Midterm Flashback #1 *Answer Key*
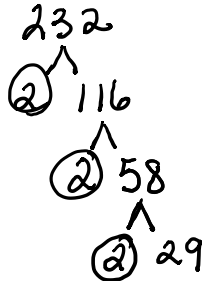
1. Write the prime factorization of 232. Is it a perfect square or cube? How do you know?

$$232$$
$$2 \nearrow 116$$
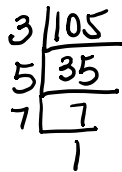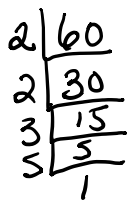$$2 \nearrow 58$$
$$2 \nearrow 29$$

$$232 = 2^3 \cdot 29^1$$

Neither square or cube

if it was a square all primes would have even exponents

if it was a cube, all primes would be a multiple of 3
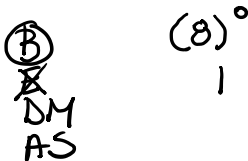
2. Determine the GCF of 60 and 105.

$$
\begin{array}{c|c}
2 & 60 \\
2 & 30 \\
3 & 15 \\
5 & 5 \\
& 1
\end{array}
\qquad
\begin{array}{c|c}
3 & 105 \\
5 & 35 \\
7 & 7 \\
& 1
\end{array}
$$

$$60 = 2^2 \cdot 3^1 \cdot 5^1 \cdot 7^0$$
$$105 = 2^0 \cdot 3^1 \cdot 5^1 \cdot 7^1$$

$$\therefore GCF = 2^0 \cdot 3^1 \cdot 5^1 \cdot 7^0$$
$$= 15$$

3. Evaluate $-(3 + 5)^0$

B
E
DM
AS

$$(8)^0$$
$$1$$

Note: the base for the exponent is $(3+8)$ or 8

You cannot distribute the exponent of zero over a binomial. Exponent laws only work on monomials

4. Simplify: $6x^2(-3x^8)\left(\frac{1}{2}x^1\right)$

Multiplication Law → add exponents
* coefficient multiply

$$6 \cdot 3 \cdot \frac{1}{2} \quad x^2 \cdot x^8 \cdot x^1$$
$$-9 \quad x^{2+8+1}$$
$$-9x^{11}$$

5. Evaluate $\left(\frac{2}{3}\right)^{-3}$ → $\left(\frac{2^1}{3^1}\right)^{-3}$ → $\frac{2^{-3}}{3^{-3}}$ → $\frac{3^3}{2^3}$ → $\frac{3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2}$ → $\frac{27}{8}$

Power of a power

Negative Exponent Law

Evaluate

6. Write 3 450 000 000 000 in scientific notation

decimal moves
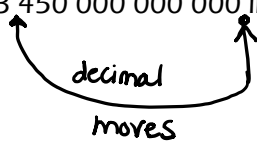
3.45×10^{12}

coefficient always between 1-10

base

exponent → positive because original number is BIG

7. Given the triangle below, determine the length of AB and angle B.

14.8m

$\sin\theta = 7.3/14.8$

$\theta = \sin^{-1}(7.3/14.8)$

$\theta \doteq 30°$
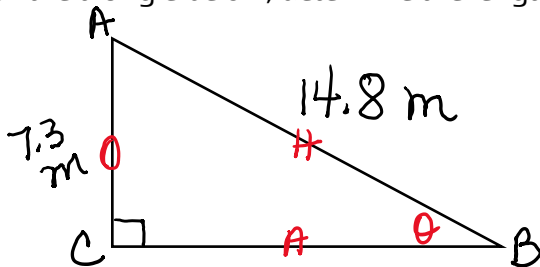
SOH CAH TOA

→ Boring! Lets find CB

$a^2 + b^2 = c^2$

$a^2 + 7.3^2 = 14.8^2$

$a^2 + 53.29 = 219.04$

$-53.29 \qquad -53.29$

$\sqrt{a^2} = \sqrt{165.75}$

$a \doteq \underline{12.9\,m}$

8. If a 10 metre tree casts a 13.4 metre shadow, what is the angle of elevation of the sun?

10m

13.4m

angle of elevation... always from the horizon... up ↑
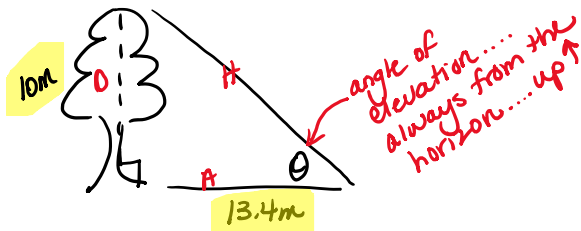
SOH CAH TOA

$\tan\theta = \dfrac{10}{13.4}$

$\theta = \tan^{-1}(10/13.4)$

$\theta \doteq 37°$

9. Simplify: $(5x^2 - 3x) + 2(10 - 4x) - (7x^2 + x - 5)$

$5x^2 - 3x + 20 - 8x - 7x^2 - x + 5$

$-2x^2 - 12x + 25$

10. Expand and simplify $(3x - 4)^2$

multiply distribute

add like terms

$(3x-4)(3x-4)$

$9x^2 - 12x - 12x + 16$

$9x^2 - 24x + 16$