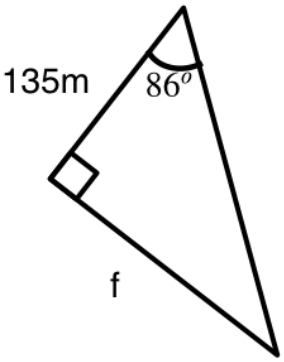


29. 

30. 

Exponents

You will need to know how to add and multiply numbers containing exponents, as well as raise exponents to a power. https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-exponent-properties/v/exponent-properties-involving-products

31. $x^3 \times x^5$

32. $\left(2.5 \times 10^{-6}\right) \times \left(4 \times 10^{6}\right)$

33. $10^{7} \times 10^{-3}$

34. $\frac{0.004 \times 32000 \times 0.6}{6400 \times 3000 \times 0.08}$

35. $\frac{\left(6 \times 10^{6}\right)\left(4 \times 10^{-5}\right)^{4}}{\left(8 \times 10^{2}\right)^{2}\left(2 \times 10^{-4}\right)^{3}}$