Rules of Exponents
Quadratics #1, 2, 3, 4a,5d,
Seq Series #3 ,5 ,7, 8,

Seq. & Series

#3) $\sum_{n=1}^{4} 2n^2$

This means "add up all the terms from the 1st to 4th. Each term can be found using formula $2n^2$"

$t_1 = 2(1)^2 = 2$

$t_2 = 2(2)^2 = 8$

$t_3 = 2(3)^2 = 18$

$t_4 = 2(4)^2 = 32$

$2+8+18+32$

$= 60$

Properties of Exponents

$(a)^m(a)^n = a^{m+n}$

$\dfrac{a^m}{a^n} = a^{m-n}$

$\underbrace{\sqrt[3]{a^4} = a^{\frac{4}{3}}}$

$(a^m)^n = a^{m \cdot n}$

$a^{\frac{b}{c}} = \sqrt[c]{a^b}$

$(ab)^n = a^n b^n$

$\left(\dfrac{a}{b}\right)^n = \dfrac{a^n}{b^n}$

$\dfrac{4a^{-3}b^5}{8a^4b^7} = \dfrac{1}{2a^3a^4b^2} = \dfrac{1}{2a^7b^2}$

Seq & Series

#5) $\underbrace{5 \xrightarrow{\times 2} 10 \xrightarrow{\times 2} 20, 40 \ldots}$ $r = 2$ so... geometric!

find

a) $t_{13} = 5(2)^{(13-1)} = \boxed{20,480}$

$t_n = t_1(r)^{(n-1)}$

b) $S_{10} = \dfrac{5 - 5(2)^{10}}{1-2} = \boxed{5,115}$

$S_n = \dfrac{t_1 - t_1(r)^n}{1-r}$

Seq & Series

#8) Find the sum of the arithmetic series.

$$\overset{-3}{20 + 17} \overset{-3}{+ 14} + 11 + \ldots + -64$$

$$S_n = \frac{(t_1 + t_n)n}{2} = \frac{(20 + -64)n}{2}$$

$$= \frac{(20 + -64)(29)}{2} = -638$$

S_n we don't know n (how many terms)!

So... we will use the arithmetic t_n formula to help

last term!

$$t_n = t_1 + d(n-1)$$

solve for n

$$-64 = 20 + {}^{-}3(n-1)$$
$$-20 \quad -20$$
$$\frac{-84}{-3} = \frac{\cancel{-3}(n-1)}{\cancel{-3}}$$
$$28 = n - 1$$
$$+1 \qquad +1$$
$$29 = n$$

plug this into S_n formula!

Seq: Series

#7) $\sum_{k=1}^{30} 3k-5$

$t_1 = 3(1)-5 = -2$

$t_2 = 3(2)-5 = 1$

$t_3 = 3(3)-5 = 4$

+3 +3

do this to figure out if pattern is arithmetic or geometric.

in this case arithmetic!

use formula!

So... $S_n = \frac{(t_1+t_n)n}{2}$

$3(30)-5 = 85$

$S_{30} = \frac{(-2+t_{30})(30)}{2}$

$S_{30} = \frac{(-2+85)30}{2}$

$\boxed{S_{30} = 1245}$

Quad

#1) solve by factoring

A M

$x^2 - 3x - 40 = 0$

$(x+5)(x-8) = 0$

40

1 40

2 20

~~3~~

4 10

5 8

~~6~~

~~7~~

So... $x + 5 = 0$

$-5 \quad -5$

$\boxed{x = -5}$

or

$x - 8 = 0$

$+8 \quad +8$

$\boxed{x = 8}$

2 answers!

Quad #2)

Solve by square roots

$$y = 4x^2 - 100$$

$$0 = 4x^2 - 100$$

$$+100 \qquad +100$$

$$\frac{100}{4} = \frac{4x^2}{4}$$

$$\sqrt{25} = \sqrt{x^2}$$

$$x = \pm 5$$

both answers for Full credit!

Quad)

#3) Solve by completing the square.

$$x^2 + 10x = 15$$

you can only solve when equation = 0

$$x^2 + 10x - 15 = 0$$

$$+40 \quad +40$$

$\left(\frac{10}{2}\right)^2 = (5)^2$

$c = 25$

$$x^2 + 10x + 25 = 40$$

$$\sqrt{(x+5)^2} = \sqrt{40}$$

$$x + 5 = \pm 6.?$$

2 answers for credit

$$x = 6.? - 5 = 1.32$$

$$x = -6.? - 5 = -11.32$$

Quad)

#4) find the roots $y = x^2 - 6x + 5$

$$0 = x^2 - 6x + 5$$

you could factor

$$0 = (x-5)(x-1)$$

$$\boxed{x = 5 \text{ or } 1}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4(a)(c)}}{2(a)}$$

$$x = \frac{-(-6) \pm \sqrt{6^2 - 4(1)(5)}}{2(1)}$$

$$= \frac{6 \pm \sqrt{36 - 20}}{2}$$

$$= \frac{6 \pm \sqrt{16}}{2}$$

$$= \frac{6 \pm 4}{2}$$

$$\frac{10}{2} = 5 = x$$

$$\frac{2}{2} = 1 = x$$

Final answer is 2 roots.

Quad #5) Find t when (in theory) will the firework hit the ground?

$h=0$

So... we are finding the roots! Use quad formula!

$$h = -16t^2 + 184t$$

$$t = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$c=0$!

$$= \frac{-184 \pm \sqrt{184^2 - 4(-16)(0)}}{2(-16)}$$

$$= \frac{-184 \pm \sqrt{184^2}}{-32}$$

$$= \frac{-184 \pm 184}{-32}$$

$$\frac{-184+184}{-32} = \frac{0}{-32} = 0$$

$$\frac{-184-184}{-32} = \frac{-368}{-32} = 11.5$$

So... The firework hits the ground after 11.5 seconds