Percents Module Draft 2 with solutions

1. A news release by a pollster called Forum Research during the Toronto mayoral election in 2014 showed John Tory had 43 per cent support. The previous week, he had 39 per cent.

Comparing the week-to-week change, the poll indicates:

Possible answers:

a) **Tory's support increased by four percentage points.**
b) Tory's support increased by four per cent.
c) Both

Hint: Percentage Points = $\text{Percent}_2 - \text{Percent}_1$

Full Solutions:

$$\text{Percentage Points} = \text{Percent}_2 - \text{Percent}_1$$
$$\text{Percentage Points} = 43 - 39$$
$$= 4$$

$$\text{Percent increase} = \frac{percent_2 - percent_1}{percent_1}$$

$$= \frac{43-39}{39} \times 100$$
$$= \frac{4}{39} \times 100$$
$$= 10\%$$

Hence, statement A is correct. Tory's support increased by four percentage points.

2. In the table below, you will see the ages of participants in the same mayoral race poll.

	Total	18-34 yrs old	35-44 yrs old	45-54 yrs old	55-64 yrs old	65+	Male	Female
Sample Size	847	130	119	179	195	227	436	411
Doug Ford	29	31	28	29	27	29	33	25
John Tory	43	33	43	46	52	53	46	41
Olivia Chow	25	33	26	21	20	16	19	30
Other Candidates	3	3	2	4	1	2	2	3

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What is the percentage of the poll participants who were between the age of 18 and 34?

Possible answers: a) 13% b) 14% c) 15% d) 16% e) 17%

Hint: $\frac{part}{whole} = \frac{x}{100}$

Full Solutions:

$$\frac{part}{whole} = \frac{x}{100}$$

$$\frac{130}{847} = \frac{x}{100}$$

$$x = \frac{130}{847} \times 100$$

$$x = 15\%$$

3. You are writing a story about retail workers. Jamila tells you that she gets paid $11.50 per hour plus a commission of 3.1 per cent on the clothes that she sells. Jamila works 16 hours a week and sells about $2,620 worth of clothes on average. Your editor wants you to include the total amount she is paid per week in the article. How much is Jamila's weekly pay?

Possible answers: a) $250.22 b) 255.22 c) 260.22 **d) 265.22** e) 270.22

Hint: Total Pay = Regular Pay + Commission
Regular Pay = rate/hr x (# of hours)
Commission = percnt x (total sales)

Full Solutions: Total Pay = Regular Pay + Commission
= 11.50x16+ 0.031x2620
= $256.22

4. You are writing a story about Christmas store sales and during your interview, the store manager tells you that they only put 20 per cent of the featured toy on the shelves at a time. The 120 remaining toys remain in storage. How many of the featured toys does the toy-manager have in total?

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Possible answers: **a) 150** b) 160 c) 170 d) 180 e) 190 e)200

Hint: $\frac{part}{whole} = \frac{\#}{100}$

Full Solutions: Method 1:

$$\frac{80}{100} = \frac{120}{x}$$
$$80x = 120(100)$$
$$x = \frac{12000}{80} = 150$$

3. You are covering a zoning press conference. They say a building is 150 meters tall, which is 75 per cent of the height restriction bylaw. What is the height of the bylaw restriction in metres?

Possible Answers: a) 105 cm b) 125 cm c) 175 cm d) 225 cm e) 200 cm

Hint: $\frac{part}{whole} = \frac{\#}{100}$

Solution: Method 1 (answer is e)

$$\frac{75}{100} = \frac{150}{x}$$
$$75x = (150)(100)$$
$$75x = 15000$$
$$x = \frac{15000}{75} = 200$$

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4. The table below shows the number of students in business majors in a certain year, compared with the total number of undergraduate students. You've have been asked to write about the popularity of business programs in Canada and some data is missing.

Year	2007	2008	2009	2010
Business Majors	1800	2196		3322
Total number of undergraduates	12000			

a) To help you with your story, calculate percentage of undergraduates in 2007 who were Business Majors?

Possible Answers: i) 10% **ii) 15%** iii) 20% iv) 25% v) 30%

Hint: $\frac{part}{whole} = \frac{\#}{100}$

Full Solutions:

$$\% = \frac{part}{whole} \times 100$$

$$\text{Business Majors} = \frac{1800}{12000} \times 100$$

$$= 15\%$$

b) Your editor asks if the percentage of students has changed at all from 2007. Find the percentage increase in the total number of business majors from 2007 to 2008.

Possible answers: i) 30% ii) 28% iii) 26% iv) 24% **v) 22%**

Hint: $\%increase / \text{decrease} = \left(\frac{\text{final} - \text{original}}{\text{original}} \right) \text{x } 100$

Full Solutions:

$$\%\text{increase} = \frac{2196 - 1800}{12000} \times 100 = 22\%$$

c) How does this compare with total undergraduate students? If only 8% of the undergraduates were business majors in 2008, find the total number of undergraduates in 2008.

Possible answers: i) 27250 ii) 27350 **iii) 27450** iv) 27550 v) 27650

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Hint: $\frac{part}{whole} = \frac{\#}{100}$

Full solutions:

$$\frac{8}{100} = \frac{2196}{x}$$
$$.08x = 2196$$
$$x = \frac{2196}{.08}$$
$$x = 27450$$

d) You want to know how many business majors there were in 2009, but that information is missing. If the number of business majors for 2010 represents a 10% increase in the business majors in 2009. Find the number of business majors in 2009.

Possible answers: **i) 3020** ii) 3000 iii) 2980 iv) 2960 v) 2940

Hint: Final amount $_{\text{with percent increase}}$ = original amount (1+ %/100)
Final amount $_{\text{with percent decrease}}$ = original amount (1-%/100)

Full solution:
Let b represent the number of business majors in 2009.

$$1.1b = 3322$$
$$b = \frac{3322}{1.1} = 3020$$
$\therefore$ there were 3020 business majors in 2009.

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5. You are doing a story on the inaccuracy of supermarket pricing. Using the information in the table below, what percent of the items were incorrectly priced overall?

Person	% of items priced	% errors
Arturo	30%	6%
Betsey	25%	5%
Cliff	40%	4%
Delores	5%	3%

Possible Answers: a) 4.2 % b) 4.4% c) 4.6% **d) 4.8%** e) 5.0%

Hint:
Overall % of items priced incorrectly = (% of $item_{1\ priced}$ × % error of $item_1$) + (% of $item_{2\ priced}$ × % error of $item_2$) + (% of $item_{3\ priced}$ × % error of $item_3$)+...

Full Solution:

Person	% of items priced	% errors	Total errors
Arturo	30%	6%	1.800%
Betsey	25%	5%	1.250%
Cliff	40%	4%	1.600%
Delores	5%	3%	0.150%
Total			4.800%

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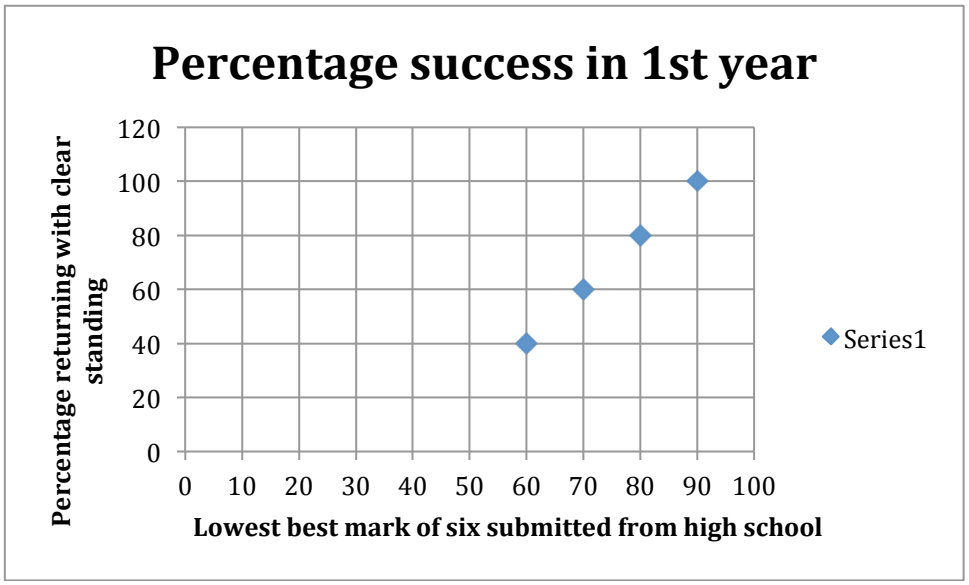
6. Shown below is a graph representing the percentage of students returning with clear standing on the y-axis given the **lowest** submitted mark on the x-axis.



You are writing a story about high school math success and failure rates for a regional website. You are told that 10% of all students completed the school year with 60, 20% submitted a mark of around 70%, and that 65% submitted a mark of 80. The remaining 5% had a mark of 90.

Using the data in this chart above, determine the percentage of students overall who are returning with a clear standing.

Answer: a) 66% b) 69% c) 73% d) 77% e) 81%

Hint: Total % with good standing = (% with grade$_1$ × % clear standing of grade$_1$) + (% of grade$_2$ × % clear standing of grade$_2$) + (% of grade$_3$ × % clear standing of grade$_3$)+...

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Full Solution:

Grade (lowerst)	% with this grade	% with clear standing	with good standing
60	10%	40%	4.000%
70	20%	60%	12.000%
80	65%	80%	52.000%
90	5%	100%	5.000%
Total with good standing			73.000%

7. Air Canada has increased the cost for checking baggage, and your editor has told you to cover the change for a story about consumer reaction. For the article you need to know some details. It now costs $120 for excess baggage. Air Canada is offering a 20% discount, but the airline is also adding a percentage back as a fuel surcharge. If final cost after fuel surcharge is $110.40, find the percent added for the fuel surcharge.

Possible Answers: a) **15%** b) 13% c) 11% d) 9% e) 7%

Hint: Discounted price = original price (1-%/100)
Final price $_{\text{with percent increase}}$ = original price (1+%/100)

Full Solution:
Discounted price before surcharge = 120 (1-0.2)
= 120 (0.8)
=$96

Let the surcharge be r
Price with fuel surcharge = 96(1+r/100)
110.40 = 96 (1+r/100)

$$\frac{110.4}{96} = 1 + \frac{r}{100}$$

$$\left(\frac{110.4}{96} - 1\right)100 = r$$

r = 15%
The surcharge is 15%.

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8. The business editor asks you to write about the cost differences between products sold in the U.S. and those in Canada. The person you are interviewing tells you they bought an Ipod for $250 in Texas because a similar Ipod in Canada cost $350. Knowing that the U.S. dollar is worth 20% more than the Canadian dollar, and the tax rate in Texas is 5% as compared to 13% in Toronto, calculate how much the interviewee has saved.

Possible Answers:

a) $100.50 b) 90.50 **c) 80.50** d) 70.50 e) 60.50

Hint:
Final amount $_{\text{with percent increase}}$ = original amount (1+ %/100)

Convert everything into Canadian dollars using ratios $\frac{CAD\$}{US\$}$.

Full Solutions:

$\text{Ipod}_{\text{US (tax included)}}$ = $250 (1.05)
= US $262.50

$\text{Ipod}_{\text{US in CAD\$}}$: $\frac{CAD\ \$1.2}{US\ \$1} = \frac{x}{262.50}$
x = 262.50 (1.2)
x = CAD $315

$\text{Ipod}_{\text{CAD (tax included)}}$ = $350 (1.13)
= CAD $395.50

Therefore, price difference = $395.50 - $315
= CAD $80.50

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