

Physics Summer Packet

Congratulations! You have decided to take Physics. Physics is applied mathematics, with the focus of applied Algebra, Geometry, and Trigonometry. This course offers insight into how our world works. This class will require effort, attention to detail, and most importantly hard work.

Within this summer packet you will find skills that critical for YOUR success in this class. It is imperative that you UNDERSTAND how to solve all problems within this packet. Should you need assistance, email me at rflatley@rpsd.org or send me a message through the Remind app. Show all of your work, and do **your own** work. I would highly suggest starting this packet in mid-August and finishing this packet by September 1st.

This packet will be due on the 2nd day of school. Please join the Remind class as attached to this packet.

See you in September!!

Mr. Flatley



Sign up for important updates from Mr. Flatley.

Get information for Roselle Park High School right on your phone—not on handouts.

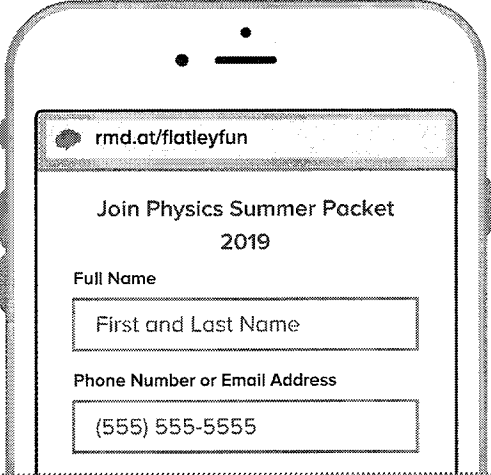
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A If you have a smartphone, get push notifications.

On your iPhone or Android phone, open your web browser and go to the following link:

rmd.at/flatleyfun

Follow the instructions to sign up for Remind. You'll be prompted to download the mobile app.




B If you don't have a smartphone, get text notifications.

Text the message @flatleyfun to the number 81010.

If you're having trouble with 81010, try texting @flatleyfun to (908) 336-0393.

** Standard text message rates apply.*



Don't have a mobile phone? Go to rmd.at/flatleyfun on a desktop computer to sign up for email notifications.

Physics Summer Work (Manipulating Equations)

Name: _____

Date: 9/6/19

Solve the following formulas for the specified variable:

1. $a^2 + b^2 = c^2$ for b^2

2. $2mp - 3l = 4$ for p

3. $3kl + 2m = 5m + 3$ for k

4. $5p + 6n = -4p - 5$ for p

5. $kn - 3 = ln - 4$ for n

6. $\frac{mkl}{3} = A$ for k

7. $6x - 3y = 4xy + 2$ for x

8. $8mn - m = 5$ for m

9. $\frac{10mn^2}{6} = k$ for m

10. $6k + 2 - m = 3k + 4$ for k

Formulas

Solve the following formulas for the specified variable:

11. $3(k + 4) = 5m + 1$ for k

12. $2l + 2w = P$ for l

13. $\frac{5mn}{3} = M$ for n

14. $6kp + lp = 5$ for p

15. $7mn - 8 = 8mk + 2$ for m

16. $\frac{15mnl}{2} = 6$ for m

17. $6ln - 4k = 4lm - 4$ for l

18. $10k + p = a + bp$ for p

19. $6abp - 2p = 7$ for p

20. $\frac{8mn}{k} = 16$ for k

Summer Assignment

Date 9/6/19**Solve for v.**

1) $KE = \frac{1}{2}mv^2$

Solve for m.

2) $KE = \frac{1}{2}mv^2$

3) $GPE = mgh$

Solve for g.

4) $GPE = mgh$

Solve for h.

5) $GPE = mgh$

Solve for a.

6) $v = v_0 + at$

7) $v^2 = v_0^2 + 2ax$

Solve for x.

8) $v^2 = v_0^2 + 2ax$

Solve for v.

$$9) v^2 = v_0^2 + 2ax$$

Solve for vo

$$10) v^2 = v_0^2 + 2ax$$

$$11) x = x_0 + v_0 \cdot t + \frac{1}{2}at^2$$

Solve for a.

$$12) x = x_0 + v_0 \cdot t + \frac{1}{2}at^2$$

Solve for t, when vo = 0.

$$13) x = x_0 + v_0 \cdot t + \frac{1}{2}at^2$$

Solve for m1.

$$14) F = \frac{Gm_1m_2}{r^2}$$

Solve for r.

$$15) F = \frac{Gm_1m_2}{r^2}$$

Solve for I.

$$16) P = I^2 \cdot R$$

Solve for V.

$$17) P = \frac{V^2}{R}$$

Solve for r.

$$18) a = \frac{v^2}{r}$$

Solve for v.

$$19) a = \frac{v^2}{r}$$

Solve for h1.

$$20) mgh_1 = mgh_2 + \frac{1}{2}mv^2$$

Solve for v.

$$21) mgh_1 = mgh_2 + \frac{1}{2}mv^2$$

Solve for k.

$$22) \frac{1}{2}kx^2 = \frac{1}{2}mv^2$$

Solve for m.

$$23) \frac{1}{2}kx^2 = \frac{1}{2}mv^2$$

Solve for x.

$$24) \frac{1}{2}kx^2 = \frac{1}{2}mv^2$$

Solve for v.

$$25) \frac{1}{2}kx^2 = \frac{1}{2}mv^2$$

Solve for m.

$$26) T=2\pi\sqrt{\frac{m}{k}}$$

Solve for k.

$$27) T=2\pi\sqrt{\frac{m}{k}}$$

Real Life Applications of Manipulation of Equations

1.

$$m = \frac{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N}{\left(1 + \frac{r}{1,200}\right)^N - 1} P$$

The formula above gives the monthly payment m needed to pay off a loan of P dollars at r percent annual interest over N months.

give P in terms of m , r , and N

2.

$$a = 1,052 + 1.08t$$

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between a , the speed of a sound wave, in feet per second, and t , the air temperature, in degrees Fahrenheit ($^{\circ}\text{F}$).

air temperature in terms of the speed of a sound wave

3.

$$R = \frac{F}{N + F}$$

A website uses the formula above to calculate a seller's rating, R , based on the number of favorable reviews, F , and unfavorable reviews, N .

number of favorable reviews in terms of the other variables

4.

$$I = \frac{P}{4\pi r^2}$$

At a large distance r from a radio antenna, the intensity of the radio signal I is related to the power of the signal P by the formula above.

find the square of the distance from the radio antenna in terms of the intensity of the radio signal and the power of the signal

5.

The density d of an object is found by dividing the mass m of the object by its volume V .
give the mass m in terms of d and V

6.

A bricklayer uses the formula $n = 7\ell h$ to estimate the number of bricks, n , needed to build a wall that is ℓ feet long and h feet high.
give ℓ in terms of n and h

7.

$$\text{Mosteller's formula: } A = \frac{\sqrt{hw}}{60}$$

$$\text{Current's formula: } A = \frac{4 + w}{30}$$

The formulas above are used in medicine to estimate the body surface area A , in square meters, of infants and children whose weight w ranges between 3 and 30 kilograms and whose height h is measured in centimeters.

Based on Current's formula, what is w in terms of A ?

If Mosteller's and Current's formulas give the same estimate for A , give the equivalent to \sqrt{hw}

8. The formula below is often used by project managers to compute E , the estimated time to complete a job, where O is the shortest completion time, P is the longest completion time, and M is the most likely completion time.

$$E = \frac{O + 4M + P}{6}$$

give P in terms of E , O , and M

Summer Packet Conversions

You **MUST** be able to convert within the **metric system**. Refer to the following videos for assistance:

<https://www.youtube.com/watch?v=5tHpDzXP-lg> Part 1

<https://www.youtube.com/watch?v=jeEUV7Xfzac> Part 2

<https://www.youtube.com/watch?v=81mlgt6quqc> Part 3

<https://www.youtube.com/watch?v=dQw4w9WgXcQ> Part 4

Convert the following:

100 grams to _____ kilograms

43 g to _____ kg

.003 g to _____ kg

10242 g to _____ kg

2 centimeters to _____ meters

1234 cm to _____ m

0.24 cm to _____ m

0.00000452 cm to _____ m

323 cm to _____ m

98 millimeters to _____ meters

76 mm to _____ m

434 mm to _____ m

2×10^3 mm to _____ m

0.0020033004 mm to _____ m

Memorize the conversions for the following:

Nano (n) $\times 10^{-9}$

Micro (μ) $\times 10^{-6}$

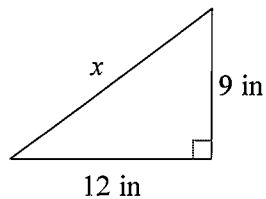
Milli (m) $\times 10^{-3}$

Centi (c) $\times 10^{-2}$

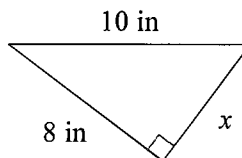
Pythagorean Theorem and Trig

Find the missing side of each triangle. Round your answers to the nearest tenth if necessary. Use Pythagorean Theorem

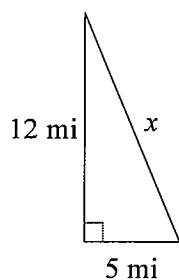
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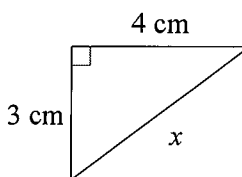
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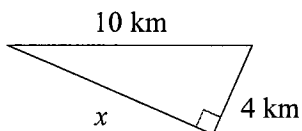
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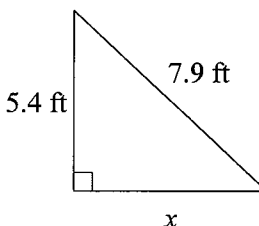
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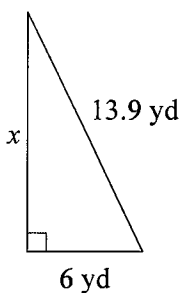
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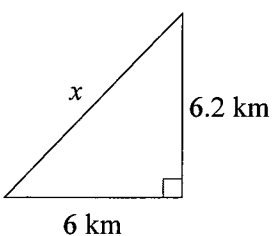
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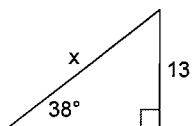


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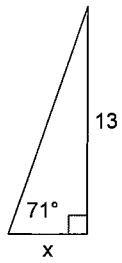


Find the missing side. Round to the nearest tenth. Use SOH CAH TOA.

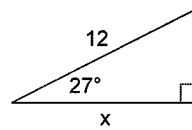
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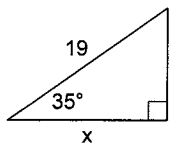
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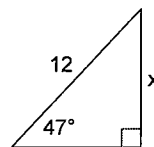
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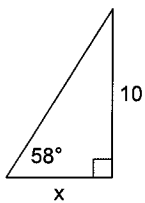
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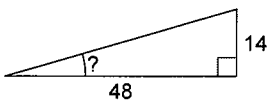


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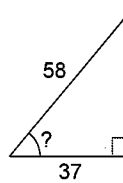


Find the measure of the indicated angle to the nearest degree. Use SOH CAH TOA and inverse trigonometric functions to solve.

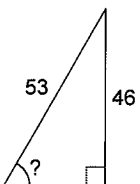
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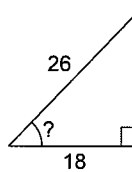
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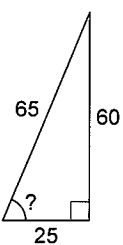
17)



18)



19)



20)

