* slightly different version from the posted version. This is the .doc version, final revision was the posted .pdf version

Exam One
PPA 897, Fall 2022
Professor John McPeak

Name: Key

The total exam is worth 15 points. Each numbered question is worth 1 ½ points, and each sub question within a numbered question is worth an equal share of the 1 ½ points.

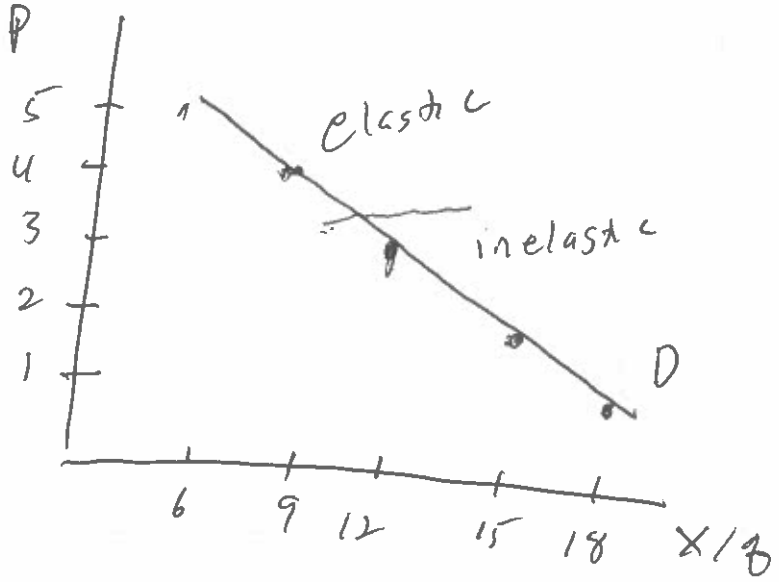
1) The demand curve is given to you as Q=21-3*p. $\varepsilon = \frac{\%\Delta Q}{\%\Delta P} = \frac{\Delta Q}{\Delta P} / \frac{P}{Q}$

   a. Fill out the following table (**use the relatively higher price / relatively lower quantity pair in the elasticity calculation**).

Price	Quantity	Elasticity
$1.00	21-3 18	$\frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$ XXXXXX
$2.00	21-6 15	$-\frac{3}{1} \cdot \frac{2}{15} \quad -\frac{6}{15} = -\frac{2}{5}$
$3.00	21-9 12	$-\frac{3}{1} \cdot \frac{3}{12} = -\frac{9}{12} = -\frac{3}{4}$
$4.00	21-12 9	$-\frac{3}{1} \cdot \frac{4}{9} = -\frac{12}{9} = -\frac{4}{3}$
$5.00	21-15 6	$-\frac{3}{1} \cdot \frac{5}{6} = -\frac{15}{6} = -\frac{5}{2}$

$-\frac{3}{1}$ or $\frac{3}{-1}$ (repeated for each row)

   b. Draw this demand curve with price on the y-axis and quantity on the x-axis. Identify the range over which the demand curve is inelastic and over which it is elastic.



2) You are given that p=46-4*q is the inverse demand curve and p=10+2*q is the inverse supply curve.

a. What is the equilibrium price quantity pair if the market is perfectly competitive?

$46-4q = 10+2q$

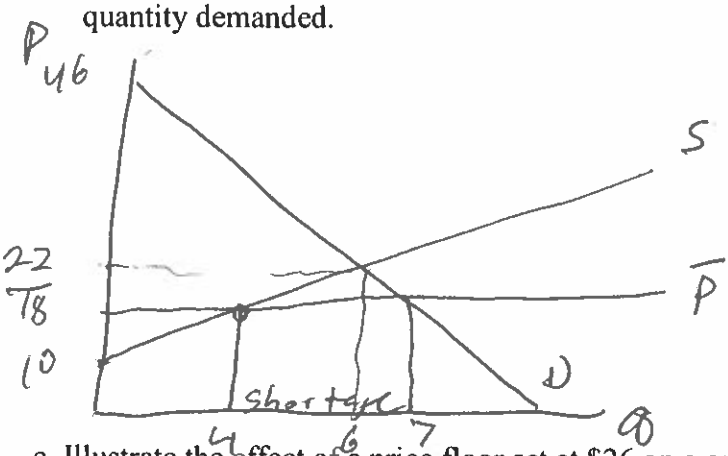
$36 = 6q$

$q = 6$

$p = 10+12 = 22$ $\quad 46-24 = 22$

$(p^{PC}, q^{PC}) = (\$22, 6)$

b. Illustrate the effect of a price ceiling set at \$18 on a graph and solve for the size of the difference between the quantity supplied and quantity demanded.



$18 = 46 - 4q$

$4q = 46 - 18$

$4q = 28$

$q^D = \frac{28}{4} = 7$

$q^S: \quad 18 = 10 + 2q$

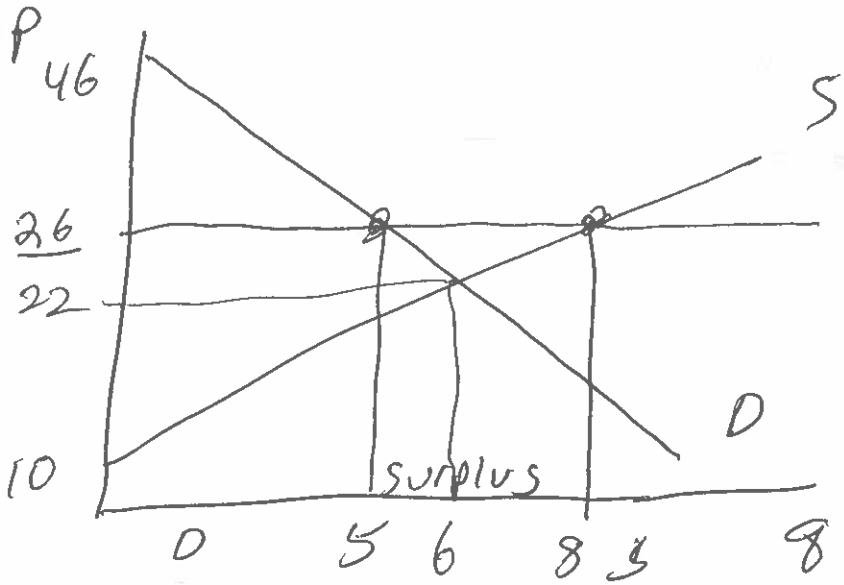
$8 = 2q$

$q^S = 4$

Shortage $= 7 - 4$

$= 3$

c. Illustrate the effect of a price floor set at \$26 on a graph and solve for the size of the difference between the quantity supplied and quantity demanded.



Surplus $= 8 - 5$

$= 3$

$26 = 46 - 4q$

$4q = 20$

$q^D = 5$

$26 = 10 + 2q$

$16 = 2q$

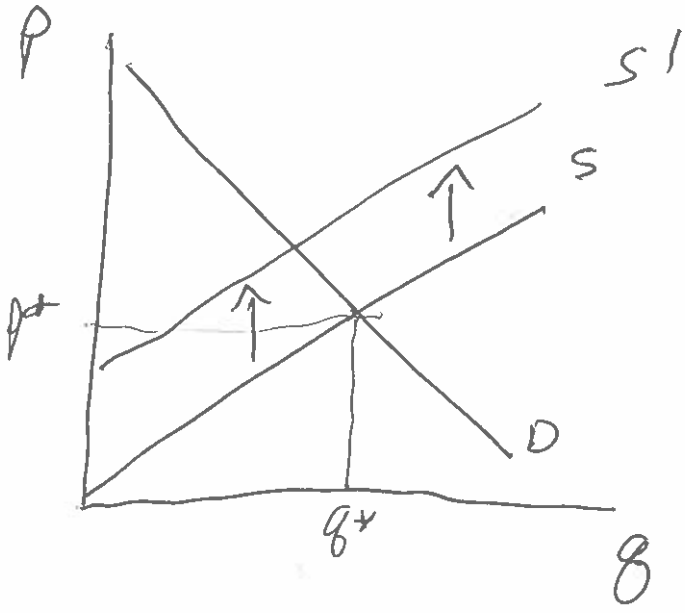
$q^S = 8$

3) Perfectly competitive markets.

a. What are the four assumptions that need to be met for a market to be perfectly competitive?

1) Price takers
2) No transaction costs
3) Symmetric information
4) Homogeneous Good

b. For supply in this market, draw supply curves before and after the cost of an input increases.



S' - after input cost increase

4) I know the price of one donut is $2.00 and the price of one cup of coffee is $2.00. At the bundle the consumer is consuming, the marginal utility of a donut is 4 and the marginal utility of a cup of coffee is 3. This bundle is on the budget line.

a. Is the bundle the consumer is consuming the optimal bundle? Why or why not?

$P_d = 2$ $MU_D = 4$ Last dollar rule

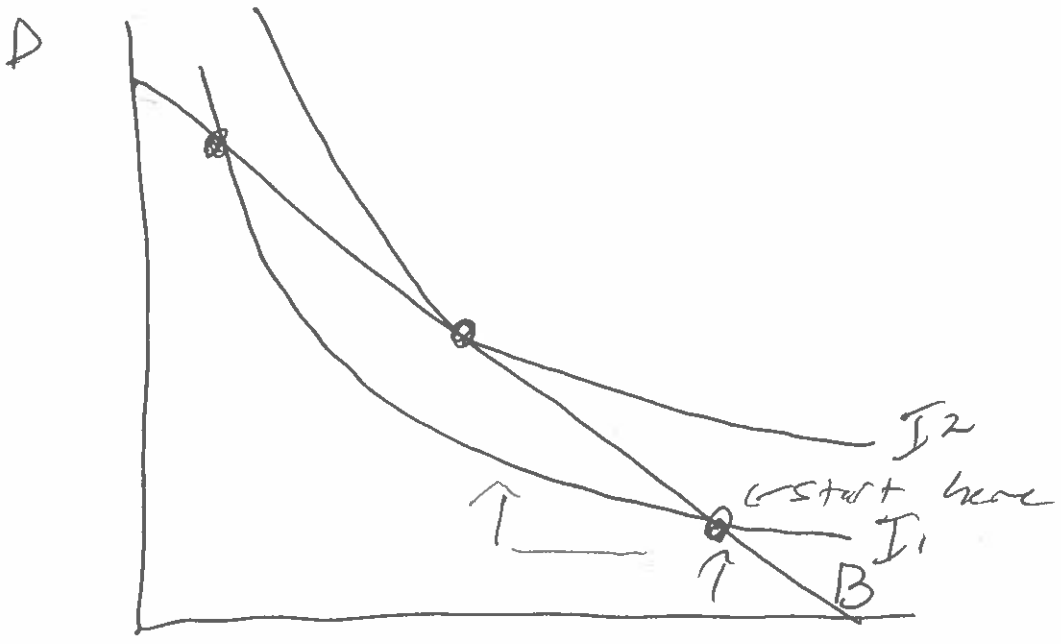
$P_c = 2$ $MU_c = 3$ $\frac{MU_D}{P_D} = \frac{4}{2} = 2$ $\frac{MU_c}{P_c} = \frac{3}{2} = 1.5$

NO

or $MRS = -\frac{MU_c}{MU_D} = -\frac{3}{4}$

$MRT = -\frac{P_c}{P_D} = -\frac{2}{2} = -1$

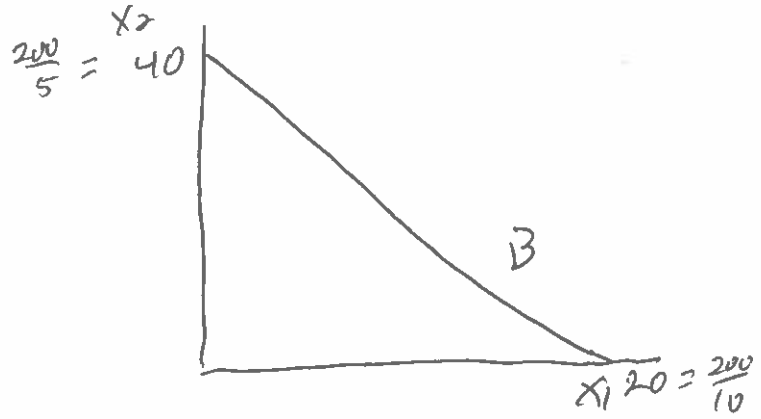
b. Show on a graph with the budget line and indifference curves the consumption bundle the consumer is consuming and where it lies in relation to the optimal bundle.



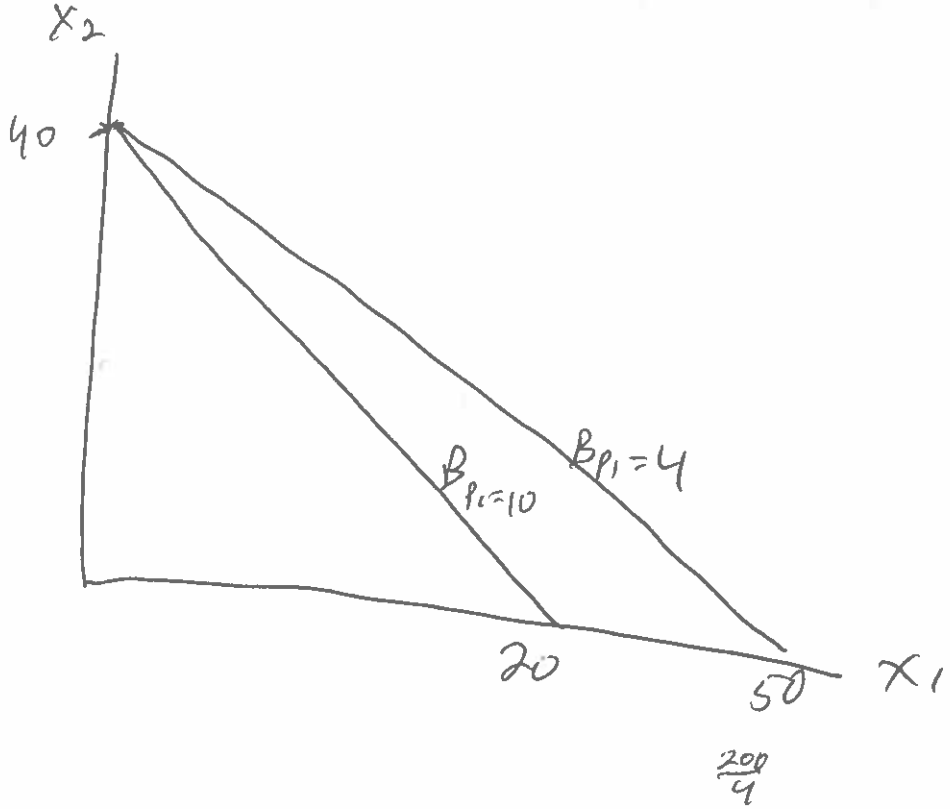
MRT steeper than MRS (or) $\frac{MU_c}{P_c} < \frac{MU_D}{P_D}$

5) If $p_1 = 10$, $p_2 = 5$, and $Y = 200$

a. Draw the budget constraint.



b. Illustrate by drawing 2 budget constraints on a single graph what happens if $p_1 = 10$ changes to $p_1 = 4$ all else constant.



6) Circle whether the statement is true of false:

a. A change in consumer income causes a shift in the demand curve.
TRUE FALSE

b. A good for which the price elasticity of demand is elastic has a larger percent change in quantity than the corresponding percent change in price.
TRUE FALSE

c. The Marginal Rate of Transformation changes if one price changes while income and the other price are held constant.
TRUE FALSE

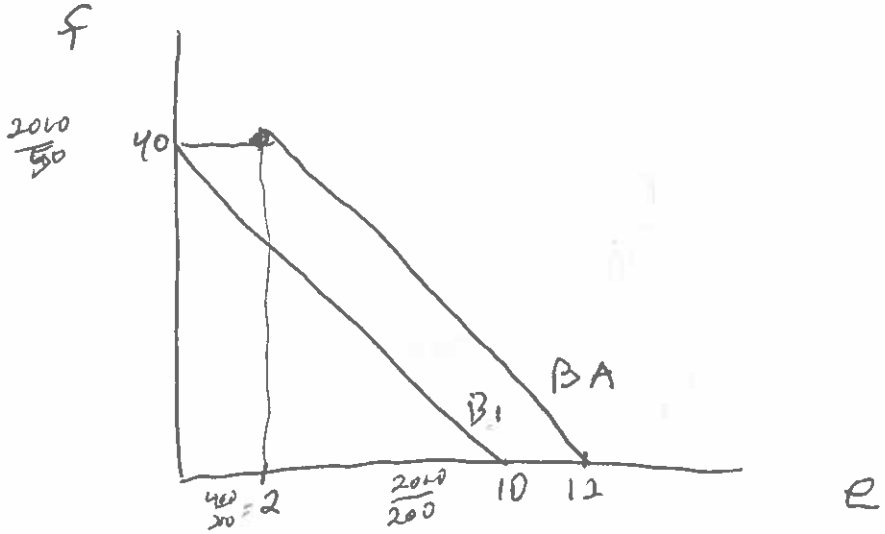
d. The Total Effect is larger than the Substitution Effect if the good in question is inferior.
TRUE FALSE

e. The cross-price elasticity for a substitute is negative.
TRUE FALSE

f. The tax incidence is higher for the more elastic party.
TRUE FALSE

7) A student has a stipend that pays her \$2,000 ~~per month~~ and she spends it on two goods: food and education. The price of one unit of education per month is \$200. The price of one unit of food per month is \$50. She just got an additional award that will give her \$400 more per month, but this additional money can only be used on education.

a. Illustrate her original budget line and her budget line after she receives the award.



$P_f \cdot f + P_e \cdot e = Y$

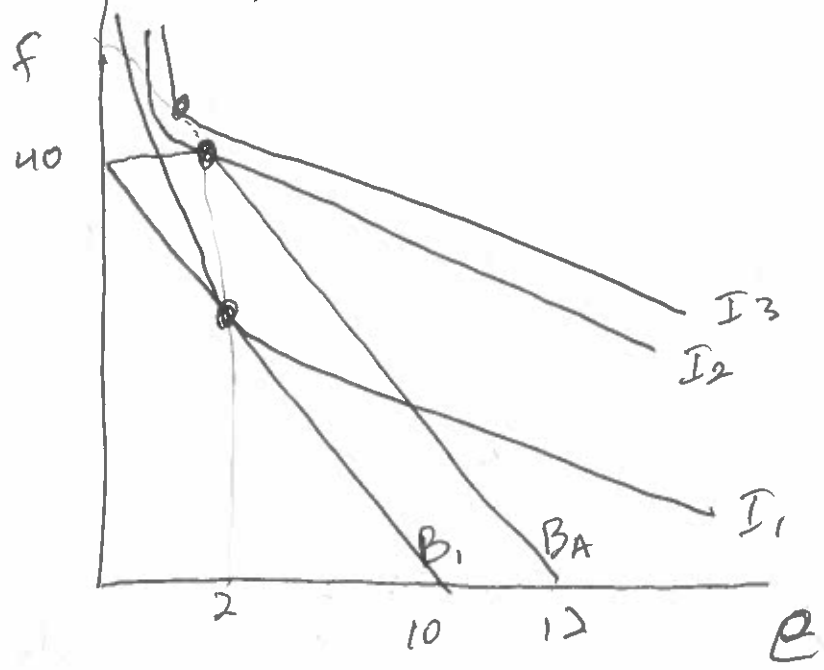
$P_f = \$50$

$P_e = \$200$

$Y = \$2000$

$A = \$400$

b. Illustrate using indifference curves how she could be made even better off if the grant had been given in cash and unconstrained in how she uses it compared to having it constrained to be spent only on education (a person for **whom it does matter that the grant is constrained**.)

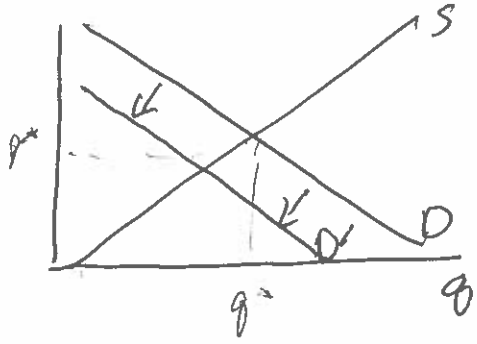


q↓

8) Compared to last year, the quantity of hand sanitizer purchased has decreased by 20% in the United States this year. The CDC proposes that this is because Covid positivity rates have declined significantly over the past year so people are using less hand sanitizer. A recent article in the Wall Street Journal (WSJ) argued that the cause for the lower quantity is an increase in labor costs in hand sanitizer production facilities.

a. Graph CDC's argument on a supply and demand graph for hand sanitizer.

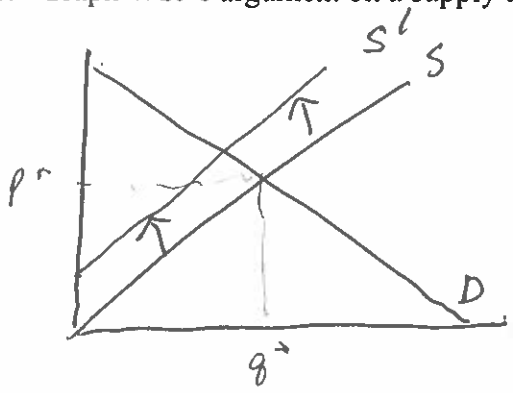
CDC



p↓ q↓

b. Graph WSJ's argument on a supply and demand graph for hand sanitizer.

WSJ



p↑ q↓

p↓

c. Which explanation is more consistent with the facts if the price of hand sanitizer increased 10% over the past year? Justify your answer.

WSJ explanation has p↑ q↓. CDC explanation has p↓ q↓. Both WSJ and CDC have q↓, but CDC explanation implies p↓. If we know p↑ then WSJ's explanation is more consistent with the evidence

d. What is the implied value of the elasticity, what kind of elasticity is it, and is it inelastic or elastic?

$\varepsilon = \frac{\%\Delta q}{\%\Delta p} = \frac{-20\%}{+10\%} = -2.0$

It is an own price elasticity of demand

It is elastic.

9) Syracuse University is selling single game tickets to each men's basketball game this season. A single ticket to attend the game against Colgate University cost $25 last year and 9,423 people bought tickets for this event. This year they are considering raising the price to $30.

a. An estimate for the own-price elasticity of demand for tickets to the Colgate game is -1.8. How many tickets should they expect to sell to the Colgate game if they raise the price from $25 to $30?

$E = -1.8$
$P_1 = \$25$ $P_2 = 30$
$Q_1 = 9,423$
$\%\Delta P = \frac{+5}{25} = +.20$
$-.36\,(9,423) = -3392$

$-1.8 = \frac{\%\Delta Q}{.20}$
$-1.8\,(.20) = \%\Delta Q$
$\%\Delta Q = -0.36$

$9423 - 3392 = 6031$

b. Is the current revenue with the ticket price of $25 higher or lower than the expected revenue if the price is $30?

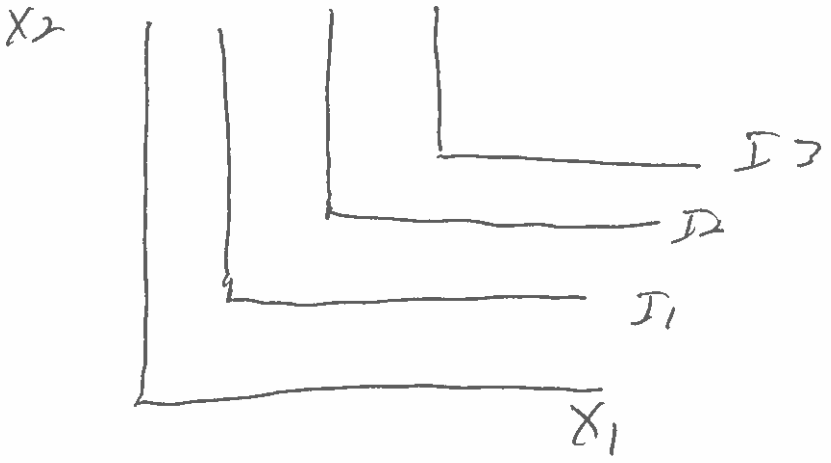
$\$25 \cdot 9423 = \$235,575$ Higher
$\$30 \cdot 6031 = \$180,930$ Lower

c. What is it about the nature of the good in question that explains why the own price elasticity of demand is elastic?

Close and available substitutes make this elastic (other sports, other entertainment, watching on tv)

10) Indifference curves.

a) Draw indifference curves for two goods that are perfect complements.



b) Explain why indifference curves and budget constraints slope downward.

In both cases, we are changing quantities of X_1 and X_2 in such a way that the outcome is held constant. In the case of an indifference curve, utility is held constant. In the case of a budget line, income (and prices) are held constant.

c) What is the name of the slope of the budget constraint and how is it defined?

Marginal rate of transformation (MRT)

$$= -\frac{P_1}{P_2}$$

Work Page.