DIRECT MATERIALS AND DIRECT LABOR
VARIANCE FORMULAS

DIRECT MATERIALS VARIANCES:
<u>Materials Price Variance</u>

$MPV = (AP – SP) * AQ$

AP = Actual price for **one unit** of materials
SP = Standards price for **one unit** of materials
AQ = Actual **total number of units** of materials
purchased for production

*Notice the difference in AQ in these two formulas.
It is not always the same!*

<u>Materials Usage Variance</u>

$MUV = (AQ – SQ) * SP$

AQ = Actual **total number of units** of materials **used** in
production
SQ = **Total number of units** of materials that should have
been used based on the unit standard quantity and
actual activity
SP = Standard price for **one unit** of materials

DIRECT LABOR VARIANCES:
<u>Labor Rate Variance</u>

$LRV = (AR – SR) * AH$

AR = Actual wage for **one hour** of labor
SR = Standard wage expected to pay for **one hour** of labor
AH = Actual **total number of hours** incurred for labor

<u>Labor Efficiency Variance</u>

$LEV = (AH – SH) * SR$

AH = Actual **total number of hours** incurred for labor
SH = **Total number of hours** that should have been used
based on the unit standard quantity and actual activity
SR = Standard wage expected to pay for **one hour** of labor

DETERMINING IF FAVORABLE OR UNFAVORABLE:
* The <u>last step</u> for each variance is to determine if the variance is favorable or unfavorable. The easiest way to determine this is to compare the two numbers in parentheses. If the number on the left is larger, the variance is unfavorable. If the number on the right is larger, the variance is favorable. The reason is intuitive. For example, if the actual price is larger than what you were expecting to pay (the standard), then you have to pay more than you were expecting, so that is unfavorable to you.
* In order to determine the overall (or total) variance, you must combine the individual variances. For example, if the MPV and MUV are both favorable, the overall direct materials variance will be the numerical addition of the two individual variances and will be favorable. If they are both unfavorable, the overall variance will be unfavorable. However, if the MPV is $500 unfavorable and the MUV is $750 favorable, the overall direct materials variance will be the numerical difference of the two and will be favorable or unfavorable depending on which one is larger. In this case, the overall direct materials variance would be $250 favorable.

Example: SLAC Company is a toy manufacturing firm. It estimates that it will produce 20,000 toy trucks during the coming year that will each use .025 gallons of paint at $30 per gallon. SLAC Company purchased 500 gallons but only used 490 gallons to actually produce 24,500 toy trucks. The actual price per gallon was $28. In addition, the company expects each truck to use 1.5 hours of labor at a cost of $7.00 per hour. However, at the end of the year it was determined that a total of 37,975 hours were used at a cost of $6.80 per hour.

Directions: Find the following variances: direct materials price variance, direct materials usage variance, overall direct materials variance, direct labor rate variance, direct labor efficiency variance, and overall direct labor variance.

STEP 1: Sort your information according to standards and actual.

Standards	Actual
Production of 20,000 trucks	Production of 24,500 trucks
.025 gallons of paint per truck	Purchased 500 gallons of paint
$30 per gallon of paint	Used 490 gallons of paint
1.5 hours of labor per truck	$28 per gallon of paint
$7.00 per labor hour	37,975 total labor hours
	$6.80 per labor hour

STEP 2: Plug the information into your variance formulas. Keep in mind that not all components of the formula may be given. Sometimes calculations may be required. SQ in the MUV formula below is an example.

$$MPV = (AP - SP) * AQ$$
$$= (\$28 - \$30) * 500$$
$$= \underline{\$1,000\ F}$$

$$MUV = (AQ - SQ) * SP$$
$$= [490 - (.025 * 24,500)] * \$30$$
$$= (490 - 612.5) * \$30$$
$$= \underline{\$3,675\ F}$$

Overall Direct Materials Variance

$$\underline{\$4,675\ F}$$

$$LRV = (AR - SR) * AH$$
$$= (\$6.80 - \$7.00) * 37,975$$
$$= \underline{\$7,595\ F}$$

$$LEV = (AH - SH) * SR$$
$$= [37,975 - (1.5 * 24,500)] * \$7.00$$
$$= (37,975 - 36,750) * \$7.00$$
$$= \underline{\$8,575\ U}$$

Overall Direct Labor Variance
$$\underline{\$980\ U}$$