Identify the test (circle one):

1. Significance test for one proportion (1-PropZTest)
2. Significance test for the difference of two proportions (2-PropZTest)
3. Significance test for a mean (T-Test)
4. Significance test for the difference of two means (2-SampTTest)

Data: Significance level $\alpha =$ .05

Other: (depending on the test, circle and give the necessary values)

$p_0 =$ ______ $\hat{p} =$ 205/2237 $\approx$ .0916 $\bar{x} =$ ______

$\mu_0 =$ ______ $\hat{p}_1 = \frac{92}{1170} \approx .0786$ $\bar{x}_1 =$ ______

$n =$ 2237 $\hat{p}_2 = \frac{113}{1067} \approx .1059$ $\bar{x}_2 =$ ______

females $n_1 =$ 1170 $x_1 =$ 92 $s =$ ______

males $n_2 =$ 1067 $x_2 =$ 113 $s_1 =$ ______

$x =$ 205 $s_2 =$ ______

Check the conditions:

1. The samples can be considered random and independent.
2. $n_1\hat{p}_1 = x_1 = 92 > 5$ ✓

   $n_1(1-\hat{p}_1) = n_1 - x_1 = 1170 - 92 > 5$ ✓

   $n_2\hat{p}_2 = x_2 = 113 > 5$ ✓
3. $n_2(1-\hat{p}_2) = n_2 - x_2 = 1067 - 113 > 5$ ✓

$10n_1 = 11700 <$ total number of females ✓

$10n_2 = 10670 <$ total number of males ✓

State the hypotheses:

H_0: $p_1 = p_2$ or $p_1 - p_2 = 0$

H_a: $p_1 < p_2$ or $p_1 - p_2 < 0$ (don't write $p_2 > p_1$ or $p_2 - p_1 > 0$)

where (circle and describe in words the appropriate symbol(s): $p, p_1, p_2, \mu, \mu_1, \mu_2$)

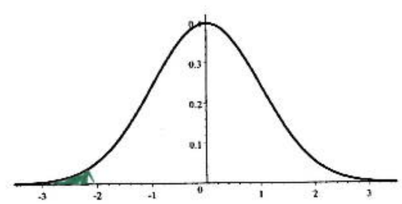
p_1 = true proportion of left-handed females

p_2 = true proportion of left-handed males

Compute the test statistic, p-value, and label and complete the sketch:

Test statistic: $\boxed{z = \dfrac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}}$ = −2.2329813

formula



P-value = .012779033

Is the sample significant? Yes

Yes/No

Conclusions:

(Circle one) We reject/don't reject the null hypothesis.

Explain in context.

Because P-Value = .01277 < .05 we reject the null hypothesis in favor of the alternate hypothesis.

If both males and females had the same proportions of left-handedness, then it would be unlikely (probability .01277) to get samples whose difference is as extreme or more than 92/1170 minus 113/1067.

Thus we have evidence to assert that a larger proportion of males are left-handed.

Identify the test (circle one):

1. Significance test for one proportion (1-PropZTest)
2. Significance test for the difference of two proportions (2-PropZTest)
3. Significance test for a mean (T-Test)
4. Significance test for the difference of two means (2-SampTTest)

Data: Significance level α = 10% = .10

Other: (depending on the test, circle and give the necessary values)

p_0 =	$\hat{p}$ = 620/2000 = .31	$\overline{x}$ =
μ_0 =	$\hat{p}_1$ = .32	$\overline{x}_1$ =
n = 2000	$\hat{p}_2$ = .30	$\overline{x}_2$ =
2009 → n_1 = 1000	x_1 = 320	s =
2004 → n_2 = 1000	x_2 = 300	s_1 =
	x = 620	s_2 =

Check the conditions:

1. Both samples are random and independent
2. $n_1\hat{p}_1 = x_1 = 320 > 5$ ✓
   $n_1(1-\hat{p}_1) = n_1 - x_1 = 1000-320 > 5$ ✓
   $n_2\hat{p}_2 = x_2 = 300 > 5$ ✓
   $n_2(1-\hat{p}_2) = n_2 - x_2 = 700 > 5$ ✓
3. $10n_1 = 10\,000 <$ total number of adults in 2009
   $10n_2 = 10\,000 <$ total number of adults in 2004

State the hypotheses:

H_0: $p_1 = p_2$ or $p_1 - p_2 = 0$

H_a: $p_1 \neq p_2$ or $p_1 - p_2 \neq 0$

where (circle and describe in words the appropriate symbol(s): $p, p_1, p_2, \mu, \mu_1, \mu_2$)

p_1 = true proportion of overweight adults in 2009

p_2 = true proportion of overweight adults in 2004

Compute the test statistic, p-value, and label and complete the sketch:

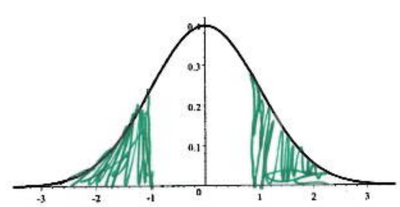
Test statistic: $\boxed{z = \dfrac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}}$ = .967

formula

P-value = .3336

Is the sample significant? No

Yes/No



Conclusions:

(Circle one) We reject/don't reject the null hypothesis.

Explain in context.

Because P-Value = .3336 > .10 = α, we don't reject the null hypothesis.

If the proportions of overweight adults in 2004 and 2009 were the same, then it would be quite likely (probability 33.36%) to get samples whose difference was as extreme or more than 320/1000 minus 300/1000. So we have no evidence to beleive that there is a change in those proportions.

Identify the test (circle one):

1. Significance test for one proportion (1-PropZTest)
2. Significance test for the difference of two proportions (2-PropZTest)
3. Significance test for a mean (T-Test)
4. Significance test for the difference of two means (2-SampTTest)

Data: Significance level $\alpha =$ .05

Other: (depending on the test, circle and give the necessary values)

$p_0 =$	$\hat{p} = 98/446 = .2197$	$\overline{x} =$
$\mu_0 =$	$\hat{p}_1 = \frac{48}{221} = .2171$	$\overline{x}_1 =$
$n =$ 446	$\hat{p}_2 = \frac{50}{225} = .222$	$\overline{x}_2 =$
N95 → $n_1 =$ 221	$x_1 =$ 48	$s =$
Surgical masks → $n_2 =$ 225	$x_2 =$ 50	$s_1 =$
	$x =$ 98	$s_2 =$

Check the conditions:

1. Subjects (nurses) were randomly assigned to either N95 respirator or surgical mask
2. $n_1\hat{p}_1 = x_1 = 48 > 5$ ✓ $n_2\hat{p}_2 = 50 > 5$ ✓
   $n_1(1-\hat{p}_1) = 221 - 48 > 5$ $n_2(1-\hat{p}_2) = 225 - 50 > 5$ ✓
3. $10n_1 = 2210 <$ total number of nurses who could use N95
   $10n_2 = 2250 <$ total number of nurses who could use surgical masks

State the hypotheses:

H_0: $p_1 = p_2$ or $p_1 - p_2 = 0$

H_a: $p_1 \neq p_2$ or $p_1 - p_2 \neq 0$

where (circle and describe in words the appropriate symbol(s): $p, p_1, p_2, \mu, \mu_1, \mu_2$)

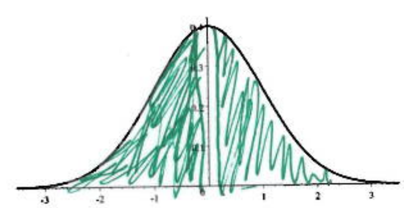
p_1 = true proportion of nurses that would get the flu when using N95 respirator

p_2 = true proportion of nurses that would get sick when using surgical masks

Compute the test statistic, p-value, and label and complete the sketch:

Test statistic: $\boxed{z = \dfrac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}}$ = -.12820

formula



P-value = .89798

Is the sample significant? No

Yes/No

Conclusions:

(Circle one) We reject/don't reject the null hypothesis.

Explain in context.

Because P-value = .89798 > .05 we don't reject the null hypothesis. If both surgical masks and N95 respirators were equally effective against the flu, then it would be very likely (probability 89.79%) to get results from an experiment as extreme or more than the difference 48/221 minus 50/225. So we have no evidence to believe that one method is better than the other.