

Mid-Year Exam 2020 Review Package

Integers

1.  $14 - (-2) = 16$
2.  $-7(-8) = 56$
3.  $0 \div 14 = 0$
4.  $-5 + (-6) = -11$
5.  $-2(-11)(+3) = 66$
6.  $-83 \div 0 = \text{undefined}$
7.  $-11 - 8 + 2 = -17$
8.  $-169 \div (-13) = 13$
9.  $-26 - (+13) = -39$
10.  $-43 - 2[11 - 3(5)] = -35$
11.  $-400 \div (+20) = -20$
12.  $-26 \div (-13) = 2$

Rational Numbers/Decimals

1.  $-2.3 + (-1.8) = -4.1$
2.  $-2.1 \times (+3.2) = -6.72$
3.  $\frac{0}{2.3} = 0$
4.  $4.82 - (-1.3) = 6.12$
5.  $8.6 \div 0.9 = 9.\bar{5}$
6.  $1.2 \div 0 = \text{undefined}$
7.  $5.3 - 11.36 = -6.06$
8.  $-2.4(-1.5) = 3.6$
9.  $-4.36 + 1.2[2.8 + (-3.51)] = -5.212$
10.  $-2.1 + (-1.35) = -3.45$
11.  $-0.55 \div (-0.66) = 0.8\bar{3}$
12.  $(4.51 - 5.32)(5.17 - 6.57) = 1.134$

13. Arrange the following numbers in ascending order:  $0.123, -1.2, 1.35, 1.335, 1.\bar{3}, -1.32, 1.\bar{35}$   
 $-1.32, -1.2, 0.123, 1.\bar{3}, 1.335, 1.35, 1.\bar{35}$
14. A submarine descends at a rate of 10.5 m/min. Express the depth below the surface after 4.2 minutes.  
 $44.1 \text{ m}$

Rational Numbers/Fractions

1.  $\frac{3}{10} + \frac{1}{5} = \frac{5}{10} = \frac{1}{2}$
2.  $2\frac{1}{3} + (-1\frac{1}{4}) = \frac{13}{12}$
3.  $1\frac{2}{5} - \frac{3}{6} = \frac{9}{10}$
4.  $-\frac{5}{12} - \frac{5}{6} = -\frac{15}{12} = -\frac{5}{4}$
5.  $\frac{3}{8} - (-\frac{1}{4}) + \frac{1}{2} = \frac{9}{8}$
6.  $\frac{4}{5} \times \frac{-10}{8} \times \frac{-16}{8} = 2$
7.  $\frac{-14}{12} + \frac{-18}{-21} \times \frac{-2}{-2} = \frac{-14}{12} + \frac{12}{7} = \frac{46}{84} = \frac{23}{42}$
8.  $\frac{1}{10} \div \frac{-3}{8} \div 2 = -\frac{2}{15}$
9.  $\frac{3}{4} \div \frac{5}{8} - \frac{3}{8} \div \frac{1}{2} = \frac{9}{20}$
10.  $1\frac{1}{2} + 1\frac{1}{2}(-2\frac{5}{6} + \frac{1}{3}) = -\frac{9}{4}$

11. Circle all rational numbers in the line.

- $\sqrt[3]{8}$     $-\sqrt{4}$     $\frac{3}{4}$     $-\frac{1}{5}$     $0$     $1$     $-5$     $\sqrt[3]{17}$     $\sqrt{0.09}$     $\sqrt{0.16}$     $-\sqrt[3]{0.001}$     $\sqrt{-4}$
- $\frac{2}{2}$     $\frac{-2}{-2}$     $\frac{3}{4}$     $\frac{-1}{5}$     $0$     $1$     $-5$     $\sqrt[3]{17}$     $\frac{0.3}{0.3}$     $\sqrt{0.16}$     $\frac{-0.1}{-0.1}$     $\sqrt{-4}$  not a real number

Square roots/ Cubic Roots/The Pythagorean Theorem

Calculate:

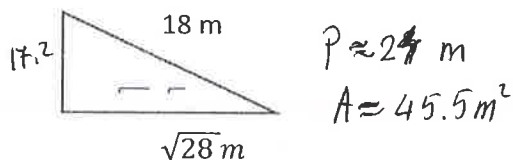
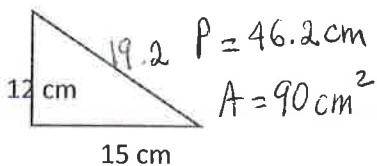
1.  $\sqrt{16} + \sqrt{25} = 9$
2.  $\sqrt{100 - 64} = 6$
3.  $\sqrt{0} = 0$
4.  $\sqrt{169} + \sqrt{121} = 24$
5.  $\sqrt{12100} = 110$
6.  $\sqrt{1} = 1$
7.  $\sqrt{16 + 25} = \sqrt{41}$
8.  $\sqrt{0.49} = 0.7$
9.  $\sqrt{-9} = \text{not a real number}$
10.  $\sqrt{8^2} = 8$
11.  $(\sqrt{15})^2 - (\sqrt{11})^2 = 4$
12.  $\sqrt[3]{27} - \sqrt[3]{125} = -2$

Estimate to one decimal place:

13.  $\sqrt{15} \approx 3.9$
14.  $\sqrt{111} \approx 10.5$
15.  $\sqrt{85} \approx 9.2$

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16. Calculate the perimeter and the area of the following right angle triangles:



Powers and Exponents:

1. Write all exponent laws and one example for each rule.

Evaluate:

2.  $-3^0 = -1$

3.  $(2+3)^0 = 1$

4.  $(2-3)^{100} = 1$

5.  $-(-1)^{50} - (-1)^{51} = 0$   
 $-1 - (-1)$

6.  $-1^0 - 2^0 = -2$

7.  $(-3)^3 = -27$

Use  $<$ ,  $>$  or  $=$  to write a true statement.

8.  $(-3)^5 = -3^5$

9.  $\left(-\frac{3}{4}\right)^2 > \left(-\frac{3}{4}\right)^4$

10.  $2^5 > 5^2$   
 $32 > 25$

11.  $\left(-\frac{7}{9}\right)^5 < \left(-\frac{7}{9}\right)^7$   
 $-\frac{7^5 \cdot 9^2}{9^5 \cdot 9^2} < -\frac{7^7}{9^7}$

Evaluate:

12.  $4 - 3 \times 2^2 = 4 - 12 = -8$

13.  $(4 - 3) \times 2^2 = 1 \times 4 = 4$

14.  $-2 \times 3^2 - 4 \times 2^2 = -18 - 16 = -34$

15.  $\frac{8+2 \times 3}{(8-2) \times 3} = \frac{14}{18} = \frac{7}{9}$

16.  $-2 \times \underbrace{(3^2 - 4)}_5 \times 2^2 = -40$

17.  $(3^2 - 4)^0 \times (-2^0) = 1 \times (-1) = -1$

Insert brackets to make the expression true.

18.  $(-4+1)^2 + (2-3)^3 = 8$   
 $9 + (-1)^3 = 8$   
 $9 - 1 = 8$

19.  $3 + 2 \times (3 - 1)^2 = 11$

Simplify. Leave answer in exponential form or evaluate, if possible.

20.  $3^4 \times 2^3 \times 3^2 \times 2 = 3^6 \times 2^4$

21.  $(-3)^4 \times 3^2 = 3^6$

22.  $(-4)^9 \div (-4)^7 + (-4)(-4)^2 = (-4)^2 + 4 = 16 + 4 = 20$

23.  $\frac{4^3 \times 4^5}{4^4} = \frac{4^8}{4^4} = 4^4$

24.  $\frac{(-2)^5 \times 2^2}{(-2)^2} = \frac{(-2)^3 \times 2^2}{1} = -2^5$

25.  $[(-3)^4]^2 \times 3^2 = 3^{10} = 16 - 64 = -48$

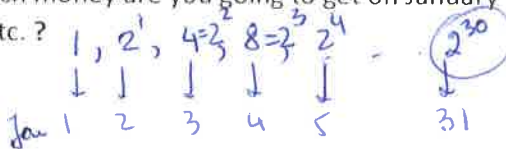
26.  $[(-2)^3]^5 = (-2)^{15}$

27.  $-4^2 + 2 \times (-3)^2 - 1^2 = -16 + 18 - 1 = 1$

28.  $\frac{[(-14)^2]^3}{[-14^2]^3} = \frac{14^6}{-14^6} = -1$

29.  $(1+2)^2 - (5-2)^3 = 9 - 27 = -18$

30. How much money are you going to get on January 31<sup>st</sup>, if you get 1 cent on Jan 1<sup>st</sup> and 2 cents on the Jan 2<sup>nd</sup>, 4 cents on Jan 3<sup>rd</sup>, etc. ?



$\$ 10\,737\,418.024$

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Polynomials

Complete the table:

	Name	Degree	Coefficients	Constant	Variable(s)
$-0.5x^3 - 4x + 5$	trinomial	3	-0.5, -4, 5	5	x
$35x^3y^2 + 5x^5y$	binomial	6	35, 5	0	x, y
$-0.5a^4 - 12b + \sqrt{2}$	trinomial	4	-0.5, -12, $\sqrt{2}$	$\sqrt{2}$	a, b

Simplify:

1.  $4x^2 - 2x - 15 - 9x^2 + 8x - 2 = -5x^2 + 6x - 17$

2.  $14x^2 - 4x - 25 + (5x^2 + 7x - 12) = 19x^2 + 3x - 37$

3.  $-2x^2 + 3x - 9 - (-9x^2 + 28x - 32) = 7x^2 - 25x + 23$

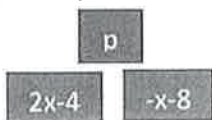
4.  $2(4x^2 - 2x) - 5x(x^2 - x + 2) = -5x^3 + 13x^2 - 14x$

5.  $4x^2(1 - 9x^2 + 8x) - \frac{2}{3}(x^4 - 3x + 6) = \frac{-110}{3}x^4 + 32x^3 + 4x^2 + 2x - 4$

6.  $\frac{2}{3}y^3 - 2y^2 + 3x - \frac{1}{2}y^2 - \frac{3}{2}x + \frac{-1}{5}y^2 = \frac{2}{3}y^3 - \frac{27}{10}y^2 + \frac{3}{2}x$

7.  $\frac{2x(x^2 - 3x)}{-x} - \frac{2x + 4}{2} = -2x^2 + 6x - 2 = -2x^2 + 5x - 2$

Complete the addition pyramid and determine m, n and p:



$p = (2x - 4) + (-x - 8)$   
 $p = x - 12$

$n = (-x - 8) - (x - 1)$   
 $n = -2x - 7$

$m = (2x - 4) - (x - 1)$   
 $m = x - 3$

9. Tickets for a school concert are \$15 for adults and \$10 for students.

$15a + 10s$ , a = number of adults

a) Write an expression that represents the total income for the school concert. Indicate what the variables represent.

s = number of students

b) What is the total income if 19 parents and 60 students attend the concert?

$15 \cdot 19 + 10 \cdot 60 = \$885.00$

10. A company charges \$80 per hour plus \$ 50 for a service call. Let n be the number of hours an electrician works at your school.

a) Write an expression that represents the total amount you have to pay, depending on the number of hours, n.

$A = 50 + 80n$

b) How much do you have to pay for four hours of work?

$A = 50 + 80 \cdot 4 = \$370.00$

c) The electrician brings three more apprentices who work at half the rate. Write a formula that indicated the amount of money you would pay the three of them if they work for n hours.

$A = 50 + 80n + 3 \cdot 40n$

$A = 50 + 200n$

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Patterns

1. Find the relationships between  $n$  and  $t$ . Then, determine the 20<sup>th</sup> number in the list.

$n$	1	2	3	4
$t$	5	7	9	11

$$t = 2n + 3$$

the 20<sup>th</sup> number is 43

2. Find the relationships between  $n$  and  $t$ . Then, determine the 50<sup>th</sup> number in the list.

$n$	1	2	3	4
$t$	-5	-3	-1	1

$$t = 2x - 7$$

the 50<sup>th</sup> number is 93

3. a) How many sides are in the 12<sup>th</sup> figure?



$n$	sides
1	3
2	5
3	7

$$s = 2n + 1$$

b) Which figure will have 43 sides?

$$43 = 2n + 1$$

$$2n = 42$$

$n = 21$  the 21<sup>st</sup> figure

4. The cost of renting a car is \$60 plus 35 cents per kilometer travelled.

a) Write an equations relating cost  $C$  (\$) to the numbers of km travelled.

$$C = 60 + 0.35n$$

b) Find the cost for travelling 100 km.

$$C = 60 + 0.35 \times 100 = \$95.00$$

c) How many km can you travel for \$150?

$$150 = 60 + 0.35n$$

$$\begin{array}{r} 150 \\ -60 \\ \hline 90 \end{array}$$

$$90 = 0.35n$$

$$n = 257.1 \text{ km}$$

$$\approx \boxed{257 \text{ km}}$$