7.4 Percents (& Interest)

Percent literally means "out of 100."

Ex 1. Convert these to percents.

(a) 0.35 $= \frac{35}{100} = 35\%$

(b) 0.0465 $= \frac{4.65}{100} = 4.65\%$

(c) 15.2 $= 1520\%$

(d) $2\frac{3}{5} = 260\%$

$= 2.6 =$

Ex 2. Convert to decimals.

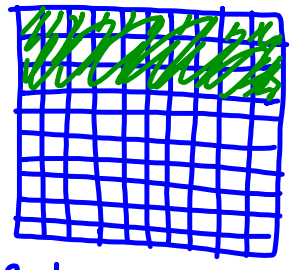
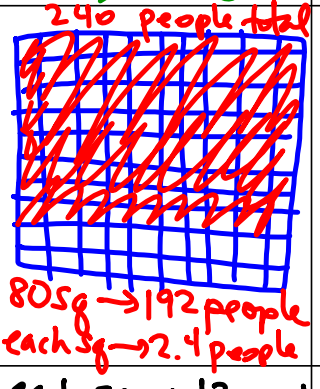
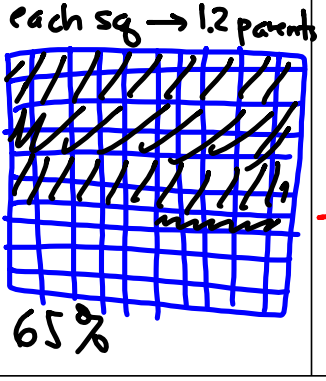
(a) 61% $= 0.61$

(b) 7.34% $= 0.0734$

(c) $2\frac{3}{5}\% = 2.6\% = 0.026$

(d) $\frac{3}{25}\% = \frac{12}{100}\% = 0.12\% = 0.0012$

Three approaches to Percent problems:

	Grid Approach	Proportion	Equation Approach
(1) 30% discount on a $500 item. What is the discount amount?		$\frac{30}{100} = \frac{x}{500}$ $\frac{30}{100}(500) = x$ $x = \$150$	$\frac{\text{part}}{\text{whole}}$ is ___% of ___ $x = .30(500)$ $= \$150$
(2) 192 people in my town voted. That is 80% of the ~~voting age~~ people. How many people are in the town?		$\frac{80}{100} = \frac{192}{x}$ $x = \frac{192}{0.8}$ $x = 240$ people	$\frac{192}{x}$ is $\frac{80}{100}$ $192 = 0.8x$ $x = \frac{192}{0.8} = 240$
(3) 78 out of 120 parents voted for the new school district. What percent is this?		$\frac{78}{120} = \frac{x}{100}$ $\frac{78(100)}{120} = x$ $65 = x$ (65%)	$\frac{78}{120}$ is $\frac{x}{100}$ $78 = x(120)$ $x = \frac{78}{120}$ $x = 0.65 = 65\%$

Word Problem Examples

Ex. 3 Old Navy is having a sale on their jeans. They are advertising 30% off. I also have a coupon for an additional 20% off. What is the overall percent discount I'll receive off my jeans?

x = price of jeans

$0.2(0.3)x = 0.06x$

$0.2+0.3-0.06 = 0.44 = 44\%$

pay:

$0.8(0.7x) = 0.56x$

pay 56%

$\Rightarrow$ discount 44%

Ex. 4 Jim bought two shirts that were originally marked at \$40 each. One shirt was discounted 20% and t he other was discounted 25%. The sales tax was 4.5%. How much did he spend in all?

$[0.8(40) + 0.75(40)]1.045$

Ex 5 Brady received an 8% raise last year. If his salary is now \$72,000, what was his salary last year?

\$72000 (part, new salary) is 108 % of x (old salary)

$72000 = 1.08x \Rightarrow x \approx \$66,666.66$

Ex. 6 The bookstore manager told me that they take the purchase price of their text books (from the publisher) and divide it by three-fourths in order to determine the price for the students purchasing the book from them. What percent mark-up is this for the student?

$\frac{x}{0.75} = x_n$ $\quad x \div \frac{3}{4} = x \cdot \frac{4}{3} = x(1.\overline{3})$

x = price from publisher

markup is $33.\overline{3}\%$

Ex. 7 If 70% of the 7th graders in a school wanted to have a school fair and 40% of the 8th graders in that same school wanted to have a school fair, is it possible that only 50% of the students wanted the school fair? Explain. (Note: Assume this school only has 7th and 8th graders.)

x = # 7th graders

y = # 8th graders

$0.7x + 0.4y = 0.5(x+y)$ ✓

$0.7x + 0.4y = 0.5x + 0.5y$

$\frac{0.2x}{0.1} = \frac{0.1y}{0.1}$

$2x = y$

Yes if there are twice as many 7th graders as 8th graders

Ex. 8 Andrew paid $330 for a new mountain bike to sell in his shop. He wants to price it so that he can offer a 10% discount and still make 20% of the price he paid for it as profit. At what price should the bike be marked?

x = price bike is marked

Customer pays: $0.9x$

$\frac{0.9x}{0.9} = \frac{330(1.2)}{0.9}$ $\left(\frac{10}{10}\right)$

$x = \frac{330(12)}{9} = \$440$

Ex Apply 15% discount and then an additional 25% discount. What is total discount percent?

$0.15(0.25) = 0.0375$

$0.15 + 0.25 - 0.0375 = 0.4 - 0.0375 = .3625$

$= 36.25\%$

7.4 A19) $4200 pay

a
$j = 2a$
$m = 1.5j = 1.5(2a) = 3a$

$a + 2a + 3a = 4200$

$6a = 4200$

$a = \$700$ $j = \$1400$ $m = \$2100$

A18) (a) 15% of 22 $= 0.15(22) = 2.2 + 1.1 = 3.3$

(b) 20% of 120 $= 0.2(120) = 2(12) = 24$

(c) 5% of 38 $= 0.05(38) = \frac{3.8}{2} = 1.9$

(d) 25% of 98 $= \frac{1}{4}(98) = \frac{1}{4}(100-2) = 25 - \frac{1}{2}$

$= 24.5$

B 23) 0.7g want

0.6b want

Is it possible 50% of all want?

$$\frac{0.7g + 0.6b}{g + b} = 0.5$$

$0.7g + 0.6b = 0.5(g + b)$

$0.7g + 0.6b = 0.5g + 0.5b$

$-0.5g \quad -0.6b \quad -0.5g \quad -0.6b$

$0.2g = -0.1b$

$2g = -b$